Air Command Secretariat
Spitfire Block
Headquarters Air Command
Royal Air Force
High Wycombe
Buckinghamshire
HP14 4UE

Ref: 2017/02164

[redacted]

21 February 2017

Dear [redacted],

Thank you for your email of 9 February 2017 requesting the following information:

> *'I would like to formally request information from my initial trade training. I'm undertaking an HNC/D in Aerospace Mechanical Engineering with Yeovil college and I need evidence of my trade training from Cosford so it can be used to accredit prior learning. I came through Cosford on my trade training in March 2002 – June 2003 as a propulsion technician. Ideally I would like to be able to get hold of both the syllabus and training notes.'*

I am treating your correspondence as a request for information under the Freedom of Information Act 2000.

A search for the information requested has now been completed within the Ministry of Defence (MOD), and I can confirm that some information in scope of your request is held. The CN1203 Syllabus and Instructional Specifications you have requested can be found attached at Annex A.

Please note that when published, this information is protected by Crown Copyright and there is no automatic right of re-use. You are free to use it for your own personal, private purposes outlined as exceptions to infringement under the Copyright, Designs and Patents Act. Any other form of re-use requires permission in the form of a licence from the MOD, and any request for re-use of the source information must be made to the MOD's Directorate of Intellectual Property Rights (DIPR). Such a request should be made by emailing DIPR-CC@mod.uk.

The CN1203 training notes you have requested are information not held.

Under section 16 of the Act (Advice and Assistance), you may find it helpful to know, the training notes for the course are no longer available. CN1203 ceased to be delivered in 2005 and at that time, course training notes were not archived by the organisation which created these documents.

If you are not satisfied with this response or wish to complain about any aspect of the handling of your request, then you should contact me in the first instance. If informal resolution is not possible and you are still dissatisfied then you may apply for an independent internal review by contacting the Information Rights Compliance Team, Ground Floor, MOD Main Building, Whitehall, SW1A 2HB (e-mail CIO-FOI-IR@mod.uk). Please note that any request for an internal review must be made within 40 working days of the date on which the attempt to reach informal resolution has come to an end.

If you remain dissatisfied following an internal review, you may take your complaint to the Information Commissioner under the provisions of Section 50 of the Freedom of Information Act. Please note that the Information Commissioner will not investigate your case until the MOD internal review process has been completed. Further details of the role and powers of the Information Commissioner can be found on the Commissioner's website, http://www.ico.org.uk.

Yours sincerely,

[Original Signed]

Air Director Resources Secretariat 2b1

PART I

INTRODUCTION

1. Aim of the Course. The aim of the course, in conjunction with training courses CN1208 and CN1209, is to train airmen to Leading Aircraftman standard in the trade of Propulsion Technician as specified in the AP 3376 series, and to develop the skills, knowledge and attitudes to enable them to be effective members of the RAF.

2. Summary of Training Requirement.

   a. As directed by AP3376 series, the tradesmen will satisfactorily complete the TOs identified in part III of this document.

   b. Training Strategy. This course will be attended as the core phase of basic trade training.

   c. Assessment. Student performance is continually assessed by:

      (1) Observation of practical tasks.
      (2) Classroom questioning.
      (3) Obtaining a satisfactory result in final examinations.
      (4) Satisfying assessment criteria required by external bodies.

3. Eligibility. Entry to the training course is by selection through recruitment in accordance with current regulations and in conjunction with the respective basic trade training course.

4. Duration of the Course. The duration of the course is 33.8 weeks, divided as follows:

   a. Effective training time Parts III and IV: 1337 hours.

   b. Non-effective training time Part V: 15 hours.

PART I

5. Security Grading. The contents of this course are up to and including RESTRICTED, the syllabus is FOR OFFICIAL USE ONLY.

6. Sponsor. The course sponsor is HQLC Logs Pers Pol 1.

7. Course Size.

   a. Maximum number: 16.

   b. Minimum number: 14.

8. Syllabus Review Date. This syllabus is to be reviewed annually by the training school staff commencing one year after the issue date.

9. Abbreviations

C	Classroom	FAFA	First Aid Fire Appliance
P	Practical	GSE	Ground Support Equipment
T	Total	AP	Air Publication
MCOQ	Multiple Choice Objective Questions	FOD	Foreign Object Damage
JPS	Job Performance Statement	SI	System International
HSW	Health and Safety at Work Act (1974)	AAES	Aircraft Assisted Escape System
IT	Information Technology	DL	Distance Learning
NVQ	National Vocational Qualification		

In Part III it is inferred that each training objective is prefaced with the phrase "The student must be able to...". Reference should be made to AP3376 Vol 3 Part 2 1st Edition Dec 98 for detailed description of relevant JPS. The JPS prefixed C refers to section 1 leaflet 3 and the JPS prefixed P refers to section 3 leaflet 3.

PART I

10. Trade Testing. The system of trade testing will be by the achievement of a satisfactory standard in:

    a. All specified training objectives.

    b. Practical exercises in each training section.

11. Instructional Specification (IS). The syllabus is not intended to be used by supervising and instructional staff as the basis for preparation of lesson notes. Staff should refer to the IS which contains a complete list of objectives. However, it would be useful for trade instructors to be familiar with Part III to give them an overview of the course and how their subject fits into it.

12. Conditions and Standards. The conditions under which each TO is performed and the statement of standards indicating the level of performance to be achieved by the student is stated in the relevant IS.

13. Metrication. Throughout the course both imperial and metric systems are to be employed and practised for dimensions, working tolerances and units of weight, force, area and pressure. As a general rule, unless otherwise specified, the units to be used primarily are those in the relevant aircraft or equipment AP; where this is not clear, SI units are preferred. English, American and metric standards are to be covered for thread forms, bolt and spanner sizes and torque loading.

14. Planning Information.

    a. Aircraft Controls, Aircraft Systems and Second Line Maintenance phases must be allocated time in multiples of 4 periods, this is due to the remote location of the airfield.

    b. The number of cells for classroom lessons is 1 and the number of cells for practical lessons are as indicated.

PART I

15. Health and Safety at Work and Environmental Protection Act. The person under training is to understand and comply with the statutory requirements of the HSW and the Environmental Protection Act 1990 (EPA) relevant to the course of instruction and in the training environment. Specific trade related safety precautions and all statutory guidance concerning individual responsibilities for HSW and Control of Substances Hazardous to Health (COSHH) is included in the IS for the syllabus.

16. Quality Assurance (QA). Throughout the course the student will be working within a QA environment and will be expected to comply with all current regulations. In addition to the formal training on QA, this will help to reinforce the service ethos and commitment to quality systems.

PART IV

AIRMAN TRAINING

SECTION Z2 - INTRODUCTION TO TRAINING

TO No (a)	TRAINING OBJECTIVE (b)	REFERENCES/ REMARKS (c)	SYLLABUS HOURS Class (d)	Pract (e)	Total (f)	No of CELLS (g)	INSTR. HOURS (h)
1.1	a. Describe the organisation of No 1 S of TT, the chain of command down to training flight level and name his commanding officers.	Briefing by Trade Training Supervisor (TTS).	1.00	1.00	2.00	1	2.00
	b. Explain the purpose of and procedure involved in gaining a GEMS award.	Briefing by Trade Training Supervisor (TTS).					
	c. State the standards to which discipline, personal conduct and cleanliness of domestic accommodation are to be maintained.	Briefing by Disciplinary staff.					
	d. Identify the fire points, fire exits, toilet facilities, break facilities and relevant offices in the training squadron.	Tour of squadron buildings conducted by TTS.					
1.2	a. Explain the process required to satisfy the requirements of the National Standards in a Modern Apprenticeship.		3.00	0.00	3.00	1	3.00
	b. Explain the requirements of the Distance Learning process.		1.00	0.00	1.00	1	1.00
1.3	Participate in a tour of the areas where elements of trade training are taught.	The course mentor, who should emphasise the continuing development of the trade training, should ideally conduct the tour.	2.00	0.00	2.00	1	2.00
		TOTAL HOURS	7.00	1.00	8.00		8.00

PART IV

Z4 PHYSICAL EDUCATION

TO No (a)	TRAINING OBJECTIVE (b)	REFERENCES/ REMARKS (c)	SYLLABUS HOURS Class (d)	Pract (e)	Total (f)	No of CELLS (g)	INSTR. HOURS (h)
1.1	Maintain an adequate level of physical fitness.	IAW RAFSC PEd Syllabuses of Training CN1203 PEd Module. QRs 430-433 & ASI Vol 1 Inst 5.	0.00	206.00	206.00	1	206.00
		TOTAL HOURS	0.00	206.00	206.00		206.00

Attitudinal Goals:

The student should:

1. Develop a personal commitment to personal fitness.

2. Appreciate the need for physical fitness in the RAF.

3. Appreciate the need to lead a healthy life style.

4. Appreciate the continuing need to be involved in sport on the unit.

5. Appreciate the contribution of sport in developing team spirit, high morale and physical fitness.

6. Appreciate the contribution of adventure and expedition training in developing self-reliance, confidence and high morale.

PART IV

Z11: MILITARY FIELD TRAINING

TO No (a)	TRAINING OBJECTIVE (b)	REFERENCES/ REMARKS (c)	SYLLABUS HOURS Class (d)	Pract (e)	Total (f)	No of CELLS (g)	INSTR. HOURS (h)
1.1	Perform and apply military field training skills in the following areas: a. Skill at arms. b. Fieldcraft. c. Minor tactics. d. Map reading and navigation. e. Signals. f. NBC. g. Field engineering. h. Operational duties.	Pilkington Optronics User Handbook UH148. AC70947, AC71271, AC71272, AC71328, AC71340, AC71596, AP3242B Vol5, AP3242C, JSP398 Cards a & b, JSP440, PACE Act 1984.	0.00	16.00	16.00	2	32.00
		TOTAL HOURS	0.00	16.00	16.00		32.00

SECTION Z13 - COMMON CORE SKILLS TRAINING

TO No (a)	TRAINING OBJECTIVE (b)	REFERENCES/ REMARKS (c)	SYLLABUS HOURS Class (d)	Pract (e)	Total (f)	No of CELLS (g)	INSTR. HOURS (h)
1.1	Undertake the common core skills diagnostic test.	AP 3242B	16.00	0.00	16.00	1	16.00
		TOTAL HOURS	16.00	0.00	16.00		16.00

PART IV

Z14 – CORPORATE COMMUNICATION TRAINING BRIEF

TO No (a)	TRAINING OBJECTIVE (b)	REFERENCES/ REMARKS (c)	SYLLABUS HOURS Class (d)	Pract (e)	Total (f)	No of CELLS (g)	INSTR HOURS (h)
1.0	Undertake the Corporate Communication Training Brief.		2.00	0.00	2.00	1	2.00
		TOTAL HOURS	2.00	0.00	2.00		2.00

Z15: INTRODUCTION TO BTEC ACADEMIC TRAINING

TO No (a)	TRAINING OBJECTIVE (b)	REFERENCES/ REMARKS (c)	SYLLABUS HOURS Class (d)	Pract (e)	Total (f)	No of CELLS (g)	INSTR. HOURS (h)
1.1	a. State the procedure to be observed in the event of fire or emergency evacuation of Fulton Block. b. State the precautions to be observed whilst working in the principles laboratories	Briefing by suitable principles staff and or supervisor.	1.00	0.00	1.00	1	1.00
		TOTAL HOURS	1.00	0.00	1.00		1.00

Z16: BTEC ACADEMIC DEBRIEF

TO No (a)	TRAINING OBJECTIVE (b)	REFERENCES/ REMARKS (c)	SYLLABUS HOURS Class (d)	Pract (e)	Total (f)	No of CELLS (g)	INSTR. HOURS (h)
1.1	Participate in a debrief of the principles element of training.	By suitable principles staff and/or supervisor.	2.00	0.00	2.00	1	2.00
		TOTAL HOURS	2.00	0.00	2.00		2.00

PART IV

SECTION Z17 – NVQ LOGBOOK BRIEF

T.O. No. (a)	TRAINING OBJECTIVE (b)	REFERENCES/ REMARKS (c)	SYLLABUS HOURS Class (d)	Pract (e)	Total (f)	No of CELLS (g)	INSTR. HOURS (h)
1.1	Participate in a briefing on the NVQ assessment strategy and the use of the candidate logbooks.	Briefing to be carried out by a NVQ co-ordinator.	4.00	0.00	4.00	1	4.00
		TOTAL HOURS	4.00	0.00	4.00		4.00

Z18: DISTANCE LEARNING BRIEF

T.O. No. (a)	TRAINING OBJECTIVE (b)	REFERENCES/ REMARKS (c)	SYLLABUS HOURS Class (f)	Pract (g)	Total (h)	No of CELLS (i)	INSTR. HOURS (j)
1.1	Describe the concepts and requirements of Distance Learning, including the use of materials, assessment procedures and available support.	By DL staff.	2.00	0.00	2.00	1	2.00
1.2	Complete module 7 of the European Computer Driving License (ECDL).	Pass marks for the exam are to reflect the requirement of the ECDL i.e. 80% for module 7. Module to be administered as student centred learning.	4.00	0.00	4.00	1	4.00
		TOTAL HOURS	6.00	0.00	6.00		6.00

PART IV

Z22: MID-COURSE DISTANCE LEARNING BRIEF

TO No (a)	TRAINING OBJECTIVE (b)	REFERENCES/ REMARKS (c)	SYLLABUS HOURS Class (d)	Pract (e)	Total (f)	No of CELLS (g)	INSTR. HOURS (h)
1.1	Describe the concepts and requirements of Distance Learning, including the use of materials, assessment procedures and available support.	Delivered by DL staff.	2.00	0.00	2.00	1	2.00
		TOTAL HOURS	2.00	0.00	2.00		2.00

Z23/1: RESIDENTIAL BTEC UNIT 4 (MATHEMATICS FOR TECHNICIANS)

TO No (a)	TRAINING OBJECTIVE (b)	REFERENCES/ REMARKS (c)	SYLLABUS HOURS Class (d)	Pract (e)	Total (f)	No of CELLS (g)	INSTR. HOURS (h)
1.1	Introduce and use algebraic expressions and equations.		4.00	0.00	4.00	1	4.00
1.2	Use algebra to solve linear equations.		2.00	0.00	2.00	1	2.00
1.3	Solve algebraic equations using transposition of formula.		4.00	0.00	4.00	1	4.00
1.4	Solve triangle problems using pythagoras and basic trigonometrical ratios.		3.00	0.00	3.00	1	3.00
1.5	Solve algebraic equations using graphical methods.		2.00	0.00	2.00	1	2.00
1.6	Solve algebraic problems involving fractions.		1.00	0.00	1.00	1	1.00
1.7	Solve problems expressed algebraically using simultaneous and quadratic equations.		4.00	0.00	4.00	1	4.00
1.8	Solve problems involving direct and indirect proportion.		2.00	0.00	2.00	1	2.00

PART IV

TO No (a)	TRAINING OBJECTIVE (b)	REFERENCES/ REMARKS (c)	SYLLABUS HOURS			No of CELLS (g)	INSTR. HOURS (h)
			Class (d)	Pract (e)	Total (f)		
1.9	Evaluate problems relating to area, surface area and perimeters.		1.00	0.00	1.00	1	1.00
1.10	Evaluate problems relating to the volume of regular solids.		1.00	0.00	1.00	1	1.00
1.11	Use trigonometric techniques to solve simple problems involving properties of a circle including radians and oscillatory functions.		7.00	0.00	7.00	1	7.00
1.12	Solve mathematical calculations using indices and logarithms.		9.00	0.00	9.00	1	9.00
1.13	Use statistical methods to gather, manipulate and display scientific and engineering data.		6.00	0.00	6.00	1	6.00
1.14	Use elementary rules of calculus arithmetic to solve problems that involve differentiation and integration of simple algebraic and trigonometric functions.		10.00	0.00	10.00	1	10.00
1.15	Participate in end of phase examinations.		4.00	0.00	4.00	1	4.00
		TOTAL HOURS	60.00	0.00	60.00		60.00

Z23/2: RESIDENTIAL BTEC UNIT 3 (SCIENCE FOR TECHNICIANS)

TO No (a)	TRAINING OBJECTIVE (b)	REFERENCES/ REMARKS (c)	SYLLABUS HOURS			No of CELLS (g)	INSTR. HOURS (h)
			Class (d)	Pract (e)	Total (f)		
2.1	Obtain solution to simple balanced and unbalanced, static or dynamic mechanical systems.		7.00	4.00	11.00	1/3	19.00
2.2	Explain Hooke's Law and its application.		4.00	0.00	4.00	1	4.00
2.3	Apply Newton's Laws to simple linear and angular motion problems.		4.00	2.00	6.00	1/3	10.00

PART IV

TO No (a)	TRAINING OBJECTIVE (b)	REFERENCES/ REMARKS (c)	SYLLABUS HOURS Class (d)	Pract (e)	Total (f)	No of CELLS (g)	INSTR. HOURS (h)
2.4	Explain the basic electrical principles and related terminology.		4.00	0.00	4.00	1	4.00
2.5	Apply circuit theory to the solution of simple circuit problems.		6.00	4.00	10.00	1/3	18.00
2.6	Apply the fundamental laws governing magnetism and electromagnetism.		5.00	2.00	7.00	1/3	11.00
2.7	Apply the concepts of work, energy and power in the solution of simple engineering systems.		3.00	2.00	5.00	1/3	9.00
2.8	Use the "kinetic theory of heat" to explain heat transfer and change of state.		4.00	0.00	4.00	1	4.00
2.9	Explain the basic principles of closed-loop engineering systems.		4.00	0.00	4.00	1	4.00
2.10	Apply system principles to aircraft applications.		1.00	2.00	3.00	1/3	7.00
2.11	Obtain a satisfactory result in mechanical principles (statics, dynamics and energy) mid-phase examination.		2.00	0.00	2.00	1	2.00
2.12	Obtain a satisfactory result in electrical principles and closed loop engineering systems end-of-phase examination.		2.00	0.00	2.00	1	2.00
		TOTAL HOURS	46.00	16.00	62.00		94.00

Z23/3: RESIDENTIAL BTEC UNIT 7 (THEORY OF FLIGHT)

TO No (a)	TRAINING OBJECTIVE (b)	REFERENCES/ REMARKS (c)	SYLLABUS HOURS Class (d)	Pract (e)	Total (f)	No of CELLS (g)	INSTR. HOURS (h)
1.1	Describe the composition and characteristics of the atmosphere and its effects on aircraft design and performance.		2.00	0.00	2.00	1	2.00
1.2	Explain the conservation of energy and Bernoulli's Equation.		2.00	1.00	3.00	1/2	4.00

PART IV

TO No (a)	TRAINING OBJECTIVE (b)	REFERENCES/ REMARKS (c)	SYLLABUS HOURS			No of CELLS (g)	INSTR. HOURS (h)
			Class (d)	Pract (e)	Total (f)		
1.3	Explain the main features of an aerofoil section and how the aerofoil section produces lift and drag.		7.00	1.00	8.00	1/2	9.00
1.4	Explain the lift and drag equations and carry out simple calculations of these forces on an aerofoil.		4.00	0.00	4.00	1	4.00
1.5	Explain the four main forces acting on an aircraft in flight including climbing, dive and turning flight.		6.00	0.00	6.00	1	6.00
2.1	Explain the controls required to carry out simple aircraft manoeuvres in flight.		3.00	1.00	4.00	1/2	5.00
3.1	Explain how boundary layer affects the airflow over a surface.		4.00	0.00	4.00	1	4.00
3.2	Explain the need for lift augmentation and the methods and devices used to achieve it.		4.00	0.00	4.00	1	4.00
3.3	Explain the problems encountered when flying at speeds approaching and exceeding the speed of sound and the design features used to alleviate those problems.		4.00	1.00	5.00	1/2	6.00
4.1	Explain the meaning of and describe the methods used to achieve stability of a fixed wing aircraft in flight.		7.00	1.00	8.00	1/2	9.00
5.1	Complete assignments based on the theory of flight.		4.00	4.00	8.00	3/3	24.00
5.2	Complete an assessment programme on the Theory of Flight module.		4.00	0.00	4.00	1	4.00
		TOTAL HOURS	51.00	9.00	60.00		81.00

PART IV

SECTION – Z25 BTEC FINAL EXAM DEBRIEF AND ADMINISTRATION

TO No (a)	TRAINING OBJECTIVE (b)	REFERENCES/ REMARKS (c)	SYLLABUS HOURS Class (d)	Pract (e)	Total (f)	No of CELLS (g)	INSTR. HOURS (h)
1.1	Complete a BTEC final exam debrief and all associated administration procedures		8.00	0.00	8.00	1	8.00
		TOTAL HOURS	8.00	0.00	8.00		8.00
		TOTAL HOURS–Part IV	207.00	248.00	455.00		524.00

PART III

SUMMARY OF COURSE CONTENT – TRADE TRAINING

SECTION C1: INTRODUCTION TO MAINTENANCE WORKING PRACTICES

TO No (a)	TRAINING OBJECTIVE (b)	REFERENCES/ REMARKS (c)	SYLLABUS HOURS			No of CELLS (g)	INSTR. HOURS (h)
			Class (d)	Pract (e)	Total (f)		
1.1	Complete phase arrival procedures and state the general safety precautions necessary in a maintenance workshop environment.		1.00	0.00	1.00	1	1.00
1.2	a. State the responsibilities within the chain of command under the HSW Act 1974 and the EP Act 1990 regulations. b. Explain the HSW and EP implications of operating or handling the equipment or substances relevant to their Trade/Branch and course of instruction.	GAI 2116. JSP 375. GAI 2125. JSP 418.	2.00	0.00	2.00	1	2.00
1.3	State the general safety precautions to ensure the safety of personnel from risks associated with falls and falling objects.		1.00	0.00	1.00	1	1.00
1.4	State the purpose of and operate effectively within a Quality Management System.		2.00	0.00	2.00	1	2.00
1.5	Complete module 1 of the European Computer Driving Licence (ECDL).	Pass marks for the test are to reflect the requirement of the ECDL CDROM i.e. 60% for module 1. Module to be administered as student centred learning.	4.00	0.00	4.00	1	4.00
1.6	Complete module 2 of the European Computer Driving Licence (ECDL).	Pass marks for the test are to reflect the requirement of the ECDL CDROM i.e. 80% for module 2. Module to be administered as student centred learning.	4.00	0.00	4.00	1	4.00
1.7	State the precautions to be taken to reduce fire risk and the procedure to be taken in the event of a fire.		1.00	0.00	1.00	1	1.00
1.8	Explain the dangers involved when working in a radiation hazardous area and the safety precautions.		1.00	0.00	1.00	1	1.00

PART III

TO No (a)	TRAINING OBJECTIVE (b)	REFERENCES/ REMARKS (c)	SYLLABUS HOURS			No of CELLS (g)	INSTR. HOURS (h)
			Class (d)	Pract (e)	Total (f)		
1.9	Describe the basic features and roles of RAF aircraft and the trades involved in their maintenance.		2.00	0.00	2.00	1	2.00
1.10	Complete a practical Health and Safety assignment.	Applicable to Prop & Wpns only - BTEC Unit.	0.00	2.00	2.00	4	8.00
1.11	State the hazards, and safety precautions required, in an aircraft hangar and airfield environment.		2.00	0.00	2.00	1	2.00
1.12	Explain how human factors can effect the performance of personnel in an aircraft maintenance environment and affect Flight Safety.		4.00	0.00	4.00	1	4.00
1.13	Describe the methods of reporting Human Factors related incidents.		2.00	0.00	2.00	1	2.00
1.14	Explain the purpose of flight safety.		1.50	0.00	1.50	1	1.50
1.15	Explain the effects of foreign object damage on aircraft and the methods used to prevent FOD.		1.00	0.00	1.00	1	1.00
		TOTAL HOURS	28.50	2.00	30.50		36.50

.

PART III

SECTION C2a: AIRCRAFT TRADES FOUNDATION MODULE

TO No (a)	TRAINING OBJECTIVE (b)	REFERENCES/ REMARKS (c)	SYLLABUS HOURS			No of CELLS (g)	INSTR. HOURS (h)
			Class (d)	Pract (e)	Total (f)		
2a.1	Complete a numeric skills diagnostic test.		2.00	0.00	2.00	1	2.00
2a.2.	Explain that learning is work and describe the benefits of learning.		2.00	0.00	2.00	1	2.00
2a.3	Describe different learning styles.		1.00	0.00	1.00	1	1.00
2a.4	Identify factors that can effect the ability to learn.		1.00	0.00	1.00	1	1.00
2a.5	Discuss the techniques used in revision.		1.00	0.00	1.00	1	1.00
2a.6	Solve basic arithmetic calculations using whole numbers.		3.00	0.00	3.00	1	3.00
2a.7	Solve basic arithmetic calculations using fractions.		4.00	0.00	4.00	1	4.00
2a.8	Solve basic arithmetic calculations using decimals.		2.00	0.00	2.00	1	2.00
2a.9	Solve arithmetic problems that include both decimals and fractions.		2.00	0.00	2.00	1	2.00
2a.10	Define the terms and solve simple problems involving percentages and ratios.		2.00	0.00	2.00	1	2.00
2a.11	Work with squared and cubed numbers and define the terms square root and cube root.		3.00	0.00	3.00	1	3.00
2a.12	Calculate the value of a quantity by using an appropriate formula.		5.00	0.00	5.00	1	5.00
2a.13	Evaluate area and volume of given shapes.		2.00	0.00	2.00	1	2.00
2a.14	Draw graphs from given data and obtain values by interpolation.		2.00	0.00	2.00	1	2.00
2a.15	Define a given range of quantities used in aircraft engineering, state the SI unit used in their measurement and state Imperial or Metric units where applicable.		2.00	0.00	2.00	1	2.00
2a.16	Describe the nature of voltage, current and resistance and state their relationship in simple DC electrical circuits.		2.00	0.00	2.00	1	2.00

PART III

SECTION C2a: AIRCRAFT TRADES FOUNDATION MODULE

TO No (a)	TRAINING OBJECTIVE (b)	REFERENCES/ REMARKS (c)	SYLLABUS HOURS Class (d)	Pract (e)	Total (f)	No of CELLS (g)	INSTR. HOURS (h)
2a.17	Describe the relationship between mass, density and volume, performing simple calculations.		2.00	0.00	2.00	1	2.00
2a.18	Describe in general terms the meaning of forces, equilibrium and the effects of out of balance forces.		4.00	0.00	4.00	1	4.00
2a.19	Describe the forces acting on an aircraft in flight.		2.00	0.00	2.00	1	2.00
2a.20	Describe the basic construction of a gas turbine engine and the services provided.		1.00	0.00	1.00	1	1.00
2a.21	Complete an end of phase examination.		2.00	0.00	2.00	1	2.00
2a.22	Participate in an end of phase debrief.		1.00	0.00	1.00	1	1.00
		TOTAL HOURS	48.00	0.00	48.00		48.00

PART III

SECTION C3: STATION VISIT

TO No (a)	TRAINING OBJECTIVE (b)	REFERENCES/ REMARKS (c)	SYLLABUS HOURS			No of CELLS (g)	INSTR HOURS (h)
			Class (d)	Pract (e)	Total (f)		
3.1	Recognise the various working environments on a flying station appropriate to his/her trade.		0.00	5.00	5.00	2	10.00
3.2	Recognise factors that have the potential to affect human performance in various operational maintenance environments.		0.00	5.00	5.00	2	10.00
3.3	Demonstrate an understanding of the culture and ethos of trained RAF personnel in an operational environment.		0.00	4.00	4.00	2	8.00
3.4	Consolidate the information gained during the station visit.		2.00	0.00	2.00	2	4.00
		TOTAL HOURS	2.00	14.00	16.00		32.00

(INTENTIONALLY BLANK)

PART III

SECTION P20: INTRODUCTION TO MAINTENANCE

TO No (a)	TRAINING OBJECTIVE (b)	REFERENCES/ REMARKS (c)	SYLLABUS HOURS			No of CELLS (g)	INSTR. HOURS (h)
			Class (d)	Pract (e)	Total (f)		
20.1	Complete phase arrival procedures and participate in a phase specific Health and Safety brief.		1.00	0.00	1.00	1	1.00
20.2	Describe the aircraft maintenance organisation within the RAF and the need for recording.		1.00	0.00	1.00	1	1.00
20.3	TO deleted.		0.00	0.00	0.00		0.00
20.4	TO deleted.		0.00	0.00	0.00		0.00
20.5	TO deleted.		0.00	0.00	0.00		0.00
20.6	TO deleted.		0.00	0.00	0.00		0.00
20.7	Explain the role of typical engineering support facilities.		1.00	0.00	1.00	1	1.00
20.8	Explain the need for Non-Destructive Testing (NDT) and describe the different types available.		2.00	0.00	2.00	1	2.00
20.9	TO deleted.		0.00	0.00	0.00		0.00
20.10	Operate selected GSE.		4.00	4.00	8.00	1/2	12.00
20.11	Operate inspection lamps, torches and floodlights.		1.00	1.00	2.00	1/2	3.00
20.12	Operate aircraft screw or hydraulic jacks to lift a load.		1.00	2.00	3.00	1/2	5.00
20.13	Recognise, assemble and position aircraft trestles to support light aircraft/aircraft structure during maintenance.		1.00	2.00	3.00	1/3	7.00
20.14	Recognise and describe the use of Hi-way staging.		1.00	1.00	2.00	1/4	5.00
20.15	TO deleted.		0.00	0.00	0.00		0.00
20.16	TO deleted.		0.00	0.00	0.00		0.00

PART III

SECTION P20: INTRODUCTION TO MAINTENANCE

TO No (a)	TRAINING OBJECTIVE (b)	REFERENCES/ REMARKS (c)	SYLLABUS HOURS Class (d)	Pract (e)	Total (f)	No of CELLS (g)	INSTR. HOURS (h)
20.17	TO deleted.		0.00	0.00	0.00		0.00
20.18	Explain the principles relating to aircraft zonal surveys.		2.00	0.00	2.00	1	2.00
20.19	Obtain a pass mark in an examination.		2.00	0.00	2.00	1	2.00
20.20	Participate in a debrief of P20.		2.00	0.00	2.00	1	2.00
		TOTAL HOURS	19.00	10.00	29.00		43.00

PART III

SECTION C4: AIRCRAFT ENGINEERING DOCUMENTATION

TO No (a)	TRAINING OBJECTIVE (b)	REFERENCES/ REMARKS (c)	SYLLABUS HOURS			No of CELLS (g)	INSTR. HOURS (h)
			Class (d)	Pract (e)	Total (f)		
4.1	Demonstrate an awareness of the content of the MOD F700C.		1.50	0.00	1.50	1	1.50
4.2	Carry out the actions necessary to place an aircraft unserviceable.		1.50	1.00	2.50	1/2	3.50
4.3	Use MOD F700 series documentation to accurately record work undertaken during an aircraft maintenance task.		5.00	5.00	10.00	1/2	15.00
4.4	Complete the relevant fields of the MOD F731 to condition an item of technical equipment 'Repairable 2nd Line (R2)'.		1.00	1.00	2.00	1/2	3.00
4.5	Record details of scheduled aircraft maintenance tasks and maintenance procedures on the MOD F707MC, F707MP, F707MS or F2988 series work cards.		3.00	2.00	5.00	1/4	11.00
4.6	Explain the independent check regulations appropriate to his trade.		1.00	0.00	1.00	1	1.00
4.7	Obtain a pass mark in an exam covering C4 and C6.		2.00	0.00	2.00	1	2.00
		TOTAL HOURS	15.00	9.00	24.00		37.00

(INTENTIONALLY BLANK)

PART III

SECTION C6: AIRCRAFT PUBLICATIONS AND TECHNICAL INSTRUCTIONS

TO No (a)	TRAINING OBJECTIVE (b)	REFERENCES/ REMARKS (c)	SYLLABUS HOURS			No of CELLS (g)	INSTR. HOURS (h)
			Class (d)	Pract (e)	Total (f)		
6.1	Interpret terminology as found in the Glossary of Terms in the Aircraft Safety and Maintenance Notes.		2.00	0.00	2.00	1	2.00
6.2	Extract information from engineering Air Publications (APs) for tasks appropriate to his trade.		3.00	3.00	6.00	1/2	9.00
6.3	Explain the function of a supply organisation and identify an item of equipment.		3.00	3.00	6.00	1/2	9.00
6.4	Recognise and state the purpose of Special Technical Instructions (STIs), Servicing Instructions (SIs), Urgent Technical Instructions (UTIs), Routine Technical Instructions (RTIs), Modifications (Mods) and Special Trial Fits (STFs).		2.00	0.00	2.00	1	2.00
		TOTAL HOURS	10.00	6.00	16.00		22.00

(INTENTIONALLY BLANK)

PART III

SECTION C5: LOGISTICS INFORMATION TECHNOLOGY STRATEGY (LITS)

TO No (a)	TRAINING OBJECTIVE (b)	REFERENCES/ REMARKS (c)	SYLLABUS HOURS Class (d)	Pract (e)	Total (f)	No of CELLS (g)	INSTR. HOURS (h)
5.1	State the purpose of LITS and explain the structure of the processes and securities involved in its operation.		2.00	0.00	2.00	1	2.00
5.2	Raise MOD F707B and MOD F731 using LITS processes and update LITS system on completion of task.		4.00	0.00	4.00	2	8.00
		TOTAL HOURS	6.00	0.00	6.00		10.00

(INTENTIONALLY BLANK)

PART III

SECTION C21a: ENGINEERING SKILLS

TO No (a)	TRAINING OBJECTIVE (b)	REFERENCES/ REMARKS (c)	SYLLABUS HOURS Class (d)	Pract (e)	Total (f)	No of CELLS (g)	INSTR. HOURS (h)
21.1	Complete phase arrival procedures and partake in a phase specific Health and Safety brief.		1.00	0.00	1.00	1	1.00
21.1.a	Identify the tools in a composite tool kit and state the methods used to control tools in an aircraft maintenance environment.		1.00	0.00	1.00	1	1.00
21.1.b	Participate in a Flight Safety / Human Factors based discussion highlighting the possible effects of: a. Distractions b. Fatigue	This TO should ideally be delivered immediately after the phase arrival brief.	2.00	0.00	2.00	1	2.00
21.2	Interpret information contained in approved engineering drawings.		5.00	0.00	5.00	1	5.00
21.3	Interpret the limit systems used in the maintenance of engineering components.		2.00	0.00	2.00	1	2.00
21.4	State the effects and causes of corrosion.		4.00	0.00	4.00	1	4.00
21.5	Examine methods of protection for material used in aircraft structures.		3.00	1.00	4.00	1	4.00
21.6	Explain the methods of preventing corrosion in aircraft.		3.00	1.00	4.00	1	4.00
21.7	Carry out the procedures for detecting and neutralising corrosive fluids.		2.00	2.00	4.00	1/2	6.00
21.8	State the nature of and identify common forms of aircraft corrosion.		2.00	0.00	2.00	1	2.00
21.9	TO deleted.		0.00	0.00	0.00		0.00
21.10	Examine materials for corrosion.		1.00	1.00	2.00	1/2	3.00
21.11	Carry out the removal of corrosion using mechanical methods.		3.00	2.00	5.00	1/2	7.00
21.12	Identify and describe the characteristics of metals and alloys and explain the effect of heat treatment on metal specifications.		3.00	0.00	3.00	1	3.00
21.12a	Explain the properties of engineering materials and the forces to which they may be subjected.		6.00	0.00	6.00	1	6.00
21.13	State the characteristics, composition, and uses for fibre reinforced plastic (FRP) materials in aircraft components and structure.		2.00	0.00	2.00	1	2.00

PART III

SECTION C21a: ENGINEERING SKILLS

TO No (a)	TRAINING OBJECTIVE (b)	REFERENCES/ REMARKS (c)	SYLLABUS HOURS Class (d)	Pract (e)	Total (f)	No of CELLS (g)	INSTR. HOURS (h)
21.14	Measure, mark, cut and shape alloy bar to broad tolerances to within ± 0.4mm (1/64") (0.016") of stated measurements and ± 1deg of stated angles.		6.00	12.00	18.00	1/2	30.00
21.15	Apply identification markings to metals.		0.50	0.50	1.00	1/2	1.50
21.16	Check round work for distortion.		1.00	1.00	2.00	1/2	3.00
21.17	Identify selected screw thread systems.		2.00	0.00	2.00	1	2.00
21.18	Identify and use metric and imperial precision measuring instruments.		8.00	4.00	12.00	1/4	24.00
21.19	Select and use non-adjustable gauges.		1.00	1.00	2.00	1/2	3.00
21.20	Drill and countersink holes using a hand-brace, a vertical floor mounted electrical drilling machine and the universal countersink tool.		2.00	5.00	7.00	1/2	12.00
21.21	Identify, state the purpose of, and carry out the assembly and dismantling of aircraft threaded fasteners using the correct tools.		4.00	3.00	7.00	1/2	10.00
21.21a	Identify, operate and check the locked position of selected Quick Release Fasteners (QRF).		1.00	2.00	3.00	1/2	5.00
21.22	Select and use locking devices.		2.00	2.00	4.00	1/2	6.00
21.23	Carry out wire locking tasks.		1.00	6.00	7.00	1/2	13.00
21.24	Lock nut and bolt assemblies by peening.		0.50	0.50	1.00	1/2	1.50
21.25	Describe the use of typical adhesives, glazing and sealing compounds and state the hazards associated with their use.		2.00	0.00	2.00	1	2.00
21.26	Not applicable to Propulsion Trade.		0.00	0.00	0.00		0.00
21.27	Not applicable to Propulsion Trade.		0.00	0.00	0.00		0.00
21.28	Repair internal and external screw threads.		2.00	2.00	4.00	1/2	6.00
21.29	Select, set and use torque tools.		2.00	3.00	5.00	1/2	8.00
21.30	Remove broken or damaged studs.		0.50	1.50	2.00	1/2	3.50

PART III

SECTION C21a: ENGINEERING SKILLS

TO No (a)	TRAINING OBJECTIVE (b)	REFERENCES/ REMARKS (c)	SYLLABUS HOURS Class (d)	Pract (e)	Total (f)	No of CELLS (g)	INSTR. HOURS (h)
21.31	Fit and remove wire thread inserts.		2.00	2.00	4.00	1/2	6.00
21.32	Not applicable to Propulsion Trade.		0.00	0.00	0.00		0.00
21.32a	Not applicable to Propulsion Trade.		0.00	0.00	0.00		0.00
21.33	Not applicable to Propulsion Trade.		0.00	0.00	0.00		0.00
21.34	Not applicable to Propulsion Trade.		0.00	0.00	0.00		0.00
21.35	Not applicable to Propulsion Trade.		0.00	0.00	0.00		0.00
21.36	Not applicable to Propulsion Trade.		0.00	0.00	0.00		0.00
21.37	Obtain a pass mark in an exam.	Exam code ES600.	2.00	0.00	2.00	1	2.00
21.38	Demonstrate skills and knowledge gained in C21a by carrying out a practical task.	Exam code ES601.	0.00	20.00	20.00	4	80.00
21.39	Carry out a debrief on phase content and assessment.		2.00	0.00	2.00	1	2.00
		TOTAL HOURS	81.50	72.50	154.00		272.50

SECTION C21a ANNEX A - AIRCRAFT WORKSHOP PRINCIPLES AND PRACTICE (BTEC UNIT 6)

TO No (a)	TRAINING OBJECTIVE (b)	REFERENCES/ REMARKS (c)	SYLLABUS HOURS Class (d)	Pract (e)	Total (f)	No of CELLS (g)	INSTR. HOURS (h)
21A.1	Demonstrate a knowledge of a variety of Non destructive Examination (NDE) techniques.	BTEC Unit 6 Merit Grade. By assignment.	0.00	0.00	0.00	0	0.00
		TOTAL HOURS	0.00	0.00	0.00		0.00

(INTENTIONALLY BLANK)

PART III

SECTION C22: TRADE ELECTRICS

TO No (a)	TRAINING OBJECTIVE (b)	REFERENCES/ REMARKS (c)	SYLLABUS HOURS			No of CELLS (g)	INSTR. HOURS (h)
			Class (d)	Pract (e)	Total (f)		
22.1	Complete phase arrival procedures and participate in a phase specific Health and Safety brief.		2.00	0.00	2.00	1	2.00
22.2	State the need for and the purpose of electrical systems fitted to aircraft.		1.00	0.00	1.00	1	1.00
22.3	Identify and describe the basic functions of the major components of an aircraft power supply system.		3.00	0.00	3.00	1	3.00
22.4	Interpret basic aircraft wiring diagrams and symbols.		2.00	1.00	3.00	1	3.00
22.5	Recognise and state the purpose of aircraft batteries and the safety precautions to be observed when handling them.		1.00	0.00	1.00	1	1.00
22.6	State the purpose of earthing and bonding of aircraft and their components.		1.00	0.00	1.00	1	1.00
22.7	Identify and describe the operation of selected fuses and circuit breakers.		2.00	0.00	2.00	1	2.00
22.8	Recognise, state the purpose of, and explain the basic operation of selected aircraft switches, indicators and lamps.		3.00	0.00	3.00	1	3.00
22.9	Identify and state the purpose and basic operation of micro-switches and proximity switches, and the trade responsibilities for their fitting and adjustment.		1.00	0.00	1.00	1	1.00
22.10	Describe the uses and basic operation of linear and rotary actuators used in aircraft systems.		2.00	0.00	2.00	1	2.00
22.11	Recognise and state the basic operation of an aircraft centralised warning system.		1.00	0.00	1.00	1	1.00
22.12	Connect and disconnect aircraft electrical connectors.		1.00	1.00	2.00	1/4	5.00
22.13	Explain the need for the correct husbandry of all aircraft wiring including fibre-optic cable, and state how this is achieved.		2.00	0.00	2.00	1	2.00

PART III

SECTION C22: TRADE ELECTRICS

TO No (a)	TRAINING OBJECTIVE (b)	REFERENCES/ REMARKS (c)	SYLLABUS HOURS			No of CELLS (g)	INSTR. HOURS (h)
			Class (d)	Pract (e)	Total (f)		
22.14	Apply external electrical power to an aircraft, observing all relevant safety precautions.		1.00	4.00	5.00	1/4	17.00
22.15	Describe the uses and basic operation of electrical solenoids and relays in aircraft systems.		1.00	0.00	1.00	1	1.00
22.16	Recognise the components and describe the operation of a basic engine high-energy ignition system.		1.00	1.00	2.00	1	2.00
22.17	Recognise and state the function of aircraft instrumentation.		2.00	0.00	2.00	1	2.00
22.18	Recognise and state the function of selected transducers used in aircraft control and instrumentation systems.		1.00	0.00	1.00	1	1.00
22.19	Describe the basic operation of a direct and remote gauging and indication system.		4.00	0.00	4.00	1	4.00
22.20	Explain the purpose, recognise the components and describe the basic operation of aircraft pitot-static systems.		2.00	1.00	3.00	1/4	6.00
22.21	Not applicable to Propulsion Trade.		0.00	0.00	0.00		0.00
22.22	Not applicable to Propulsion Trade.		0.00	0.00	0.00		0.00
22.23	Use a digital multimeter to carry out voltage and resistance measurements.		2.00	4.00	6.00	1/4	18.00
22.24	Explain the basic operation of a digital transmission system.		1.00	0.00	1.00	1	1.00
22.25	Explain the basic operation of a Mil Std 1553 based data transmission system.		1.00	0.00	1.00	1	1.00
22.26	Obtain a pass mark in an examination.		2.00	0.00	2.00	1	2.00
22.27	Carry out a debrief on phase content and assessment.		2.00	0.00	2.00	1	2.00
		C22 TOTAL HOURS	42.00	12.00	54.00		84.00

PART III

SECTION C22 ANNEX A - ELECTRICAL AND ELECTRONIC SYSTEMS - MECHANICAL (BTEC UNIT 16)

TO No (a)	TRAINING OBJECTIVE (b)	REFERENCES/ REMARKS (c)	SYLLABUS HOURS Class (d)	Pract (e)	Total (f)	No of CELLS (g)	INSTR. HOURS (h)
22.A.1	Demonstrate an understanding of the underpinning electrical theory associated with simple a.c. theory.	BTEC Unit 16 Outcome 1.	2.00	1.00	3.00	1/3	5.00
22.A.2	Demonstrate an understanding of the underpinning theory relating to inductance and inductors.	BTEC Unit 16 Outcome 1.	6.00	0.00	6.00	1	6.00
22.A.3	Explain the behaviour and applications of capacitors.	BTEC Unit 16 Outcome 1.	1.00	1.00	2.00	1/3	4.00
22.A.4	Demonstrate an understanding of series LCR circuits.	BTEC Unit 16 Outcome 1.	5.00	4.00	9.00	1/3	17.00
22.A.5	Demonstrate an understanding of a practical parallel LCR circuit.	BTEC Unit 16 Outcome 1.	1.00	0.00	1.00	1	1.00
22.A.6	Demonstrate an understanding of electronic logic representation.	BTEC Unit 16 Outcome 4.	6.00	4.00	10.00	1/3	18.00
22.A.7	Identify basic electronic hardware.	BTEC Unit 16 Outcome 4.	3.00	0.00	3.00	1	3.00
22.A.8	Obtain a pass mark in an examination covering C22 Annex A.	BTEC Unit 16 Outcomes 1 and 4.	2.00	0.00	2.00	1	2.00
		C22 ANNEX A TOTAL HOURS	26.00	10.00	36.00		56.00

(INTENTIONALLY BLANK)

PART III

SECTION P23: AIRCRAFT CONTROLS

TO No (a)	TRAINING OBJECTIVE (b)	REFERENCES/ REMARKS (c)	SYLLABUS HOURS Class (d)	Pract (e)	Total (f)	No of CELLS (g)	INSTR. HOURS (h)
23.1	Complete phase arrival procedures and participate in a phase specific Health and Safety brief.		1.00	0.00	1.00	1	1.00
23.2	State the purpose and construction of aircraft remote control systems.		4.00	0.00	4.00	1	4.00
23.3	State the purpose of documentation used during control system maintenance, the purpose of independent control system inspections and tests and the methods of recording them.		4.00	0.00	4.00	1	4.00
23.4	State the purpose and describe the construction of fork-ends, shackle pins and turnbuckles in a remote control system.		2.00	0.00	2.00	1	2.00
23.5	a. Describe the construction and explain the principles of operation of a Teleflex control system. b. Describe the general maintenance requirements for Teleflex control systems.		4.00	0.00	4.00	1	4.00
23.6	TO deleted.		0.00	0.00	0.00		0.00
23.7	a. Describe the construction and explain the principles of operation of a push rod and lever control system. b. Describe the general maintenance requirements for push rod and lever control systems.		2.00	0.00	2.00	1	2.00
23.8	State the purpose and explain the principles of operation of Electrical and Electronic Remote Control Systems.		3.00	0.00	3.00	1	3.00
23.9	a. Describe the construction and explain the principles of operation of a wire cable control system. b. Describe the general maintenance requirements for wire cable control systems.		2.00	0.00	2.00	1	2.00
23.10	Carry out maintenance on the following control systems: a. Teleflex. b. Push rod and lever. c. Wire cable.		0.00	16.00	16.00	4	64.00
		TOTAL HOURS	22.00	16.00	38.00		86.00

(INTENTIONALLY BLANK)

PART III

SECTION P27: AIRCRAFT SYSTEMS

TO No (a)	TRAINING OBJECTIVE (b)	REFERENCES/ REMARKS (c)	SYLLABUS HOURS			No of CELLS (g)	INSTR. HOURS (h)
			Class (d)	Pract (e)	Total (f)		
27.1	State the purpose of an aircraft fuel system and describe the methods of fuel storage.		6.00	0.00	6.00	1	6.00
27.1a	Participate in a Flight Safety / Human Factors based discussion highlighting the possible effects of: a. Lack of knowledge. b. Lack of awareness.	This TO should ideally be delivered immediately after phase arrival.	2.00	0.00	2.00	1	2.00
27.2	Describe the basic operation and construction of an aircraft fuel supply and transfer system.		4.00	0.00	4.00	1	4.00
27.3	Describe the basic operation and construction of an aircraft refuel/defuel system.		6.00	0.00	6.00	1	6.00
27.4	Describe the basic operation and construction of an aircraft fuel pressurisation and venting system.		4.00	0.00	4.00	1	4.00
27.5	Describe the basic operation and construction of an aircraft fuel contents gauging system.		2.00	0.00	2.00	1	2.00
27.6	Describe the methods and indications used in an aircraft fuel management system.		2.00	0.00	2.00	1	2.00
27.7	State the purpose of flight refuelling and identify the associated equipment and components.		2.00	0.00	2.00	1	2.00
27.8	TO deleted.		0.00	0.00	0.00	-	0.00
27.9	Describe the construction of common types of pipeline and connector/coupling.		4.00	0.00	4.00	1	4.00
27.10	Identify, remove and refit V-band clamps.		2.00	1.00	3.00	1	3.00
27.11	Carry out fault rectification on an aircraft fuel system.		0.00	20.00	20.00	4	80.00
27.12	Describe the methods of examining fuel tanks, testing for leaks and methods of carrying out minor repairs.		2.00	0.00	2.00	1	2.00
27.13	State the procedure for removing fuel vapour from fuel tanks.		1.00	0.00	1.00	1	1.00
27.14	State the procedures for packing and storing aircraft flexible fuel tanks.		1.00	0.00	1.00	1	1.00

PART III

SECTION P27: AIRCRAFT SYSTEMS

TO No (a)	TRAINING OBJECTIVE (b)	REFERENCES/ REMARKS (c)	SYLLABUS HOURS Class (d)	Pract (e)	Total (f)	No of CELLS (g)	INSTR. HOURS (h)
27.15	State the procedures for carrying out pre-use checks on aircraft fuel tanks.		1.00	0.00	1.00	1	1.00
27.16	Identify fuel tanks, remove and fit fuel system components.		4.00	22.00	26.00	1/4	92.00
27.17	TO deleted.		0.00	0.00	0.00		0.00
27.18	Assist with fault diagnosis to identify faults in an aircraft fuel system.		14.00	22.00	36.00	1/4	102.00
27.19	Describe the construction and operation of aircraft fire detection and extinguishing systems.		6.00	0.00	6.00	1	6.00
27.19a	Identify and explain the requirements of a gas turbine engine ice detection and protection system.	BTEC Unit 14 - "Pass & Merit criteria - 4"	4.00	0.00	4.00	1	4.00
27.20	Obtain a pass mark in an examination of P23 and P27.		4.00	0.00	4.00	1	4.00
27.21	Participate in a debrief of P23 and P27.		2.00	0.00	2.00	1	2.00
		TOTAL HOURS	73.00	65.00	138.00		330.00

PART III

SECTION P25: GAS TURBINES

TO No (a)	TRAINING OBJECTIVE (b)	REFERENCES/ REMARKS (c)	SYLLABUS HOURS			No of CELLS (g)	INSTR HOURS (h)
			Class (d)	Pract (e)	Total (f)		
25.1	Complete phase arrival procedures and participate in a phase specific Health and Safety brief.		1.00	0.00	1.00	1	1.00
25.1a	Participate in a Flight Safety / Human Factors based discussion highlighting the possible effects of: a. Pressure. b. Stress.	This TO should ideally be delivered immediately after the phase arrival brief.	2.00	0.00	2.00	1	2.00
25.2	Describe in simple terms the fundamentals of gas turbine theory.		6.00	1.00	7.00	1/2	8.00
25.3	Describe the construction and theory behind typical intake design both fixed and variable.		2.00	0.00	2.00	1	2.00
25.4	Describe in simple terms the general construction and principle of operation of compressors.		8.00	0.00	8.00	1	8.00
25.5	Describe in simple terms the general construction and principle of operation of the combustion section.		4.00	0.00	4.00	1	4.00
25.6	Describe in simple terms the general construction and principal of operation of turbine sections.		4.00	0.00	4.00	1	4.00
25.7	Describe in simple terms the general construction and principle of operation of the exhaust section.		6.00	0.00	6.00	1	6.00
25.8	State the purpose and describe the construction of internal and external gearboxes, accessory drives and the need for engine driven accessories.		4.00	0.00	4.00	1	4.00
25.9	Consolidate the principles and construction of gas turbine engines.		4.00	28.00	32.00	1/4	116.00
25.10	Identify and state the purpose of engine instrumentation.		2.00	0.00	2.00	1	2.00
25.11	Explain, in simple terms, the factors affecting thrust and how gas turbine performance is measured.		4.00	0.00	4.00	1	4.00
25.12	Identify and state the purpose of documentation required maintaining engines.		4.00	0.00	4.00	1	4.00
25.13	Describe (to block diagram level) the principles of operation of gas turbine starting and ignition systems and their components.		8.00	0.00	8.00	1	8.00

PART III

SECTION P25: GAS TURBINES

TO No (a)	TRAINING OBJECTIVE (b)	REFERENCES/ REMARKS (c)	SYLLABUS HOURS			No of CELLS (g)	INSTR HOURS (h)
			Class (d)	Pract (e)	Total (f)		
25.14	Consolidate the principles of gas turbine engine starting systems with reasoning and practical exercises.		0.00	4.00	4.00	4	16.00
25.15	Recognise and operate the training equipment of the GAM.		4.00	4.00	8.00	2/4	24.00
25.16	State the purpose and explain the operation of a secondary power system.		2.00	2.00	4.00	1/4	10.00
25.17	Participate in a practical exercise on the operation of the GAM secondary power system.		0.00	6.00	6.00	4	24.00
25.18	Describe in simple terms the properties and specifications of lubricants and their associated safety precautions.		2.00	0.00	2.00	1	2.00
25.19	Describe (to block diagram level) the principles of operation of gas turbine lubrication systems and their components.		12.00	0.00	12.00	1	12.00
25.20	State the reason for, the principles of and the methods of health monitoring on gas turbine engines.		2.00	2.00	4.00	1/2	6.00
25.21	Consolidate gas turbine engine oil systems with reasoning and practical exercises.		0.00	18.00	18.00	4	72.00
25.22	Participate in a practical exercise on the operation of the GAM engine lubrication system and complete all relevant documentation.		0.00	6.00	6.00	4	24.00
25.23	Describe in simple terms the properties and specifications of fuels and fuel additives and their associated safety precautions.		2.00	0.00	2.00	1	2.00
25.24	Describe (to block diagram level) the principles of operation of gas turbine fuel systems and their components.		12.00	0.00	12.00	1	12.00
25.25	Describe (to block diagram level) the principles of operation of a gas turbine electronic fuel control system.		2.00	0.00	2.00	1	2.00
25.25a	Describe in simple terms the operation of a gas turbine engine auto throttle system.	BTEC Unit 14 - "Merit criteria - 3"	2.00	0.00	2.00	1	2.00

PART III

SECTION P25: GAS TURBINES

TO No (a)	TRAINING OBJECTIVE (b)	REFERENCES/ REMARKS (c)	SYLLABUS HOURS Class (d)	Pract (e)	Total (f)	No of CELLS (g)	INSTR HOURS (h)
25.26	Consolidate gas turbine engine fuel system training with reasoning and practical tasks.		0.00	18.00	18.00	4	72.00
25.27	Explain the operation of the GAM electronically controlled main engine fuel system.		4.00	0.00	4.00	1	4.00
25.28	Participate in a practical exercise on the operation of the GAM digitally controlled main engine fuel system and complete all relevant documentation.		0.00	8.00	8.00	4	32.00
25.29	Describe (to block diagram level) the principles of operation of gas turbine air systems and their components.		4.00	0.00	4.00	1	4.00
25.30	Describe in simple terms the general construction and principle of operation of variable inlet guide vanes and bleed valves.		4.00	0.00	4.00	1	4.00
25.31	Consolidate gas turbine engine airflow control systems training with reasoning and practical exercises.		0.00	4.00	4.00	4	16.00
25.32	Describe (to block diagram level) the principles of operation of gas turbine reheat systems and their components.		4.00	0.00	4.00	1	4.00
25.33	Consolidate gas turbine thrust augmentation (Reheat) training with reasoning and practical exercises.		0.00	4.00	4.00	4	16.00
25.34	Explain the operation and control of the GAM reheat system.		4.00	0.00	4.00	1	4.00
25.35	Participate in a practical exercise on the operation of the GAM digitally controlled reheat system and complete all relevant documentation.		0.00	6.00	6.00	4	24.00
25.36	Carry out an APST consolidation exercise.		0.00	12.00	12.00	4	48.00
25.37	Carry out maintenance tasks on gas turbine engines.		0.00	8.00	8.00	4	32.00
25.38	Enhance gas turbine engine training with reasoning and practical exercises.		0.00	4.00	4.00	4	16.00
25.39	Obtain a pass in an examination.		4.00	0.00	4.00	1	4.00
25.40	Participate in a debrief of P25 Gas Turbines.		2.00	0.00	2.00	1	2.00
		TOTAL HOURS	125.00	135.00	260.00		663.00

(INTENTIONALLY BLANK)

PART III

SECTION: P26 MODULAR ENGINE BAY MAINTENANCE

TO No (a)	TRAINING OBJECTIVE (b)	REFERENCES/ REMARKS (c)	SYLLABUS HOURS Class (d)	Pract (e)	Total (f)	No of CELLS (g)	INSTR. HOURS (h)
26.1	Complete all relevant documentation related to modular engine maintenance.		8.00	0.00	8.00	1	8.00
26.2	Complete phase arrival procedures and participate in a phase specific Health and Safety brief.		1.00	0.00	1.00	1	1.00
26.2KS	Participate in a Key skills portfolio brief.		4.00	0.00	4.00	2	8.00
26.2a	Participate in a Flight Safety / Human Factors based discussion highlighting the possible effects of: a. Poor communications. b. Poor teamwork.	This TO should ideally be delivered immediately after the phase arrival brief.	2.00	0.00	2.00	1	2.00
26.3	Operate remote controlled overhead and mobile cranes using standard and specialised lifting tackle.		1.00	2.00	3.00	1/4	9.00
26.3KS	Participate in a Key skills portfolio brief.		2.00	0.00	2.00	2	4.00
26.4	Explain the principles of preservation and packing.		2.00	1.00	3.00	1	3.00
26.4KS	Participate in a Key skills portfolio brief.		2.00	0.00	2.00	2	4.00
26.5	Unpack a modular engine, install it in a lay-by stand, carry out a pre-strip examination and re-pack engine.		0.00	10.00	10.00	4	40.00
26.5KS	Participate in a Key skills portfolio brief.		2.00	0.00	2.00	2	4.00
26.6	Clean and examine a WVR bag.		2.00	4.00	6.00	1/4	18.00
26.6a	Participate in a Flight Safety / Human Factors based discussion highlighting the possible effects of: a. Resource difficulties. b. Lack of assertiveness.	This TO should ideally be delivered immediately before the, “remove and fit modules of a modular engine” TO.	2.00	0.00	2.00	1	2.00
26.6KS	Participate in a Key skills portfolio brief.		2.00	0.00	2.00	2	4.00
26.7	Remove and fit modules of a modular engine.		0.00	88.00	88.00	4	352.00
26.8	Clean, inspect, preserve and pack engine modules and components.		3.00	3.00	6.00	1/4	15.00
26.8KS	Participate in a Key skills portfolio brief.		2.00	0.00	2.00	2	4.00

PART III

SECTION: P26 MODULAR ENGINE BAY MAINTENANCE

TO No (a)	TRAINING OBJECTIVE (b)	REFERENCES/ REMARKS (c)	SYLLABUS HOURS			No of CELLS (g)	INSTR. HOURS (h)
			Class (d)	Pract (e)	Total (f)		
26.9	Examine, blend and dress a damaged LP compressor blade.		1.00	7.00	8.00	1/4	29.00
26.10	Set-up and adjust engine controls.		1.00	12.00	13.00	1/4	49.00
26.11	Inhibit a modular engine and pack into a WVR bag.		0.00	4.00	4.00	4	16.00
26.12	Obtain a pass mark in an examination.		2.00	0.00	2.00	1	2.00
26.13KS	Undertake a Key Skills IT assignment.		6.00	0.00	6.00	2	12.00
26.14KS	Provide evidence for Application of Number (AON).		6.00	0.00	6.00	2	12.00
26.15KS	Give a short talk on a chosen subject.		4.00	0.00	4.00	2	8.00
26.16KS	Participate in a group discussion on a chosen subject.		4.00	0.00	4.00	2	8.00
26.17KS	Undertake an assignment based on the content of the P26 phase.		4.00	0.00	4.00	2	8.00
26.18KS	Complete Key Skills Log Book and participate in a Key Skills debrief.		2.00	0.00	2.00	2	4.00
26.13	Participate in a debrief of P26.		2.00	0.00	2.00	1	2.00
		TOTAL HOURS	67.00	131.00	198.00		628.00

PART III

SECTION: C15 AIRCRAFT ASSISTED ESCAPE SYSTEMS

TO No (a)	TRAINING OBJECTIVE (b)	REFERENCES/ REMARKS (c)	SYLLABUS HOURS Class (d)	Pract (e)	Total (f)	No of CELLS (g)	INSTR. HOURS (h)
15.1	Check visually that the Aircraft Assisted Escape System (AAES) is in the 'Safe for Parking' or 'Safe for Maintenance' condition on all relevant aircraft types.	1. Training to be delivered by Eng Tech W instructional staff iaw Eng Tech W Instructional Specification for AAES Common Module. 2. Training to be delivered at a frequency to ensure compliance with the requirements of AP109A-0100-2(R)1 2nd Edition Part 1 Lft 201. 3. Implementation of this training is to be arranged by Sqn training management within the constraints of para 2 above.	2.00	2.00	4.00	1/4	10.00
		TOTAL HOURS	2.00	2.00	4.00		10.00

(INTENTIONALLY BLANK)

PART III

SECTION P40: SECOND LINE MAINTENANCE

TO No (a)	TRAINING OBJECTIVE (b)	REFERENCES/ REMARKS (c)	SYLLABUS HOURS Class (d)	Pract (e)	Total (f)	No of CELLS (g)	INSTR. HOURS (h)
40.1	Complete phase arrival procedures and participate in a phase specific Health and Safety brief.		1.00	0.00	1.00	1	1.00
40.1a	Participate in a Flight Safety / Human Factors based discussion highlighting the possible effects of: a. Complacency. b. Acceptance of norms – failure to question accuracy.	This TO should ideally be delivered immediately after the phase arrival brief.	2.00	0.00	2.00	1	2.00
40.2	Apply external electrical power to a specific aircraft.		1.00	2.00	3.00	1/2	5.00
40.3	Carry out cockpit checks prior to moving an aircraft.		1.00	2.00	3.00	1/4	9.00
40.4	Demonstrate the ability to carry out aircraft maintenance.		2.00	24.00	26.00	1/4	98.00
40.4a	State the procedures to be carried out following a hazardous incident.	BTEC Unit 11 - "Pass criteria - 5"	1.00	1.00	2.00	1/4	5.00
40.5	Carry out removal and fitment of an engine change unit.		1.00	16.00	17.00	1/4	65.00
40.6	Carry out a ground test of an installed aircraft engine.		9.00	8.00	17.00	1/4	41.00
40.7	Debrief students on their performance in P40 second line maintenance.		2.00	0.00	2.00	1	2.00
		TOTAL HOURS	20.00	53.00	73.00		228.00

(INTENTIONALLY BLANK)

PART III

SECTION C7: COMPOSITE FLIGHT SERVICING AND GROUND HANDLING TRAINING

T.O. No. (a)	TRAINING OBJECTIVE (b)	REFERENCES/ REMARKS (c)	SYLLABUS HOURS			No of CELLS (g)	INSTR. HOURS (h)
			Class (d)	Pract (e)	Total (f)		
7.1	State the safety precautions required in an aircraft hangar and airfield environment.		2.00	0.00	2.00	1	2.00
7.2	Kit issue.		1.00	0.00	1.00	1	1.00
7.3	State where the information relating to flight servicing can be found and the period of validity.		3.00	1.00	4.00	1/2	5.00
7.4	Demonstrate an understanding of the general practices to be observed at the site of an aircraft incident.		1.00	0.00	1.00	1	1.00
7.5	Undertake flight servicing on an Aircraft Assisted Escape System (AAES).		4.00	4.00	8.00	1/4	20.00
7.6	Undertake cockpit checks prior to applying power.		1.00	1.00	2.00	1/4	5.00
7.7	Apply external electrical power to an aircraft.		1.00	1.00	2.00	1/4	5.00
7.8	Recognise and state the purpose of a Centralised Warning System (CWS). Operate the test facility on the CWS.		1.00	1.00	2.00	1/4	5.00
7.9	Identify, state the purpose and operation of the engine ignition system, and explain the safety precautions to be observed.		1.00	1.00	2.00	1/4	5.00
7.10	State the purpose, recognise and check the serviceability of desiccants.		0.50	0.50	1.00	1/4	2.50
7.11	Examine the aircraft skin and structure for damage.		1.00	1.00	2.00	1/4	5.00
7.12	Identify and examine Fibre Reinforced Plastic (FRP) structures.		0.50	0.50	1.00	1/4	2.50
7.13	Identify inflatable and non-inflatable seals and sealing strips and examine for damage.		0.50	0.50	1.00	1/4	2.50

PART III

SECTION C7: COMPOSITE FLIGHT SERVICING AND GROUND HANDLING TRAINING

T.O. No. (a)	TRAINING OBJECTIVE (b)	REFERENCES/ REMARKS (c)	SYLLABUS HOURS			No of CELLS (g)	INSTR. HOURS (h)
			Class (d)	Pract (e)	Total (f)		
7.14	Examine and clean aerials and static dischargers.		0.50	0.50	1.00	1/4	2.50
7.15	Examine and clean aircraft transparencies.		0.50	0.50	1.00	1/4	2.50
7.16	Identify and examine aircraft remote control systems.		0.50	0.50	1.00	1/4	2.50
7.17	Replenish nitrogen systems on aircraft.		4.00	4.00	8.00	1/4	20.00
7.18	Identify fluids and lubricants and recognise signs of contamination.		1.00	0.00	1.00	1	1.00
7.19	Identify and operate fluid replenishment cans.		1.00	1.00	2.00	1/4	5.00
7.20	Check and replenish aircraft hydraulic systems.		2.00	3.00	5.00	1/4	14.00
7.21	Examine aircraft wheels, tyres, brakes and landing gear for damage, leaks and signs of wear.		3.00	3.00	6.00	1/4	15.00
7.22	Check and adjust aircraft tyre pressures.		1.00	1.00	2.00	1/4	5.00
7.23	Demonstrate the ability to carry out selected Flight Servicing based replenishment and inspection procedures.		0.00	8.00	8.00	1/4	32.00
7.24	Replenish gaseous oxygen systems on aircraft.		2.00	4.00	6.00	1/4	18.00
7.25	Describe the characteristics of LOX and the safety precautions to be observed when working with LOX.		1.00	0.00	1.00	1	1.00
7.26	State the methods to be used and the safety precautions to be observed during anti-icing and de-icing of aircraft on the ground.		1.00	0.00	1.00	1	1.00
7.27	State the purpose of an aircraft fatigue meter, read and reset accelerometers and record fatigue meter readings.		1.00	1.00	2.00	1/4	5.00

SECTION C7: COMPOSITE FLIGHT SERVICING AND GROUND HANDLING TRAINING

T.O. No. (a)	TRAINING OBJECTIVE (b)	REFERENCES/ REMARKS (c)	SYLLABUS HOURS			No of CELLS (g)	INSTR. HOURS (h)
			Class (d)	Pract (e)	Total (f)		
7.28	Explain the purpose of a pitot/static system, locate and examine system components and operate pitot pressure head heaters.		0.50	0.50	1.00	1/4	2.50
7.29	Functionally check an aircraft's lighting system.		1.00	1.00	2.00	1/4	5.00
7.30	Demonstrate the ability to use LITS processes for carrying out Post Sortie Feedback to Post Category 095 'Groundcrew' level.		0.00	3.00	3.00	2	6.00
7.31	State the safety precautions when working on or in the vicinity of armed aircraft.		1.00	0.00	1.00	1	1.00
7.32	Examine the engine, engine bay and associated equipment.		1.00	2.00	3.00	1/4	9.00
7.33	Locate and examine aircraft fire detection and suppression systems.		0.50	0.50	1.00	1/4	2.50
7.34	Check and replenish an engine oil system.		1.00	2.00	3.00	1/4	9.00
7.35	Demonstrate the ability to act as a member of a Flight Servicing Team during selected aircraft Flight Line Servicings.		0.00	12.00	12.00	1/4	48.00
7.36	Refuel an aircraft and identify aircraft fuels.		4.00	6.00	10.00	1/2	16.00
7.37	Operate specific items of engine operated Ground Support Equipment.		0.50	1.50	2.00	1/4	6.50
7.38	Recognise, locate and explain in simple terms the purpose of the main component parts and controls of a helicopter.		1.00	2.00	3.00	1/2	5.00
7.39	Recognise and explain the hazards and dangers of working in a helicopter environment and state the safety precautions necessary to safeguard personnel and equipment.		1.00	1.50	2.50	1/2	4.00
7.40	State the precautions to be observed when handling or storing rotor blades.		0.50	0.00	0.50	1	0.50

PART III

SECTION C7: COMPOSITE FLIGHT SERVICING AND GROUND HANDLING TRAINING

T.O. No. (a)	TRAINING OBJECTIVE (b)	REFERENCES/ REMARKS (c)	SYLLABUS HOURS			No of CELLS (g)	INSTR. HOURS (h)
			Class (d)	Pract (e)	Total (f)		
7.41	Act as a member of a team to carry out a ground handling tasks on fixed and rotary wing aircraft.		2.00	8.00	10.00	1/4	34.00
7.42	Assist in the starting and running of an aircraft engine.		4.00	4.00	8.00	1/8	36.00
7.43	Marshall a fixed and rotary wing aircraft.	Rotary wing marshalling to be carried out in SEPT only.	4.00	12.00	16.00	1/8	100.00
7.44	Carry out aircraft Ground Handling and Flight Line Servicing under simulated operational conditions.		2.00	14.00	16.00	1/8	114.00
7.45	Obtain a pass mark in an examination.		2.00	0.00	2.00	1	2.00
7.46	Debrief/De-kit.		2.00	0.00	2.00	1	2.00
		TOTAL HOURS	64.00	108.00	172.00		589.00

PART III

SECTION : EXAMINATIONS AND DEBRIEF

TO No (a)	TRAINING OBJECTIVE (b)	REFERENCES/ REMARKS (c)	SYLLABUS HOURS Class (d)	Pract (e)	Total (f)	No of CELLS (g)	INSTR. HOURS (h)
1.1	Undertake the Application of Number Key Skills Test (L2).		2.00	0.00	2.00	1	2.00
1.2	Undertake the Communications Key Skills Test (L2).		2.00	0.00	2.00	1	2.00
1.3	Undertake the IT Key Skills Test (L2).		2.00	0.00	2.00	1	2.00
1.4	Complete an MCOQ examination on the contents of the training course to achieve a pass mark.		4.00	0.00	4.00	2	8.00
1.5	Complete a debrief of the course.		2.00	0.00	2.00	1	2.00
		TOTAL HOURS	12.00	0.00	12.00		16.00

(INTENTIONALLY BLANK)

PART III

TRADE TRAINING

SECTION: 4. MATHEMATICS FOR ENGINEERS

SUBJECT: 1. ELECTRONIC AIDS

TRAINING OBJECTIVE (a)	REFERENCE (b)	ALLOCATION OF PERIODS (c)	SYLL HRS (e)	No of CELLS (f)	INSTR HOURS (g)
1.0 Use appropriate electronic aids to solve problems.	BTEC 14166HH 1.1 & 1.2.	Classroom	3.00	1	3.00
		Practical	0.00		
		Total	3.00		3.00

EQUIPMENT (h)	PUBLICATIONS (i)
Scientific calculators.	National Engineering Mathematics Vol 1 – J C Yates.

FILMS/VIDEOS		
No (j)	TITLE (k)	TIME (l)

PART III

No (a)	ENABLING OBJECTIVES (b)	CONDITIONS (c)	STANDARDS (d)	REFERENCE (e)
1.1	Use a scientific calculator to revise the use of the four basic arithmetic operations and make use of the memory facility.	In a classroom.	Correctly.	NEM, Chap 1.
1.2	Use a scientific calculator to extend operations to include reciprocals, roots, powers and pi.	In a classroom.	Correctly.	NEM, Chap 1.
1.3	Use a scientific calculator to find the values of trigonometrical functions.	In a classroom.	Correctly.	NEM, Chap 5/6.
1.4	Use a scientific calculator to find the values of exponential, logarithmic and degree/radian functions.	In a classroom.	Correctly.	NEM, Chap 4/10.
1.5	Use a scientific calculator to find values of statistical quantities. End of 1.0	In a classroom.	Correctly.	NEM, Chap 17.

PART III

TRADE TRAINING

SECTION: 4. MATHEMATICS FOR ENGINEERS

SUBJECT: 2. FORMULAE

TRAINING OBJECTIVE (a)	REFERENCE (b)	ALLOCATION OF PERIODS (c)	SYLL HRS (e)	No of CELLS (f)	INSTR HOURS (g)
2.0 Solve problems using formulae and also check answers by numerical substitution.	BTEC 14166HH 5.1, 5.2 & 6.1.	Classroom	14.00	1	14.00
		Practical	0.00		
		Total	14.00		14.00

EQUIPMENT (h)	PUBLICATIONS (i)
	National Engineering Mathematics Vol 1 – J C Yates.

FILMS/VIDEOS		
No (j)	TITLE (k)	TIME (l)

PART III

No (a)	ENABLING OBJECTIVES (b)	CONDITIONS (c)	STANDARDS (d)	REFERENCE (e)
2.1	Solve simple linear equations.	In a classroom.	Correctly.	NEM, Chap 2.
2.2	Transpose formulae in which the subject appears only once, where symbols are connected by one or a combination of the following arithmetic operations: a. Addition. b. Subtraction. c. Multiplication. d. Division.	In a classroom.	Correctly.	NEM, Chap 3.
2.3	Using a logical sequence, transpose formulae in which the subject appears more than once.	In a classroom.	Correctly.	NEM, Chap 3.
2.4	Transpose formulae containing roots.	In a classroom.	Correctly.	NEM, Chap 3.
2.5	Transpose formulae containing powers.	In a classroom.	Correctly.	NEM, Chap 3.
2.6	Solve engineering problems given a formulae and check answers by substitution. End of 2.0	In a classroom.	Correctly.	NEM, Chap 3.

PART III

TRADE TRAINING

SECTION: 4. MATHEMATICS FOR ENGINEERS

SUBJECT: 3. AREAS, PERIMETERS AND MASS

TRAINING OBJECTIVE (a)	REFERENCE (b)	ALLOCATION OF PERIODS (c)	SYLL HRS (e)	No of CELLS (f)	INSTR HOURS (g)
3.0 Evaluate problems relating to Areas, Perimeters and Mass.	BTEC 14166HH 11.	Classroom	5.00	1	5.00
		Practical	0.00		
		Total	5.00		5.00

EQUIPMENT (h)	PUBLICATIONS (i)
	National Engineering Mathematics Vol 1 – J C Yates.

FILMS/VIDEOS		
No (j)	TITLE (k)	TIME (l)

PART III

No (a)	ENABLING OBJECTIVES (b)	CONDITIONS (c)	STANDARDS (d)	REFERENCE (e)
3.1	State and use the formulae for calculating the area of: a. Rectangle and Square. b. Triangle. c. Parallelogram. d. Trapezium. e. Circle.	In a classroom.	Correctly.	NEM, Chap 4 & 6.
3.2	State and use the formulae for calculating the perimeter of: a. Rectangle and Square. b. Triangle. c. Parallelogram. d. Trapezium. e. Circle.	In a classroom.	Correctly.	NEM, Chap 4 & 6.

PART III

No (a)	ENABLING OBJECTIVES (b)	CONDITIONS (c)	STANDARDS (d)	REFERENCE (e)
3.3	State and use the formulae for calculating the volume and surface area of regular bodies including: a. Cuboid. Volume l x b x h Surface area = 2(l x b) + 2(b x h) + 2(l x h) b. Cone. Volume = $\frac{1}{3}\pi r^2 h$ Surface Area = $\pi rl + \pi r^2 (l^2 = r^2 + h^2)$ c. Cylinder Volume = $\pi r^2 h$ Surface area = $2\pi r(h + r)$ d. Sphere Volume = $\frac{4}{3}\pi r^3$ Surface Area = $4\pi r^2$	In a classroom.	Correctly.	NEM, Chap 4 & 6.
3.5	Calculate volumes of composite regular bodies.	In a classroom.	Correctly.	NEM, Chap 16.
3.6	Define the term Mass.	In a classroom.	Correctly.	
3.7	Define the term Density: a. Density = $\frac{\text{mass}}{\text{volume}}$	In a classroom.	Correctly.	
3.8	Solve problems using mass, areas, surface areas and volumes of regular bodies that relate to engineering. End of 3.0	In a classroom.	Correctly.	NEM, Chap 16.

PART III

TRADE TRAINING

SECTION: 4. MATHEMATICS FOR ENGINEERS

SUBJECT: 4. GRAPHS

TRAINING OBJECTIVE (a)	REFERENCE (b)	ALLOCATION OF PERIODS (c)	SYLL HRS (e)	No of CELLS (f)	INSTR HOURS (g)
4.0 Draw graphs from given data and read values by interpolation and determine linear laws.	BTEC 14166HH 7.	Classroom	4.00	1	4.00
		Practical	0.00		
		Total	4.00		4.00

EQUIPMENT (h)	PUBLICATIONS (i)
	National Engineering Mathematics Vol 1 – J C Yates.

FILMS/VIDEOS		
No (j)	TITLE (k)	TIME (l)

PART III

No (a)	ENABLING OBJECTIVES (b)	CONDITIONS (c)	STANDARDS (d)	REFERENCE (e)
4.1	Define and label a set of Cartesian axes.	In a classroom.	Correctly.	NEM, Chap 2.
4.2	Determine scales from given data and mark axes accordingly.	In a classroom.	Correctly.	NEM, Chap 2.
4.3	Plot co-ordinates on a pair of labelled Cartesian axes.	In a classroom.	Correctly.	NEM, Chap 2.
4.4	Draw the graph for a straight-line law.	In a classroom.	Correctly.	NEM, Chap 2.
4.5	Deduce the gradient, vertical intercept and equation from a straight-line graph.	In a classroom.	Correctly.	NEM, Chap 2.
4.6	Interpolate a linear graph from given data.	In a classroom.	Correctly.	NEM, Chap 2.
4.7	Plot the graph of a quadratic equation.	In a classroom.	Correctly.	NEM, Chap 7.
4.8	Graphically solve a quadratic equation. End of 4.0	In a classroom.	Correctly.	NEM, Chap 7.

PART III

TRADE TRAINING

SECTION: 4. MATHEMATICS FOR ENGINEERS

SUBJECT: 5. ALGEBRAIC PROBLEMS

<table>
<tr><td rowspan="2"></td><td rowspan="2"></td><td colspan="4">ALLOCATION OF PERIODS</td></tr>
<tr><td>TRAINING OBJECTIVE
(a)</td><td>REFERENCE
(b)</td><td></td><td>SYLL HRS
(e)</td><td>No of CELLS
(f)</td><td>INSTR HOURS
(g)</td></tr>
<tr><td rowspan="4">5.0 Solve problems expressed algebraically selecting the appropriate formulae using Linear, Simultaneous and Quadratic Equations.</td><td rowspan="4">BTEC 14166HH
5.1 & 6.2.</td><td>Classroom</td><td>6.00</td><td>1</td><td>6.00</td></tr>
<tr><td>Practical</td><td>0.00</td><td></td><td></td></tr>
<tr><td></td><td></td><td></td><td></td></tr>
<tr><td>Total</td><td>6.00</td><td></td><td>6.00</td></tr>
<tr><td>EQUIPMENT
(h)</td><td colspan="5">PUBLICATIONS
(i)</td></tr>
<tr><td rowspan="3"></td><td colspan="5">National Engineering Mathematics Vol 1 – J C Yates.</td></tr>
<tr><td colspan="5">FILMS/VIDEOS</td></tr>
<tr><td>No
(j)</td><td colspan="3">TITLE
(k)</td><td>TIME
(l)</td></tr>
<tr><td></td><td></td><td colspan="3"></td></tr>
</table>

PART III

No (a)	ENABLING OBJECTIVES (b)	CONDITIONS (c)	STANDARDS (d)	REFERENCE (e)
5.1	State the difference between dependent and independent variables.	In a classroom.	Correctly.	NEM, Chap 12.
5.2	State the relationship between two variables which are: a. Directly proportional. b. Inversely proportional.	In a classroom.	Correctly.	NEM, Chap 12.
5.3	Calculate the coefficient of proportionality from given data.	In a classroom.	Correctly.	NEM, Chap 12.
5.4	State that for inverse proportionality the product of variables is constant.	In a classroom.	Correctly.	NEM, Chap 12.
5.5	Determine the equation that is satisfied by a given pair of roots.	In a classroom.	Correctly.	NEM, Chap 7.
5.6	Solve quadratic equations using formula.	In a classroom.	Correctly.	NEM, Chap 7.
5.7	Solve a pair of linear simultaneous equations.	In a classroom.	Correctly.	NEM, Chap 9.
5.8	Solve simultaneous linear and quadratic equations.	In a classroom.	Correctly.	NEM, Chap 9.
5.9	Form and solve equations that are mathematical models of practical problems. End of 5.0	In a classroom.	Correctly.	NEM, Chap 7/9.

PART III

TRADE TRAINING

SECTION: 4. MATHEMATICS FOR ENGINEERS

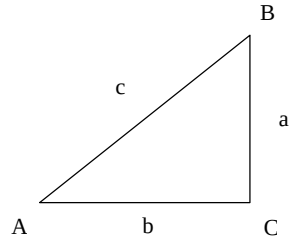
SUBJECT: 6. TRIGONOMETRICAL RELATIONSHIPS

TRAINING OBJECTIVE (a)	REFERENCE (b)	ALLOCATION OF PERIODS (c)	SYLL HRS (e)	No of CELLS (f)	INSTR HOURS (g)
6.0 Use trigonometrical relationship in an engineering context.	BTEC 14166HH 10.	Classroom	9.00	1	9.00
		Practical	0.00		
		Total	9.00		9.00

EQUIPMENT (h)	PUBLICATIONS (i)
	National Engineering Mathematics Vol 1 – J C Yates.

FILMS/VIDEOS		
No (j)	TITLE (k)	TIME (l)

PART III

No (a)	ENABLING OBJECTIVES (b)	CONDITIONS (c)	STANDARDS (d)	REFERENCE (e)
6.1	Define the term radian.	In a classroom.	Correctly.	NEM, Chap 4.
6.2	Define the relationship between radians and degrees.	In a classroom.	Correctly.	NEM, Chap 4.
6.3	Convert degree measure to radian and vice versa.	In a classroom.	Correctly.	NEM, Chap 4.
6.4	Express angular rotation in multiples of π radians.	In a classroom.	Correctly.	NEM, Chap 4.
6.5	Use the relationship $s = r\theta$ to calculate the length of the arc of a circle.	In a classroom.	Correctly.	NEM, Chap 4.
6.6	Use the relationship $A = \frac{1}{2}r^2\theta$ to calculate the area of a sector of a circle.	In a classroom.	Correctly.	NEM, Chap 4.
6.7	Solve problems involving lengths of arc, areas and angles.	In a classroom.	Correctly.	NEM, Chap 4.
6.8	State the trigonometrical ratios for a right angled triangle ABC as follows: $\sin A = \frac{a}{c} = \frac{\text{side opposite A}}{\text{hypotenuse}}$ $\cos A = \frac{b}{c} = \frac{\text{side adjacent to A}}{\text{hypotenuse}}$ $\tan A = \frac{a}{b} = \frac{\text{side opposite A}}{\text{side adjacent to A}}$ 	In a classroom.	Correctly.	NEM, Chap 5.
6.9	Determine values of the trigonometric ratios for angles between 0^0 and 360^0.	In a classroom.	Correctly.	NEM, Chap 5.
6.10	Define a trigonometrical identity.	In a classroom.	Correctly.	NEM, Chap 5.
6.11	Show that: $\tan A = \frac{\sin A}{\cos A}$	In a classroom.	Correctly.	NEM, Chap 5.
6.12	Show that: $\sin^2 A + \cos^2 A = 1$	In a classroom.	Correctly.	NEM, Chap 5.
6.13	Define the inverse of the trigonometrical ratios as follows: a. $\sin^{-1}\theta$ or arcsin θ. b. $\cos^{-1}\theta$ or arccos θ. c. $\tan^{-1}\theta$ or arctan θ.	In a classroom.	Correctly.	NEM, Chap 5.
6.14	Sketch the sine and cosine waveforms over one complete cycle.	In a classroom.	Correctly.	NEM, Chap 5.

PART III

No (a)	ENABLING OBJECTIVES (b)	CONDITIONS (c)	STANDARDS (d)	REFERENCE (e)
6.15	Sketch the tangent curve using the identity: $\tan\theta = \frac{\sin\theta}{\cos\theta}$	In a classroom.	Correctly.	NEM, Chap 5.
6.16	State the periodic properties of the sine, cosine and tangent curves.	In a classroom.	Correctly.	NEM, Chap 5.
6.17	Determine values of the trigonometric ratios for angles greater than 360^0 and for negative angles.	In a classroom.	Correctly.	NEM, Chap 5.
6.18	State the period and amplitude of: a. Sinusoidal waveforms. b. Square waveforms. c. Sawtooth waveforms.	In a classroom.	Correctly.	Course manual.
6.19	State and use the sine rule for a labelled triangle ABC in the form: $\frac{a}{\sin A} = \frac{b}{\sin B} = \frac{c}{\sin C}$	In a classroom.	Correctly.	NEM, Chap 6.
6.20	State and use the cosine rule for a labelled triangle in the form: $a^2 = b^2 + c^2 - 2bc\ \cos A$	In a classroom.	Correctly.	NEM, Chap 6.
6.21	State the conditions under which the sine and cosine rule can be used.	In a classroom.	Correctly.	NEM, Chap 6.
6.22	Calculate the area of any triangle using any of the following formulae: a. ½bh. b. ½ ab sinC c. $\sqrt{s(s-a)(s-b)(s-c)}$	In a classroom.	Correctly.	NEM, Chap 6.
6.23	Solve problems on triangles and quadrilaterals involving the use of the sine rule, cosine rule and formulae for areas of triangles.	In a classroom.	Correctly.	NEM, Chap 6.
6.24	Define the angles of elevation and depression.	In a classroom.	Correctly.	NEM, Chap 6.
6.25	Solve problems incorporating angles of elevation and depression that relate to engineering. End of 6.0	In a classroom.	Correctly.	NEM, Chap 6.

PART III

TRADE TRAINING

SECTION: 4. MATHEMATICS FOR ENGINEERS

SUBJECT: 7. VECTORS

TRAINING OBJECTIVE (a)	REFERENCE (b)	ALLOCATION OF PERIODS (c)	SYLL HRS (e)	No of CELLS (f)	INSTR HOURS (g)
7.0 Represent physical quantities as vectors and undertake addition and subtraction of vector quantities.	BTEC 14166HH 13.	Classroom	6.00	1	6.00
		Practical	0.00		
		Total	6.00		6.00

EQUIPMENT (h)	PUBLICATIONS (i)
	National Engineering Mathematics Vol 1 – J C Yates. BTEC National III Mathematics for Technicians – Greer & Taylor.

FILMS/VIDEOS		
Nº (j)	TITLE (k)	TIME (l)

PART III

No (a)	ENABLING OBJECTIVES (b)	CONDITIONS (c)	STANDARDS (d)	REFERENCE (e)
7.1	Define a polar co-ordinate.	In a classroom.	Correctly.	NIII, Chap 2.
7.2	Plot polar coordinates on an argand diagram.	In a classroom.	Correctly.	NIII, Chap 2.
7.3	Define a scalar quantity.	In a classroom.	Correctly.	NEM, Chap 13.
7.4	Define a vector quantity.	In a classroom.	Correctly.	NEM, Chap 13.
7.5	Define a negative vector – a.	In a classroom.	Correctly.	NEM, Chap 13.
7.6	Define the addition of two or more vectors.	In a classroom.	Correctly.	NEM, Chap 13.
7.7	Resolve a vector into two component parts at right angles to one another.	In a classroom.	Correctly.	NEM, Chap 13.
7.8	Calculate the magnitude and direction of a vector.	In a classroom.	Correctly.	NEM, Chap 13.
7.9	Define the result of multiplying a vector by a scalar.	In a classroom.	Correctly.	NEM, Chap 13.
7.10	State the parallelogram rule for the addition of two vectors.	In a classroom.	Correctly.	NEM, Chap 13.
7.11	Determine the resultant of a – b and relate the result to the diagonal of the parallelogram.	In a classroom.	Correctly.	NEM, Chap 13.
7.12	Solve simple problems involving the addition and subtraction of vectors. End of 7.0	In a classroom.	Correctly.	NEM, Chap 13.

PART III

TRADE TRAINING

SECTION: 4. MATHEMATICS FOR ENGINEERS

SUBJECT: 8. DECIMALS, INDICES AND PERCENTAGES

<table>
<tr><td rowspan="2">TRAINING OBJECTIVE
(a)</td><td rowspan="2">REFERENCE
(b)</td><td colspan="4">ALLOCATION OF PERIODS</td></tr>
<tr><td>(c)</td><td>Syll Hrs
(e)</td><td>No of CELLS
(f)</td><td>INSTR HOURS
(g)</td></tr>
<tr><td rowspan="4">8.0 Solve problems involving decimals, indices and percentages which relate to engineering subjects.</td><td rowspan="4">BTEC 14166HH
2.1, 2.3 & 2.4
Logarithms not included.</td><td>Classroom</td><td>3.00</td><td>1</td><td>3.00</td></tr>
<tr><td>Practical</td><td>0.00</td><td></td><td></td></tr>
<tr><td></td><td></td><td></td><td></td></tr>
<tr><td>Total</td><td>3.00</td><td></td><td>3.00</td></tr>
<tr><td>EQUIPMENT
(h)</td><td colspan="5">PUBLICATIONS
(i)</td></tr>
<tr><td></td><td colspan="5">National Engineering Mathematics Vol 1 – J C Yates
BTEC First Mathematics for Technicians – Greer & Taylor</td></tr>
<tr><td rowspan="3"></td><td colspan="5">FILMS/VIDEOS</td></tr>
<tr><td>Nº
(j)</td><td colspan="3">TITLE
(k)</td><td>TIME
(l)</td></tr>
<tr><td></td><td colspan="3"></td><td></td></tr>
</table>

PART III

Nº (a)	ENABLING OBJECTIVES (b)	CONDITIONS (c)	STANDARDS (d)	REFERENCE (e)
8.1	Incorporating the precedence rule for brackets, carry out the basic arithmetic operations of: a. Addition. b. Subtraction. c. Multiplication. d. Division.	In a classroom.	Correctly.	NEM, Chap 1 Section 1-1
8.2	Incorporating the precedence rule for brackets, extend the arithmetic operations to include square roots and squares.	In a classroom.	Correctly.	1-2
8.3	Reduce a number: a. to a given number of decimal places. b. To a specific number of significant figures.	In a classroom.	Correctly.	1-3
8.4	Express a denary number in standard form.	In a classroom.	Correctly.	1-9
8.5	Estimate the approximate value of an arithmetic expression.	In a classroom.	Correctly.	1-4
8.6	Solve arithmetic expressions using powers, roots and reciprocals.	In a classroom.	Correctly.	1-10
8.7	Express decimals as fractions and vice versa.	In a classroom.	Correctly.	1-5
8.8	Express decimals as percentages and vice versa.	In a classroom.	Correctly.	1-6
8.9	Define the following in terms of A^n: a. Base. b. Index. c. Power. d. Reciprocal.	In a classroom.	Correctly.	1-7
8.10	State and use the following rules of indices, where **m** and **n** are integers: a. $a^m \times a^n = a^{m+n}$ b. $a^m/a^n = a^{m-n}$ c. $(a^m)n = a^{mn}$ d. $a^0 = 1$ e. $a^{-m} = \frac{1}{a}m$ f. $a^{m/n} = \sqrt[n]{a^m}$	In a classroom.	Correctly.	1-8
8.11	Solve problems which have an engineering application. End of 8.0	In a classroom.	Correctly.	1-1 to 1-10

PART III

TRADE TRAINING

SECTION: 4. MATHEMATICS FOR ENGINEERS

SUBJECT: 9. TABLES AND CHARTS

TRAINING OBJECTIVE (a)	REFERENCE (b)	ALLOCATION OF PERIODS (c)	Syll Hrs (e)	No of CELLS (f)	INSTR HOURS (g)
9.0 Evaluate and use tables and charts.	BTEC 14166HH 3.1 & 3.2	Classroom	1.00	1	1.00
		Practical	0.00		
		Total	1.00		1.00

EQUIPMENT (h)	PUBLICATIONS (i)
	National Engineering Mathematics Vol 1 – J C Yates BTEC First Mathematics for Technicians – Greer & Taylor

FILMS/VIDEOS		
Nº (j)	TITLE (k)	TIME (l)

PART III

Nº (a)	ENABLING OBJECTIVES (b)	CONDITIONS (c)	STANDARDS (d)	REFERENCE (e)
9.1	Use conversion tables and illustrate use of Interpolation.	In a classroom.	Correctly.	BFMT, Chap 8
9.2	Use parallel scale conversion charts.	In a classroom.	Correctly.	BFMT, Chap 8
9.3	Use calibration curves.	In a classroom.	Correctly.	
9.4	Use nomographs.	In a classroom.	Correctly.	BFMT, Chap 8
9.5	Use timetables. End of 9.0	In a classroom.	Correctly.	

PART III

TRADE TRAINING

SECTION: 4. MATHEMATICS FOR ENGINEERS

SUBJECT: 10. CALCULATIONS IN VARIOUS NUMBERING AND MEASURING SYSTEMS

TRAINING OBJECTIVE (a)	REFERENCE (b)	ALLOCATION OF PERIODS			
		(c)	Syll Hrs (e)	No of CELLS (f)	INSTR HOURS (g)
10.0 Perform calculations in various numbering and measuring systems	BTEC 14166HH 2.1, 2.2, 4.1 & 4.2	Classroom	2.00	1	2.00
		Practical	0.00		
		Total	2.00		2.00

EQUIPMENT (h)	PUBLICATIONS (i)
	BTEC First Mathematics for Technicians – Greer & Taylor

FILMS/VIDEOS		
Nº (j)	TITLE (k)	TIME (l)

PART III

Nº (a)	ENABLING OBJECTIVES (b)	CONDITIONS (c)	STANDARDS (d)	REFERENCE (e)
10.1	Define the seven fundamental units as follows: a. Length - metre (m) b. Mass - kilogram (kg) c. Time - second (s) d. Electric current - ampere (A) e. Luminous intensity - candela (cd) f. Temperature - kelvin (k) g. Unit of substance - Mole (mol)	In a classroom.	Correctly.	BFMT, Chap 6
10.2	Define the multiples and sub-multiples of SI and their multplication factor.	In a classroom.	Correctly.	BFMT, Chap 6
10.3	Define the multiples of the following Imperial based units and their conversion factors to SI units: a. Length - inch, foot, mile 1 inch = 25.4 mm 1 foot = 0.305 m 1 mile = 1.61 km c. Areas – acre 1 acre = 0.405 ha d. Volume – pint, gallon 1 gallon = 4.55 lt e. Mass – ounce, pound, ton 1 pound = 0.454 kg 1 ton = 1020 kg	In a classroom.	Correctly.	
10.4	Solve problems involving SI and Imperial units and convert between these units.	In a classroom.	Correctly.	
10.5	Define and convert between the following number systems: a. Decimal. b. Binary. c. Octal. d. Hexadecimal.	In a classroom.	Correctly.	
10.6	Add and subtract 2 binary numbers. End of 10.0	In a classroom.	Correctly.	

PART III

TRADE TRAINING

SECTION: 4. MATHEMATICS FOR ENGINEERS

SUBJECT: 11. EXAMINATION

TRAINING OBJECTIVE (a)	REFERENCE (b)	ALLOCATION OF PERIODS (c)	SYLL HRS (e)	No of CELLS (f)	INSTR HOURS (g)
11.0 Obtain a satisfactory result in an examination.		Classroom	2.00	1	2.00
		Practical	0.00		
		Total	2.00		2.00

EQUIPMENT (h)	PUBLICATIONS (i)

FILMS/VIDEOS		
No (j)	TITLE (k)	TIME (l)

PART III

No (a)	ENABLING OBJECTIVES (b)	CONDITIONS (c)	STANDARDS (d)	REFERENCE (e)
11.1	Undertake and pass an examination. End of 11.0	In a classroom. Under examination conditions.	Attaining the examination pass mark.	EC AB800.

PART III

TRADE TRAINING

SECTION: P3 ENGINEERING SCIENCE

SUBJECT: 1. INTERNAL AND EXTERNAL SYSTEMS

TRAINING OBJECTIVE (a)	REFERENCE (b)	ALLOCATION OF PERIODS (c)	Syll Hrs (d)	No of CELLS (e)	INSTR HOURS (f)
1.0 Identify and explain internal and external systems.	BTEC 14567F A1	Classroom	2.00	1	2.00
		Practical	0.00		0.00
		Total	2.00		2.00

EQUIPMENT (g)	PUBLICATIONS (h)
	1. Course manual 2. Engineering Science – Hughes and Hughes 3. Engineering Science – W Bolton

FILMS/VIDEOS		
Nº (i)	TITLE (j)	TIME (k)

PART III

N^{o} (a)	ENABLING OBJECTIVES (b)	CONDITIONS (c)	STANDARDS (d)	REFERENCE (e)
1.1	Define: a. Systems and system boundaries. b. Sub-systems and sub-system boundaries. c. Interactional paths.	In a classroom.	Correctly.	1. Course manual. 2. chap 24. 3. chap 1.
1.2	Sketch simple systems - such as manufacturing processes, domestic central heating systems, internal combustion engine and domestic water tank – identifying: a. Systems and system boundaries. b. Sub-systems and sub-system boundaries. c. Interactional paths.	In a classroom.	Correctly.	1. Course manual. 2. chap 24. 3. chap 1.
1.3	Explain the effect of component interaction, particularly in fault diagnosis for such simple systems as: a. Manufacturing processes. b. Domestic central heating systems. c. Internal combustion engine. d. Domestic water tank. End of 1.0	In a classroom.	Correctly.	1. Course manual. 2. chap 24. 3. chap 1.

PART III

TRADE TRAINING

SECTION: P3 ENGINEERING SCIENCE

SUBJECT: 2. BLOCK DIAGRAMS

TRAINING OBJECTIVE (a)	REFERENCE (b)	ALLOCATION OF PERIODS (c)	Syll Hrs (d)	No of CELLS (e)	INSTR HOURS (f)
2.0 Produce and interpret block diagrams of systems referred to in the Aircraft technology modules.	BTEC 14567F A2	Classroom	2.00	1	2.00
		Practical	0.00		0.00
		Total	2.00		2.00

EQUIPMENT (g)	PUBLICATIONS (h)
	1. Course manual 2. Engineering Science. Hughes and Hughes 3. Engineering Science. W. Bolton

FILMS/VIDEOS		
Nº (i)	TITLE (j)	TIME (k)

PART III

N° (a)	ENABLING OBJECTIVES (b)	CONDITIONS (c)	STANDARDS (d)	REFERENCE (e)
2.1	Explain the function of block diagrams.	In a classroom.	Correctly.	1. Course manual. 2. chap 24. 3. chap 1.
2.2	Define: a. Inputs and outputs. b. Open and closed loops. c. Direction of signal flow. d. Concept of signal conditioning and modification.	In a classroom.	Correctly.	1. Course manual. 2. chap 24. 3. chap 1.
2.3	Produce and interpret simplified block diagrams - for such things as: aircraft control systems; aircraft cabin conditioning systems; and engine control systems - identifying: a. Inputs and outputs. b. Open and closed loops. c. Direction of signal flow. e. Concept of signal conditioning and modification. End of 2.0	In a classroom.	Correctly.	1. Course manual. 2. chap 24. 3. chap 1.

PART III

TRADE TRAINING

SECTION: P3 ENGINEERING SCIENCE

SUBJECT: 3. PRACTICAL MEASURING SYSTEMS

TRAINING OBJECTIVE (a)	REFERENCE (b)	ALLOCATION OF PERIODS (c)	Syll Hrs (d)	No of CELLS (e)	INSTR HOURS (f)
3.0 Produce and interpret practical measuring systems in a block diagram form, identifying the functional elements.	BTEC 14567F A3	Classroom	2.00	1	2.00
		Practical	0.00		0.00
		Total	2.00		2.00

EQUIPMENT (g)	PUBLICATIONS (h)
	1. Course manual 2. Engineering Science. Hughes and Hughes 3. Engineering Science. W. Bolton

FILMS/VIDEOS		
Nº (i)	TITLE (j)	TIME (k)

PART III

N° (a)	ENABLING OBJECTIVES (b)	CONDITIONS (c)	STANDARDS (d)	REFERENCE (e)
3.1	Define: a. Transducer/sensor. b. Signal conditioner/signal amplification. c. Receiver. d. Recorder. e. Display module. f. Error. g. Accuracy. h. Lag. i. Repeatability. j. Reliability.	In a classroom.	Correctly.	1. Course manual. 2. chap 24. 3. chap 1.
3.2	Produce and interpret practical measuring systems – for such quantities as: stress, strain, force, pressure, temperature, fluid flow – identifying and explaining, where applicable, the principles of operation of each of the elements detailed in EO 3.1. End of 3.0	In a classroom.	Correctly.	1. Course manual. 2. chap 24. 3. chap 1.

PART III

TRADE TRAINING

SECTION: P3 ENGINEERING SCIENCE

SUBJECT: 4. CONCEPTS OF FORCE

TRAINING OBJECTIVE (a)	REFERENCE (b)	ALLOCATION OF PERIODS (c)	Syll Hrs (d)	No of CELLS (e)	INSTR HOURS (f)
4.0 Explain the concepts of force.	BTEC 14567F B5	Classroom	4.00	1	4.00
		Practical	4.00	2	8.00
		Total	8.00		12.00

EQUIPMENT (g)	PUBLICATIONS (h)
Friction planes, slider blocks and various masses. LJ Mechanics equipment.	1. Course manual 2. Mechanical Engineering Science. Hannah and Hillier 3. Engineering Science. Hughes and Hughes

FILMS/VIDEOS		
Nº (i)	TITLE (j)	TIME (k)

PART III

N° (a)	ENABLING OBJECTIVES (b)	CONDITIONS (c)	STANDARDS (d)	REFERENCE (e)
4.1	Define a force and its relationship with Newton's Laws of Motion	In a classroom.	Correctly.	1. Course Manuals 2. Chap 9 para 9.1-9.2 3. Chap 7 para 7.1-7.4
4.2	Explain that force is a vector quantity and that the characteristics of a force are as follows: a. Magnitude. b. Direction (line of action and sense). c. Point of application.	In a classroom.	Correctly.	1. Course Manuals 2. Chap 1 para 1.1-1.11 3. Chap 2 para 2.2
4.3	Explain the relationship between mass, weight and gravitational acceleration.	In a classroom.	Correctly.	1. Course Manuals 2. Chap1 para 1.7 3. Chap 1 para 1.8
4.4	Explain the six laws of dry friction.	In a classroom.	Correctly.	1. Course Manuals 2. Chap 4 para 4.1– 4.9 3. Chap 5
4.5	Define the following terms: a. Coefficient of friction. $F = \mu N$ b. Static friction. c. Dynamic friction. d. Angle of friction. e. Angle of repose.	In a classroom.	Correctly.	1. Course Manuals 2. Chap 4 para 4.1– 4.9 3. Chap 5
4.6	Construct force diagrams for a body experiencing frictional forces when stationary, or moving with uniform velocity, on horizontal or inclined planes.	In a classroom.	Correctly.	1. Course Manuals 2. Chap 4 para 4.1– 4.9 3. Chap 5
4.7	Solve friction problems from EO 4.6 above using resolution of forces or scale drawing.	In a classroom.	Correctly.	1. Course Manuals 3. Chap 5 para 5.2
4.8	Investigate the effects of friction experimentally. End of 4.0	In a classroom or laboratory.	Correctly, under the guidance of the instructor.	

PART III

TRADE TRAINING

SECTION: P3 ENGINEERING SCIENCE

SUBJECT: 5. CO-PLANAR FORCES

TRAINING OBJECTIVE (a)	REFERENCE (b)	ALLOCATION OF PERIODS (c)	Syll Hrs (d)	No of CELLS (e)	INSTR HOURS (f)
5.0 Explain the principles of co-planar forces.	BTEC 14567F B6	Classroom	6.00	1	6.00
		Practical	2.00	2	4.00
		Total	8.00		10.00

EQUIPMENT (g)	PUBLICATIONS (h)
Griffin and George peg board.	1. Course manuals 2. Mechanical Engineering Science. Hannah and Hillier 3. Engineering Science. Hughes and Hughes

FILMS/VIDEOS		
Nº (i)	TITLE (j)	TIME (k)

PART III

N^{o} (a)	ENABLING OBJECTIVES (b)	CONDITIONS (c)	STANDARDS (d)	REFERENCE (e)
5.1	Define the following terms: a. Resultant. b. Forces in equilibrium. c. Equilibrant.	In a classroom.	Correctly.	1. Course Manuals 2. Chap 1 3. Chap 2
5.2	Resolve two or more forces into horizontal and vertical components	In a classroom.	Correctly.	1. Course Manuals 2. Chap 1 3. Chap 2
5.3	Explain the parallelogram of forces theorem.	In a classroom.	Correctly.	1. Course Manuals 2. Chap 1 3. Chap 2
5.4	Solve simple problems involving two or more co-planar forces using the methods from EOs 5.2 and 5.3 above.	In a classroom.	Correctly.	1. Course Manuals 2. Chap 1 3. Chap 2
5.5	Explain the triangle of forces theorem.	In a classroom.	Correctly.	1. Course Manuals 2. Chap 1 3. Chap 2
5.6	Explain the principle of Bow's notation.	In a classroom.	Correctly.	1. Course Manuals 2. Chap 1 3. Chap 2
5.7	Solve simple problems involving three forces in equilibrium using methods from EOs 5.5 and 5.6 above.	In a classroom.	Correctly.	1. Course Manuals 2. Chap 1 3. Chap 2
5.8	Investigate the triangle of forces theorem practically. End of 5.0	In a classroom or laboratory.	Correctly, under the guidance of the instructor.	1. Course Manuals 2. Chap 1 3. Chap 2

PART III

TRADE TRAINING

SECTION: P3 ENGINEERING SCIENCE

SUBJECT: 6. MOMENTS/TORQUE

TRAINING OBJECTIVE (a)	REFERENCE (b)	ALLOCATION OF PERIODS (c)	Syll Hrs (d)	No of CELLS (e)	INSTR HOURS (f)
6.0 Determine a resultant turning moment as torque.	BTEC 14567F B8 Cross refer to D15 and D17	Classroom	4.00	1	4.00
		Practical	0.00		0.00
		Total	4.00		4.00

EQUIPMENT (g)	PUBLICATIONS (h)
LJ Mechanisms equipment.	1. Course manuals 2. Mechanical Engineering Science. Hannah and Hillier 3. Engineering Science. Hughes and Hughes. 4. Advanced Design and Technology. Norman et al.

FILMS/VIDEOS		
N^{o} (i)	TITLE (j)	TIME (k)

PART III

N^o (a)	ENABLING OBJECTIVES (b)	CONDITIONS (c)	STANDARDS (d)	REFERENCE (e)
6.1	Define torque as a turning moment. $T = F\ r$	In a classroom.	Correctly.	1. Course Manuals 2. Chap 2
6.2	Define a couple and the turning effect of a couple.	In a classroom.	Correctly.	1. Course Manuals 2. Chap 2 3. Chap 3 para 3.9
6.3	Solve simple problems involving torque and couples.	In a classroom.	Correctly.	1. Course Manuals 2. Chap 2
6.4	Explain input and output speed, and torque of a simple gear train. $\frac{t_2}{t_1} = \frac{N_1}{N_2} = \frac{T_2}{T_1}$	In a classroom.	Correctly.	1. Course Manuals 2. Chap 6 para 6.16-19 4. Chap 9 para 9.3.1-3
6.5	Investigate input and output speeds of a simple gear train practically.	In a classroom or laboratory.	Correctly, under the guidance of the instructor.	
6.6	Solve simple problems involving speed and torque of simple gear trains. End of 6.0	In a classroom.	Correctly.	1. Course Manuals 2. Chap 6 para 6.16-19 4. Chap 9 para 9.3.1-3

PART III

TRADE TRAINING

SECTION: P3 ENGINEERING SCIENCE

SUBJECT: 7. MOMENTS AND EQUILIBRIUM

TRAINING OBJECTIVE (a)	REFERENCE (b)	ALLOCATION OF PERIODS (c)	Syll Hrs (d)	No of CELLS (e)	INSTR HOURS (f)
7. Explain the principle of moments and system equilibrium.	BTEC 14567F B9 Cross refer to B11	Classroom	2.00	1	2.00
		Practical	2.00	2	4.00
		Total	4.00		6.00

EQUIPMENT (g)	PUBLICATIONS (h)
	1. Course manuals 2. Mechanical Engineering Science. Hannah and Hillier. 3. Engineering Science. Hughes and Hughes.

FILMS/VIDEOS		
Nº (i)	TITLE (j)	TIME (k)

PART III

N° (a)	ENABLING OBJECTIVES (b)	CONDITIONS (c)	STANDARDS (d)	REFERENCE (e)
7.1	Define the following terms: a. Moment. b. Centre of Gravity.	In a classroom.	Correctly.	1. Course Manuals 3. Chap 3 para 3.1-5
7.2	Explain the principle of moments and equilibrium of uniform simply supported and cantilever beams.	In a classroom.	Correctly.	1. Course Manuals 3. Chap 3 para 3.1-5
7.3	Determine the reactions of supports for simply supported beams carrying: a. Concentrated (point) loads. b. Uniformly distributed loads.(U.D.L) c. Combination of a) and b) above.	In a classroom.	Correctly.	1. Course Manuals 3. Chap 3 para 3.1-5
7.4	Determine the vertical reaction and fixing moment for cantilever beams carrying: a. Concentrated (point) loads. b. Uniformly distributed loads. (U.D.L) c. Combination of a) and b) above.	In a classroom.	Correctly.	1. Course Manuals 3. Chap 3 para 3.1-5
7.5	Solve simple problems involving reactions of simply supported beams under concentrated and U.D.L's.	In a classroom.	Correctly.	1. Course Manuals 3. Chap 3 para 3.1-5
7.6	Solve simple problems involving vertical reaction and fixing moment of cantilever beams, under concentrated and U.D.L's. End of 7.0	In a classroom.		1. Course Manuals 3. Chap 3 para 3.1-5

PART III

TRADE TRAINING

SECTION: P3 ENGINEERING SCIENCE

SUBJECT: 8. LINEAR MOTION

TRAINING OBJECTIVE (a)	REFERENCE (b)	ALLOCATION OF PERIODS (c)	Syll Hrs (d)	No of CELLS (e)	INSTR HOURS (f)
8.0 Investigate the relationship between displacement, velocity and acceleration for linear motion and angular motion.	BTEC 14567F C12	Classroom	4.00	1	4.00
		Practical	2.00	2	4.00
		Total	6.00		8.00

EQUIPMENT (g)	PUBLICATIONS (h)
Airtrack equipment.	1. Course manuals 2. Mechanical Engineering Science. Hannah and Hillier. 3. Engineering Science. Hughes and Hughes.

FILMS/VIDEOS		
Nº (i)	TITLE (j)	TIME (k)

PART III

N° (a)	ENABLING OBJECTIVES (b)	CONDITIONS (c)	STANDARDS (d)	REFERENCE (e)
8.1	Define the following terms: a. Displacement. b. Distance. c. Speed. d. Velocity. e. Acceleration.	In a classroom.	Correctly.	1. Course Manuals 2. Chap 7 para 7.1 – 4 3. Chap 6
8.2	State the equations of linear motion with a constant acceleration: a. $v = u + at$ b. $s = ut + \frac{1}{2}at^2$ c. $s = \frac{1}{2}(u + v)t$ d. $v^2 = u^2 + 2as$	In a classroom.	Correctly.	1. Course Manuals 2. Chap 7 para 7.1 – 4 3. Chap 6
8.3	Solve practical problems relating to linear motion.	In a classroom.	Correctly.	1. Course Manuals 2. Chap 7 para 7.1 – 4 3. Chap 6
8.4	Investigate the equations of motion experimentally.	In a classroom or laboratory.	Correctly.	
8.5	Define resultant and relative velocity	In a classroom.	Correctly, under the guidance of the instructor.	1. Course Manuals 2. Chap 7 para 7.13 – 15 3. Chap 6
8.6	Solve simple problems relating to resultant and relative velocity. End of 8.0	In a classroom.	Correctly.	1. Course Manuals 2. Chap 7 para 7.13 – 15 3. Chap 6

PART III

TRADE TRAINING

SECTION: P3 ENGINEERING SCIENCE

SUBJECT: 9. CONSERVATION OF MOMENTUM

TRAINING OBJECTIVE (a)	REFERENCE (b)	ALLOCATION OF PERIODS (c)	Syll Hrs (d)	No of CELLS (e)	INSTR HOURS (f)
9.0 Explain the principle of conservation of momentum for linear motion.	BTEC 14567F C13	Classroom	4.00	1	4.00
		Practical	4.00	2	4.00
		Total	8.00		12.0

EQUIPMENT (g)	PUBLICATIONS (h)
Airtrack equipment.	1. Course manuals. 2. Mechanical Engineering Science. Hannah and Hillier. 3. Engineering Science. Hughes and Hughes.

FILMS/VIDEOS		
N^{o} (i)	TITLE (j)	TIME (k)

PART III

N^{o} (a)	ENABLING OBJECTIVES (b)	CONDITIONS (c)	STANDARDS (d)	REFERENCE (e)
9.1	State the concept of mass.	In a classroom.	Correctly.	1. Course Manual. 2. Chap 9 3. Chap 7
9.2	Define Inertia.	In a classroom.	Correctly.	1. Course Manual. 2. Chap 9 3. Chap 7
9.3	State Newton's First Law of Motion.	In a classroom.	Correctly.	1. Course Manual. 2. Chap 9 3. Chap 7
9.4	Define the following terms: a. Momentum and impact of elastic bodies. Mv b. Impulse. Ft	In a classroom.	Correctly.	1. Course Manual. 2. Chap 9. 3. Chap 7.
9.5	State the principle of conservation of momentum. a. $m_1u_1 + m_2u_2 = m_1v_1 + m_2v_2$	In a classroom.	Correctly.	1. Course Manual. 2. Chap 9. 3. Chap 7.
9.6	State Newton's Second Law of Motion and deduce F = ma.	In a classroom.	Correctly.	1. Course Manual. 2. Chap 9. 3. Chap 7.
9.7	State Newton's Third Law of Motion.	In a classroom.	Correctly.	1. Course Manual. 2. Chap 9. 3. Chap 7.
9.8	Solve problems involving Newton's Laws of Motion, inertia, impulse and using the conservation of momentum.	In a classroom.	Correctly.	1. Course Manual. 2. Chap 9. 3. Chap 7.
9.9	Investigate the conservation of momentum practically. End of 9.0	In a classroom or laboratory.	Correctly, under the guidance of the instructor.	

PART III

TRADE TRAINING

SECTION: P3 ENGINEERING SCIENCE

SUBJECT: 10. ANGULAR MOTION

TRAINING OBJECTIVE (a)	REFERENCE (b)	ALLOCATION OF PERIODS (c)	Syll Hrs (d)	No of CELLS (e)	INSTR HOURS (f)
10.0 Explain the effects of centripetal acceleration.	BTEC 14567F C14	Classroom	2.00	1	2.00
		Practical	2.00	2	4.00
		Total	4.00		6.00

EQUIPMENT (g)	PUBLICATIONS (h)
	1. Course manuals. 2. Mechanical Engineering Science. Hannah and Hillier. 3. Engineering Science. Hughes and Hughes.

FILMS/VIDEOS		
Nº (i)	TITLE (j)	TIME (k)

PART III

N° (a)	ENABLING OBJECTIVES (b)	CONDITIONS (c)	STANDARDS (d)	REFERENCE (e)
10.1	Define the following terms: a. Displacement. b. Distance. c. Speed. d. Velocity. e. Acceleration.	In a classroom.	Correctly.	1. Course Manual. 2. Chap 10 para 10.1-10. 3. Chap 8 para 8.1-5.
10.2	State the equations of angular motion with constant acceleration: a. $\omega_2 = \omega_1 + \alpha t$ b. $\theta = \omega t + \frac{1}{2}\alpha t^2$ c. $\theta = \frac{1}{2}(\omega_1 + \omega_2)t$ d. $\omega_2^2 = \omega_1^2 + 2\alpha\theta$	In a classroom.	Correctly.	1. Course Manual. 2. Chap 10 para 10.1-10. 3. Chap 8 para 8.1-5.
10.3	Solve practical problems relating to angular motion	In a classroom.	Correctly.	1. Course Manual. 2. Chap 10 para 10.1-10. 3. Chap 8 para 8.1-5.
10.4	Define centripetal acceleration and centripetal force. $a = r\omega^2$ or $a = \frac{v^2}{r}$ $F = mr\omega^2$ or $F = \frac{mv^2}{r}$	In a classroom.	Correctly.	1. Course Manual. 2. Chap 10 para 10.1-10. 3. Chap 8 para 8.1-5.
10.5	Define the inertia reaction to the force in EO 10.4 as a consequence of Newton's Third Law.	In a classroom.	Correctly.	1. Course Manual. 2. Chap 10 para 10.1-10. 3. Chap 8 para 8.1-5.
10.6	Explain balancing of rotating machinery, such as: car wheels, helicopter blades and gas turbine blades.	In a classroom.	Correctly.	1. Course Manual. 2. Chap 10 para 10.1-10. 3. Chap 8 para 8.1-5.
10.7	Explain the forces on an aircraft in a balanced level turn and relate to the angle of bank. $\tan\theta = \frac{v^2}{gr}$	In a classroom.	Correctly.	1. Course Manual.

PART III

Nº (a)	ENABLING OBJECTIVES (b)	CONDITIONS (c)	STANDARDS (d)	REFERENCE (e)
10.8	Solve simple problems relating to centripetal acceleration and centripetal force in situations such as: a. Aircraft banking. b. Vehicles traversing level curves. c. Engine governors. End of 10.0	In a classroom.	Correctly.	1. Course Manual. 2. Chap 10 para 10.1-10. 3. Chap 8 para 8.1-5.

PART III

TRADE TRAINING

SECTION: P3 ENGINEERING SCIENCE

SUBJECT: 11. THEORY OF MACHINES

TRAINING OBJECTIVE (a)	REFERENCE (b)	ALLOCATION OF PERIODS (c)	Syll Hrs (d)	No of CELLS (e)	INSTR HOURS (f)
11.0 Explain processes involving energy transfer.	BTEC 14567F D15 and D17 Cross refer to B8	Classroom	2.00	1	2.00
		Practical	2.00	2	4.00
		Total	4.00		6.00

EQUIPMENT (g)	PUBLICATIONS (h)
	1. Course manuals 2. Mechanical Engineering Science. Hannah and Hillier. 3. Engineering Science. Hughes and Hughes.

FILMS/VIDEOS		
Nº (i)	TITLE (j)	TIME (k)

PART III

N^{o} (a)	ENABLING OBJECTIVES (b)	CONDITIONS (c)	STANDARDS (d)	REFERENCE (e)
11.1	Describe a machine as a device for changing the magnitude and line of action of a force.	In a classroom.	Correctly.	1. Course Manual. 2. Chap 6. 3. Chap 10.
11.2	Define a lever as the simplest form of machine.	In a classroom.	Correctly.	1. Course Manual. 2. Chap 6. 3. Chap 10.
11.3	Define mechanical advantage and velocity ratio as applied to simple machines.	In a classroom.	Correctly.	1. Course Manual. 2. Chap 6. 3. Chap 10.
11.4	Using systems approach, define efficiency in terms of work in, work out and losses, and relate this to power in, power out and losses-including braking systems.	In a classroom.	Correctly.	1. Course Manual. 2. Chap 6. 3. Chap 10.
11.5	Explain the principles of a hydraulic jack, a screw jack and a simple gear train.	In a classroom.	Correctly.	1. Course Manual. 2. Chap 6. 3. Chap 10.
11.6	Solve problems involving a hydraulic jack, a screw jack and a simple gear train.	In a classroom.	Correctly.	1. Course Manual. 2. Chap 6. 3. Chap 10.
11.7	Define power transmitted by a shaft as: $P = 2\pi NT/60$	In a classroom.	Correctly.	1. Course Manual. 2. Chap 6. 3. Chap 10.
11.8	Solve problems with power being transmitted through a simple gear train. End of 11.0	In a classroom.	Correctly.	1. Course Manual. 2. Chap 6. 3. Chap 10.

PART III

TRADE TRAINING

SECTION: P3 ENGINEERING SCIENCE

SUBJECT: 12. STEADY FLOW

TRAINING OBJECTIVE (a)	REFERENCE (b)	ALLOCATION OF PERIODS (c)	Syll Hrs (d)	No of CELLS (e)	INSTR HOURS (f)
12.0 Explain the steady flow energy equation.	BTEC 14567F D16	Classroom	2.00	1	2.00
		Practical	0.00		0.00
		Total	2.00		2.00

EQUIPMENT (g)	PUBLICATIONS (h)
	1. Course manuals. 2. Engineering Science. W. Bolton. 3. Advanced Design and Technology. Norman et al.

FILMS/VIDEOS		
Nº (i)	TITLE (j)	TIME (k)

PART III

N^o (a)	ENABLING OBJECTIVES (b)	CONDITIONS (c)	STANDARDS (d)	REFERENCE (e)
12.1	Define the steady flow energy process.	In a classroom.	Correctly.	1. Course Manual. 2. Chap 11 para 11.7 3. Chap 5
12.2	Identify the following forms in a steady flow system: a. Potential energy. ρgh b. Kinetic energy. $\frac{1}{2}\rho v^2$ c. Internal energy. u d. Flow energy. PV	In a classroom.	Correctly.	1. Course Manual. 2. Chap 11 para 11.7 3. Chap 5
12.3	State the effects of the following terms on the internal energy in a steady flow system: a. Heat added. Q b. Work done. W	In a classroom.	Correctly.	1. Course Manual. 2. Chap 11 para 11.7 3. Chap 5
12.4	Identify the terms in the steady flow energy equation. a. $\rho gh + \frac{1}{2}\rho v^2 + p + u + q + w$ b. $mgh + \frac{1}{2}mv^2 + PV + U + Q + W$	In a classroom.	Correctly.	1. Course Manual. 2. Chap 11 para 11.7 3. Chap 5
12.5	State the steady flow energy equation as a consequence of "conservation of energy". End of 12.0	In a classroom.	Correctly.	1. Course Manual. 2. Chap 11 para 11.7 3. Chap 5

PART III

TRADE TRAINING

SECTION: P3 ENGINEERING SCIENCE

SUBJECT: 13. ENERGY, WORK AND POWER

TRAINING OBJECTIVE (a)	REFERENCE (b)	ALLOCATION OF PERIODS (c)	Syll Hrs (d)	No of CELLS (e)	INSTR HOURS (f)
13.0 Explain the principles of work done, potential energy, linear kinetic energy, and power.	BTEC 14567F D15 and D17	Classroom	4.00	1	4.00
		Practical	0.00		0.00
		Total	4.00		4.00

EQUIPMENT (g)	PUBLICATIONS (h)
	1. Course manual.

FILMS/VIDEOS		
Nº (i)	TITLE (j)	TIME (k)

PART III

N^{o} (a)	ENABLING OBJECTIVES (b)	CONDITIONS (c)	STANDARDS (d)	REFERENCE (e)
13.1	Define potential energy (PE) as energy due to position.	In a classroom.	Correctly.	Course manual.
13.2	Solve simple problems involving potential energy. PE = mgh	In a classroom.	Correctly.	Course manual.
13.3	Define kinetic energy (KE) as energy due to motion.	In a classroom.	Correctly.	Course manual.
13.4	Solve simple problems involving kinetic energy. KE =½mv^2	In a classroom.	Correctly.	Course manual.
13.5	State the principle of conservation of energy.	In a classroom.	Correctly.	Course manual.
13.6	Apply the principle of conservation of energy in solving problems involving both potential and kinetic energies where there are no energy losses.	In a classroom.	Correctly.	Course manual.
13.7	Define work as a transfer of energy. Work Done = Force x Distance (WD = FS)	In a classroom.	Correctly.	Course manual.
13.8	Apply the principle of conservation of energy to inclined planes and lifts in solving problems involving potential energy and kinetic energy, and with friction as a form of energy loss (ie, work done against friction).	In a classroom.	Correctly.	Course manual.
13.9	Define power as the rate of doing work. P = WD/t	In a classroom.	Correctly.	Course manual.
13.10	Using inclined planes and lifts, solve problems involving energy, work and power. End of 13.0	In a classroom.	Correctly.	Course manual.

PART III

TRADE TRAINING

SECTION: P3 ENGINEERING SCIENCE

SUBJECT: 14. MID PHASE EXAMINATION

TRAINING OBJECTIVE (a)	REFERENCE (b)	ALLOCATION OF PERIODS (c)	Syll Hrs (d)	No of CELLS (e)	INSTR HOURS (f)
14.0 Complete a mid-phase examination on TOs 3.1 to 3.11 and TO 3.13.	BTEC 14567F A1-D17	Classroom	4.00	0.00	4.00
		Practical	0.00		0.00
		Total	4.00		4.00

EQUIPMENT (g)	PUBLICATIONS (h)

FILMS/VIDEOS		
Nº (i)	TITLE (j)	TIME (k)

PART III

N° (a)	ENABLING OBJECTIVES (b)	CONDITIONS (c)	STANDARDS (d)	REFERENCE (e)
14.1	Complete a mid-phase examination on TOs 3.1 to 3.11 and TO 3.13. End of 14.0	In a classroom, under examination conditions.	Attaining the examination pass mark.	

PART III

TRADE TRAINING

SECTION: P3 ENGINEERING SCIENCE

SUBJECT: 15. GAS LAWS

TRAINING OBJECTIVE (a)	REFERENCE (b)	ALLOCATION OF PERIODS (c)	Syll Hrs (d)	No of CELLS (e)	INSTR HOURS (f)
15.0 Explain the basic gas laws.	BTEC 14567F E18	Classroom	2.00	1	2.00
		Practical	0.00		0.00
		Total	2.00		2.00

EQUIPMENT (g)	PUBLICATIONS (h)
	1. Course manual. 2. Mechanical Engineering Science. Hannah and Hillier 3. Advanced Design and Technology. Norman et al

FILMS/VIDEOS		
Nº (i)	TITLE (j)	TIME (k)

PART III

N° (a)	ENABLING OBJECTIVES (b)	CONDITIONS (c)	STANDARDS (d)	REFERENCE (e)
15.1	Define the following: a. Fluid, and explain the difference between gases and liquids. b. Density and relative density. c. Atmospheric pressure and the barometer. $p = \rho gh$ d. Gauge and absolute pressure. $P_{absolute} = p_{gauge} + p_{atmos}$ e. Absolute temperature, and relate between Celsius and Kelvin.	In a classroom.	Correctly.	1. Course Manuals 2. Chap 15 para 15.1-11 3. Chap 11 para 11.6.1-2
15.2	State Boyle's Law and recognise as an isothermal process.	In a classroom.	Correctly.	1. Course Manuals 2. Chap 15 para 15.1-11 3. Chap 11 para 11.6.1-2
15.3	Solve problems using Boyle's Law. $P_1V_1 = P_2V_2$, ($PV = C$)	In a classroom.	Correctly.	1. Course Manuals 2. Chap 15 para 15.1-11 3. Chap 11 para 11.6.1-2
15.4	State Charles' Law and recognise as an isobaric process.	In a classroom.	Correctly.	1. Course Manuals 2. Chap 15 para 15.1-11 3. Chap 11 para 11.6.1-2
15.5	Solve problems using Charles' Law. $V_1/T_1 = V_2/T_2$, ($V/T = C$)	In a classroom.	Correctly.	1. Course Manuals 2. Chap 15 para 15.1-11 3. Chap 11 para 11.6.1-2
15.6	State the Combined Gas Law.	In a classroom.	Correctly.	1. Course Manuals 2. Chap 15 para 15.1-11 3. Chap 11 para 11.6.1-2
15.7	Solve problems using the Combined Gas Law. $P_1V_1/T_1 = P_2V_2/T_2$, ($PV/T = C$)	In a classroom.	Correctly.	1. Course Manuals 2. Chap 15 para 15.1-11 3. Chap 11 para 11.6.1-2
15.8	State the Characteristic Gas Equation.	In a classroom.	Correctly.	1. Course Manuals 2. Chap 15 para 15.1-11 3. Chap 11 para 11.6.1-2
15.9	Solve problems using the Characteristic Gas Equation. $PV = mRT$ End of 15.0	In a classroom.	Correctly.	1. Course Manuals 2. Chap 15 para 15.1-11 3. Chap 11 para 11.6.1-2

PART III

TRADE TRAINING

SECTION: P3 ENGINEERING SCIENCE

SUBJECT: 16. CONTINUITY OF FLOW

TRAINING OBJECTIVE (a)	REFERENCE (b)	ALLOCATION OF PERIODS (c)	Syll Hrs (d)	No of CELLS (e)	INSTR HOURS (f)
16.0 Explain continuity and Bernoulli's equation.	BTEC 14567F E19	Classroom	2.00	1	2.00
		Practical	0.00		0.00
		Total	2.00		2.00

EQUIPMENT (g)	PUBLICATIONS (h)
	1. Course manual. 2. Mechanical Engineering Science. Hannah and Hillier. 3. Engineering Science. W. Bolton. 4. Advanced Design and Technology. Norman et al. 5. Fluid Mechanics, Level III. Madill.

FILMS/VIDEOS

Nº (i)	TITLE (j)	TIME (k)

PART III

N° (a)	ENABLING OBJECTIVES (b)	CONDITIONS (c)	STANDARDS (d)	REFERENCE (e)
16.1	State the continuity equation for steady flow as a consequence of conservation of matter.	In a classroom.	Correctly.	1. Course Manual. 3. Chap 13. 4. Chap 12.5.1. 5. Chap 5.
16.2	Identify the terms in the continuity equation. $A_1v_1 = A_2v_2$	In a classroom.	Correctly.	1. Course Manual. 2. Chap 21.16. 3. Chap 13. 4. Chap 12.5.1. 5. Chap 5.
16.3	Identify Bernoulli's equation as being derived from the steady flow energy equation.	In a classroom.	Correctly.	1. Course Manual. 3. Chap 13. 4. Chap 12.5.1. 5. Chap 5.
16.4	State Bernoulli's equation as a consequence of conservation of energy.	In a classroom.	Correctly.	1. Course Manual. 3. Chap 13. 4. Chap 12.5.1. 5. Chap 5.
16.5	Identify the forms of energy in Bernoulli's equation. $p + \frac{1}{2}\rho v^2 + \rho gh$	In a classroom.	Correctly.	1. Course Manual. 3. Chap 13. 4. Chap 12.5.1. 5. Chap 5.
16.6	Define the concept of "fluid head".	In a classroom.	Correctly.	1. Course Manual. 3. Chap 13. 4. Chap 12.5.1. 5. Chap 5.
16.7	Identify the terms in the "head" form of Bernoulli's equation. $\frac{p}{\rho g} + \frac{v^2}{2g} + h$	In a classroom.	Correctly.	1. Course Manual. 3. Chap 13. 4. Chap 12.5.1. 5. Chap 5.
16.8	Solve simple problems involving continuity equation and Bernoulli's equation.	In a classroom.	Correctly.	1. Course Manual. 3. Chap 13. 4. Chap 12.5.1. 5. Chap 5.

PART III

Nº (a)	ENABLING OBJECTIVES (b)	CONDITIONS (c)	STANDARDS (d)	REFERENCE (e)
16.9	Define a non-flow process.	In a classroom.	Correctly.	1. Course Manual 3. Chap 13 4. Chap 11.7
16.10	Identify the terms from the steady flow energy equation relevant to a non-flow process.	In a classroom.	Correctly.	1. Course Manual 3. Chap 13 4. Chap 11.7
16.11	Identify the non-flow energy equation as the first law of thermodynamic. $Q = \Delta U + W$ End of 16.0	In a classroom.	Correctly.	1. Course Manuals 3. Chap 13 4. Chap 11.7

PART III

TRADE TRAINING

SECTION: P3 ENGINEERING SCIENCE

SUBJECT: 17. BERNOULLI'S EQUATION

TRAINING OBJECTIVE (a)	REFERENCE (b)	ALLOCATION OF PERIODS (c)	Syll Hrs (d)	No of CELLS (e)	INSTR HOURS (f)
17.0 Apply continuity and Bernoulli's equation.		Classroom	1.00	1	1.00
		Practical	1.00	2	2.00
		Total	2.00		3.00

EQUIPMENT (g)	PUBLICATIONS (h)
Fluids Flow Bench.	1. Course manual. 2. Engineering Science. W. Bolton. 3. Advanced Design and Technology. Norman et al. 4. Fluid Mechanics, Level III. Madill.

FILMS/VIDEOS		
Nº (i)	TITLE (j)	TIME (k)

PART III

N° (a)	ENABLING OBJECTIVES (b)	CONDITIONS (c)	STANDARDS (d)	REFERENCE (e)
17.1	Describe the following: a. Venturi meter. b. Orifice meter.	In a classroom.	Correctly.	1. Course Manual. 2. Chap 3 pages 41- 43. 3. Chap 12 para 12.6.1-2. 4. Chap 6.
17.2	Solve theoretical flow problems involving fluid flow in pipelines, venturi and orifice meters. $Q_A = A_1 \times \sqrt{\frac{2gh}{\left[\frac{A_1}{A_2}\right]^2 - 1}}$	In a classroom.	Correctly.	1. Course Manual. 2. Chap 3 pages 41- 43. 3. Chap 12 para 12.6.1-2. 4. Chap 6.
17.3	Define the coefficient of discharge.	In a classroom.	Correctly.	1. Course Manual. 2. Chap 3 pages 41- 43. 3. Chap 12 para 12.6.1-2. 4. Chap 6.
17.4	Calculate actual flow rate from the pressure drop across an orifice plate or a venturi meter. $Q_A = Q_t x C_d$	In a classroom.	Correctly.	1. Course Manual. 2. Chap 3 pages 41- 43. 3. Chap 12 para 12.6.1-2. 4. Chap 6.
17.5	Calculate fluid velocity from pitot and static pressures. $\sqrt{2g\frac{\rho_{manometer}}{\rho_{fluid}}}$	In a classroom.	Correctly.	1. Course Manual. 2. Chap 3 pages 41- 43. 3. Chap 12 para 12.6.4. 4. Chap 7 pages 47-48.
17.6	Use relevant fluid equations and practical measurements to calculate the pressure drop across a venturi meter, in a practical setting.	In a laboratory.	Correctly, under the guidance of an instructor.	
17.7	Relate applications of Bernoulli's equation and the continuity equation to practical settings; e.g. fuel flow. End of 17.0	In a classroom.	Correctly.	

PART III

TRADE TRAINING

SECTION: P3 ENGINEERING SCIENCE

SUBJECT: 18. INCOMPRESSIBLE FLOW

TRAINING OBJECTIVE (a)	REFERENCE (b)	ALLOCATION OF PERIODS (c)	Syll Hrs (d)	No of CELLS (e)	INSTR HOURS (f)
18.0 Explain the principles of incompressible fluid flow.	BTEC 14567F E21	Classroom	1.00	1	1.00
		Practical	1.00	2	2.00
		Total	2.00		3.00

EQUIPMENT (g)	PUBLICATIONS (h)
	1. Course manual 2. Engineering Science. W. Bolton 3. Advanced Design and Technology. Norman et al 4. Fluid Mechanics, Level III. Madill

FILMS/VIDEOS		
Nº (i)	TITLE (j)	TIME (k)

PART III

N^{o} (a)	ENABLING OBJECTIVES (b)	CONDITIONS (c)	STANDARDS (d)	REFERENCE (e)
18.1	Describe the velocity profile in a uniform circular duct.	In a classroom.	Correctly.	1. Course Manual. 2. Chap 13 page 199 3. Chap 12 para 12.8.1 4. Chap 5 pages 34-35
18.2	Describe the following terms as applicable to a uniform circular duct: a. Laminar flow. b. Turbulent flow. c. Boundary flow.	In a classroom.	Correctly.	1. Course Manual. 2. Chap 13 page 199 3. Chap 12 para 12.8.1 4. Chap 5 pages 34-35
18.3	Identify the occurrence of the effects listed in EO 18.2 in practical setting. End of 18.0	In a classroom.	Correctly.	1. Course Manual. 2. Chap 13 page 199 3. Chap 12 para 12.8.1 4. Chap 5 pages 34-35

PART III

TRADE TRAINING

SECTION: P3 ENGINEERING SCIENCE

SUBJECT: 19. THERMODYNAMICS

TRAINING OBJECTIVE (a)	REFERENCE (b)	ALLOCATION OF PERIODS (c)	Syll Hrs (d)	No of CELLS (e)	INSTR HOURS (f)
19.0 Explain the basic thermodynamic relationships.		Classroom	6.00	1	6.00
		Practical	0.00		0.00
		Total	6.00		6.00

EQUIPMENT (g)	PUBLICATIONS (h)
	1. Course manual. 2. Mechanical Engineering Science. Hannah and Hillier. 3. Basic Engineering Thermodynamics. Joel. 4. Advanced Design and Technology. Norman et al.

FILMS/VIDEOS		
N^{o} (i)	TITLE (j)	TIME (k)

PART III

N° (a)	ENABLING OBJECTIVES (b)	CONDITIONS (c)	STANDARDS (d)	REFERENCE (e)
19.1	Define the relationship between heat-energy and temperature.	In a classroom.	Correctly.	1. Course Manual. 3. Chap1 1.7-1.25
19.2	State the first law of thermodynamics for a non-flow process.	In a classroom.	Correctly.	1. Course Manual. 3. Chap1 1.7-1.25
19.3	Solve problems using the first law of thermodynamics. $Q = W + \Delta U$	In a classroom.	Correctly.	1. Course Manual. 3. Chap1 1.7-1.25
19.4	Define the following terms: a. Isovolumetric. b. Adiabatic. c. Isentropic. d. Polytropic.	In a classroom.	Correctly.	1. Course Manual. 3. Chap1 1.7-1.25
19.5	Define work done as the area under a PV diagram.	In a classroom.	Correctly.	1. Course Manual. 2. Chap 15 p345-350 3. Chap1 1.7-1.25
19.6	Define: a. Specific heat at constant pressure. b. Specific heat at constant volume.	In a classroom.	Correctly.	1. Course Manual. 2. Chap 15 p345-350 3. Chap1 1.7-1.25
19.7	Solve problems using: a. Specific heat at constant pressure. b. Specific heat at constant volume.	In a classroom.	Correctly.	1. Course Manual. 2. Chap 15 p345-350 3. Chap1 1.7-1.25
19.8	Define the term: a. $PV^n = C$ (Polytropic Law)	In a classroom.	Correctly.	1. Course Manual. 2. Chap 15 p345-350 3. Chap1 1.7-1.25
19.9	Solve problems using $PV^n = C$	In a classroom.	Correctly.	1. Course Manual. 2. Chap 15 p345-350 3. Chap1 1.7-1.25
19.10	Explain how $PV^n = C$ relates to constant pressure, volume and temperature processes.	In a classroom.	Correctly.	1. Course Manual. 2. Chap 15 p345-350 3. Chap1 1.7-1.25
19.11	Define: $\gamma = C_p/C_v$ (Ratio of Specific Heats)	In a classroom.	Correctly.	1. Course Manual. 2. Chap 15 p345-350 3. Chap1 1.7-1.25
19.12	Solve problems using the ratio of specific heats and the polytropic process. $\gamma = C_p/C_v$ and $PV^n = C$	In a classroom.	Correctly.	1. Course Manual. 2. Chap 15 p345-350 3. Chap1 1.7-1.251.

PART III

Nº (a)	ENABLING OBJECTIVES (b)	CONDITIONS (c)	STANDARDS (d)	REFERENCE (e)
19.13	Sketch PV-Diagrams for basic engine cycles such as: a. The Otto Cycle (constant volume cycle). b. Brayton or Gas Turbine Cycle (constant pressure cycle). c. Diesel (constant volume/constant pressure cycle). End of 19.0	In a classroom.	Correctly.	1. Course Manual 4. Chap 11.8.2

PART III

TRADE TRAINING

SECTION: P3 ENGINEERING SCIENCE

SUBJECT: 20. EFFICIENCY

TRAINING OBJECTIVE (a)	REFERENCE (b)	ALLOCATION OF PERIODS (c)	Syll Hrs (d)	No of CELLS (e)	INSTR HOURS (f)
20.0 Determine engine power output and efficiencies.	BTEC 14567F F23	Classroom	2.00	1	2.00
		Practical	0.00		0.00
		Total	2.00		2.00

EQUIPMENT (g)	PUBLICATIONS (h)
	1. Course notes 2. Mechanical Engineering Science. Hannah and Hillier. 3. Basic Engineering Thermodynamics. Joel.

FILMS/VIDEOS		
Nº (i)	TITLE (j)	TIME (k)

PART III

N° (a)	ENABLING OBJECTIVES (b)	CONDITIONS (c)	STANDARDS (d)	REFERENCE (e)
20.1	Explain the operation of a rope brake.	In a classroom.	Correctly.	1. Course Manual 2. Chap 20 3.Chap 15.3 3. Chap 15.7-15.15
20.2	Calculate braking torque.	In a classroom.	Correctly.	1. Course Manual 2. Chap 20 3. Chap 15.3 3. Chap 15.7-15.15
20.3	Define brake power (bp).	In a classroom.	Correctly.	1. Course Manual 2. Chap 20 3. Chap 15.3 3. Chap 15.7-15.15
20.4	Calculate brake power from brake torque.	In a classroom.	Correctly.	1. Course Manual 2. Chap 20 3. Chap 15.3 3. Chap 15.7-15.15
20.5	Define indicated mean effective pressure (imep).	In a classroom.	Correctly.	1. Course Manual 2. Chap 20 3. Chap 15.3 3. Chap 15.7-15.15
20.6	Calculate indicated power (ip) from imep.	In a classroom.	Correctly.	1. Course Manual 2. Chap 20 3. Chap 15.3 3. Chap 15.7-15.15
20.7	Define the mechanical efficiency of an engine.	In a classroom.	Correctly.	1. Course Manual 2. Chap 20 3. Chap 15.3 3. Chap 15.7-15.15
20.8	Calculate the mechanical efficiency of an engine from bp and ip. End of 20.0	In a classroom.	Correctly.	1. Course Manual 2. Chap 20 3. Chap 15.3 3. Chap 15.7-15.15

PART III

TRADE TRAINING

SECTION: P3 ENGINEERING SCIENCE

SUBJECT: 21. AIRSPEEDS

TRAINING OBJECTIVE (a)	REFERENCE (b)	ALLOCATION OF PERIODS (c)	Syll Hrs (d)	No of CELLS (e)	INSTR HOURS (f)
21.0 Explain the relationship between Indicated, Equivalent, Rectified and True airspeed.	BTEC 14567F G24	Classroom	2.00	1	2.00
		Practical	0.00		0.00
		Total	2.00		2.00

EQUIPMENT (g)	PUBLICATIONS (h)
Wind Generator and Pitot tube.	1. Course manual. 2. Mechanics of Flight. A. C. Kermode. 3. Aircraft Flight. Barnard and Philpott.

FILMS/VIDEOS

Nº (i)	TITLE (j)	TIME (k)

PART III

N° (a)	ENABLING OBJECTIVES (b)	CONDITIONS (c)	STANDARDS (d)	REFERENCE (e)
21.1	Explain the composition and characteristics of the earth's atmosphere and how it changes with altitude.	In a classroom.	Correctly.	1. Course Manual 2. Chap2 P 32-38 3. Chap7 P193-197
21.2	Explain the main requirements of the International Standard Atmosphere (ISA).	In a classroom.	Correctly.	1. Course Manual 2. Chap2 P 32-38 3. Chap7 P193-197
21.3	Explain how an airspeed instrument measures dynamic pressure and relate this to indicated airspeed.	In a classroom.	Correctly.	1. Course Manual 2. Chap2 P 32-38 2. Chap2 P 63-67 3. Chap7 P193-197
21.4	Explain how the following errors are compensated for in airspeed instruments: a. Instrument error. b. Pressure error. c. Compressibility error. d. Density error.	In a classroom.	Correctly.	1. Course Manual 2. Chap2 P 32-38 3. Chap7 P193-197
21.5	Solve simple problems related to true airspeed and equivalent airspeed. $v_1 = v\sqrt{\frac{\rho}{\rho_0}}$ Where V_1 = True airspeed V = Equivalent airspeed End of 21.0	In a classroom.	Correctly.	

PART III

TRADE TRAINING

SECTION: P3 ENGINEERING SCIENCE

SUBJECT: 22. LIFT AND DRAG

TRAINING OBJECTIVE (a)	REFERENCE (b)	ALLOCATION OF PERIODS (c)	Syll Hrs (d)	No of CELLS (e)	INSTR HOURS (f)
22.0 Explain the lift and drag equations relating to an aerofoil section.	BTEC 14567F G25	Classroom	1.00	1	1.00
		Practical	1.00	2	2.00
		Total	2.00		3.00

EQUIPMENT (g)	PUBLICATIONS (h)
	1. Course manuals. 2. Mechanics of Flight. A.C Kermode. 3. Aircraft Flight. Barnard and Philpott.

FILMS/VIDEOS

Nº (i)	TITLE (j)	TIME (k)
	Weight and Lift. Shell Video Unit. Thrust and Drag. Shell Video Unit.	17 min 11 min

PART III

N° (a)	ENABLING OBJECTIVES (b)	CONDITIONS (c)	STANDARDS (d)	REFERENCE (e)
22.1	Define an aerofoil.	In a classroom.	Correctly.	1. Course Manual. 2. Chap 3 3. Chap 1
22.2	Define and explain each component of the lift and drag equations: a. $L = \frac{1}{2}\rho v^2 S C_L$ b. $D = \frac{1}{2}\rho v^2 S C_D$	In a classroom.	Correctly.	1. Course Manual. 2. Chap 3 3. Chap 1
22.3	Solve simple problems relating to lift and drag on an aerofoil section. End of 22.0	In a classroom.	Correctly.	

PART III

TRADE TRAINING

SECTION: P3 ENGINEERING SCIENCE

SUBJECT: 23. ANGLE OF ATTACK

TRAINING OBJECTIVE (a)	REFERENCE (b)	ALLOCATION OF PERIODS (c)	Syll Hrs (d)	No of CELLS (e)	INSTR HOURS (f)
23.0 Explain the effects of angle of attack and airspeed on aerofoil performance.	BTEC 14567F G26	Classroom	1.00	1	1.00
		Practical	1.00	2	2.00
		Total	2.00		3.00

EQUIPMENT (g)	PUBLICATIONS (h)
Subsonic wind tunnel and balance. Armfield 1 ft wind tunnel and pressure distribution manometer. Smoke tunnel.	1. Course manual 2. Mechanics of Flight . A. C. Kermode 3. Aircraft Flight. Barnard and Philpott.

FILMS/VIDEOS		
N^{o} (i)	TITLE (j)	TIME (k)
	Controls and their effect. Shell Video Unit	17 min

PART III

N° (a)	ENABLING OBJECTIVES (b)	CONDITIONS (c)	STANDARDS (d)	REFERENCE (e)
23.1	Explain the effects of angle of attack and airspeed on aerofoil performance.	In a classroom.	Correctly.	1. Course Manual. 2. Chap 3 3. Chap 1 & Chap 4
23.2	Define stalling angle.	In a classroom.	Correctly.	1. Course Manual. 2. Chap 3 3. Chap 1 & Chap 4
23.3	Investigate practically the lift/drag ratio at various angles of attack.	In a laboratory.	Correctly, under the guidance of an instructor.	
23.4	Explain how the total drag of an aircraft affects the flight range. End of 23.0	In a classroom.	Correctly.	1. Course Manual. 3. Chap 7 page 203

PART III

TRADE TRAINING

SECTION: P3 ENGINEERING SCIENCE

SUBJECT: 24. BOUNDARY LAYER

TRAINING OBJECTIVE (a)	REFERENCE (b)	ALLOCATION OF PERIODS (c)	Syll Hrs (d)	No of CELLS (e)	INSTR HOURS (f)
24.0 Analyse boundary layer and boundary layer control.	BTEC 14567F G27	Classroom	1.00	1	1.00
		Practical	1.00	2	2.00
		Total	2.00		3.00

EQUIPMENT (g)	PUBLICATIONS (h)
Subsonic wind tunnel. Smoke tunnel.	1. Course manual. 2. Mechanics of Flight. A. C. Kermode 3. Aircraft Flight. Barnard and Philpott.

FILMS/VIDEOS		
N^{o} (i)	TITLE (j)	TIME (k)
	Controls and their effect. Shell Video Unit	17 min

PART III

N° (a)	ENABLING OBJECTIVES (b)	CONDITIONS (c)	STANDARDS (d)	REFERENCE (e)
24.1	Explain laminar and turbulent flow over an aerofoil section and the transition point between them.	In a classroom.	Correctly.	1. Course Manual. 2. Chap 2 pages 55-58 3. Chap 3 pages 69-87
24.2	Explain boundary layer separation and aerofoil stall.	In a classroom.	Correctly.	1. Course Manual. 2. Chap 2 pages 55-58 3. Chap 3 pages 69-87
24.3	Explain the reasons for and the methods used to control the boundary layer such as flaps and slats. End of 24.0	In a classroom.	Correctly.	1. Course Manual. 2. Chap 3 pages 115-123

PART III

TRADE TRAINING

SECTION: P3 ENGINEERING SCIENCE

SUBJECT: 25. SUBSONIC, TRANSONIC AND SUPERSONIC FLIGHT

TRAINING OBJECTIVE (a)	REFERENCE (b)	ALLOCATION OF PERIODS (c)	Syll Hrs (d)	No of CELLS (e)	INSTR HOURS (f)
25.0 Explain the concepts of transonic/supersonic flight	BTEC 14567F G28	Classroom	1.00	1	1.00
		Practical	1.00	2	2.00
		Total	2.00		3.00

EQUIPMENT (g)	PUBLICATIONS (h)
Supersonic wind tunnel.	1. Course manual. 2. Mechanics of Flight. A. C. Kermode.

FILMS/VIDEOS		
Nº (i)	TITLE (j)	TIME (k)
	Approaching the speed of sound. Shell Video Unit.	25 min
	Transonic Flight. Shell Video Unit.	20 min
	Beyond the speed of sound. Shell Video Unit.	20 min

PART III

N° (a)	ENABLING OBJECTIVES (b)	CONDITIONS (c)	STANDARDS (d)	REFERENCE (e)
25.1	Define the subsonic/transonic/supersonic speed ranges and the effect on airflow within those regions.	In a classroom.	Correctly.	1. Course Manual 2. Chap 11 pages 321-342 and pages 348-369
25.2	Define: a. Mach Number. b. Critical Mach Number. c. Mach Cone. d. Mach Angle.	In a classroom.	Correctly.	1. Course Manual 2. Chap 11 pages 321-342 and pages 348-369
25.3	Explain the formation of shock waves and the effect they have on aerofoil performance and aircraft control.	In a classroom.	Correctly.	1. Course Manual 2. Chap 11 pages 321-342 and pages 348-369
25.4	Explain how the following design features are used to minimise the problems encountered in high speed flight: a. Thin wings. b. Sweepback. c. Spoilers. d. All moving tailplanes. e. Area rule.	In a classroom.	Correctly.	1. Course Manual 2. Chap 11 pages 321-342 and pages 348-369
25.5	Explain how high speed can effect trim and centre of gravity of the aircraft and the kinetic heating effect.	In a classroom.	Correctly.	1. Course Manual 2. Chap 11 pages 321-342 and pages 348-369
25.6	Show the development of shock waves on an aerofoil section practically. End of 25.0	In a laboratory.	Correctly, under the guidance of an instructor.	

PART III

TRADE TRAINING

SECTION: P3 ENGINEERING SCIENCE

SUBJECT: 26. ASSIGNMENT

TRAINING OBJECTIVE (a)	REFERENCE (b)	ALLOCATION OF PERIODS (c)	Syll Hrs (d)	No of CELLS (e)	INSTR HOURS (f)
26.0 Complete an assignment covering any topic within P3.	BTEC 14567F A1-G28	Classroom	4.00	2	8.00
		Practical			
		Total	4.00		8.00

EQUIPMENT (g)	PUBLICATIONS (h)

FILMS/VIDEOS		
Nº (i)	TITLE (j)	TIME (k)

PART III

N^{o} (a)	ENABLING OBJECTIVES (b)	CONDITIONS (c)	STANDARDS (d)	REFERENCE (e)
26.1	Complete an assignment covering any topic within P3. End of 26.0	In own time.	Attaining the assignment pass mark.	

PART III

TRADE TRAINING

SECTION: P3 ENGINEERING SCIENCE

SUBJECT: 27. END OF PHASE EXAMINATION

TRAINING OBJECTIVE (a)	REFERENCE (b)	ALLOCATION OF PERIODS (c)	Syll Hrs (d)	No of CELLS (e)	INSTR HOURS (f)
27.0 Complete an end of phase examination covering TOs 3.12 and 3.15 to 3.25		Classroom	4.00	1	4.00
		Practical	0.00		0.00
		Total	4.00		4.00

EQUIPMENT (g)	PUBLICATIONS (h)

FILMS/VIDEOS		
Nº (i)	TITLE (j)	TIME (k)

PART III

N° (a)	ENABLING OBJECTIVES (b)	CONDITIONS (c)	STANDARDS (d)	REFERENCE (e)
27.1	Complete an end of phase examination covering TOs 3.12 and 3.15 to 3.25. End of 27.0	In a classroom, under examination conditions.	Attaining the examination pass mark.	

PART III

TRADE TRAINING

SECTION: P4 ELECTRICAL PRINCIPLES

SUBJECT: 1. SIMPLE ELECTRICAL CIRCUIT

TRAINING OBJECTIVE (a)	REFERENCE (b)	ALLOCATION OF PERIODS (c)	Syll Hrs (e)	No of CELLS (f)	INSTR HOURS (g)
1.0 Explain the characteristics of a simple electrical circuit.	BTEC 14575F A1.	Classroom	2.00	1	2.00
		Practical	1.00	2	2.00
		Total	3.00		4.00

EQUIPMENT (h)	PUBLICATIONS (i)
	1. Course manual 2. AP3302 3. BS 3939

FILMS/VIDEOS		
Nº (j)	TITLE (k)	TIME (l)

PART III

N^{o} (a)	ENABLING OBJECTIVES (b)	CONDITIONS (c)	STANDARDS (d)	REFERENCE (e)
1.1	State the meaning of the terms conductor, semi-conductor and insulator.	In a classroom.	Correctly.	
1.2	Explain the meaning of the terms voltage, current, resistance and power.	In a classroom.	Correctly.	AP3302 Pt 1, Sect 1, Chap 3, 4 and 8.
1.3	State the basic units of current and voltage and describe how they are measured in a simple circuit.	In a classroom.	Correctly.	BS 3939.
1.4	Identify the symbols used for voltage, current, resistance and power.	In a classroom.	Correctly.	AP3302 Pt 1, Sect 1, Chap 3, 4 and 8.
1.5	Explain the relationship between voltage, current, resistance and power.	In a classroom.	Correctly.	
1.6	Define the term `Lethal Voltage`. End of 1.0	In a classroom.	Without error.	

PART III

TRADE TRAINING

SECTION: P4 ELECTRICAL PRINCIPLES

SUBJECT: 2. RESISTORS

TRAINING OBJECTIVE (a)	REFERENCE (b)	ALLOCATION OF PERIODS (c)	Syll Hrs (e)	No of CELLS (f)	INSTR HOURS (g)
2.0 Identify selected values of resistor.		Classroom	1.00	1	1.00
		Practical	0.00		0.00
		Total	1.00		1.00

EQUIPMENT (h)	PUBLICATIONS (i)
	1. Course manual 2. A 3302

FILMS/VIDEOS

Nº (j)	TITLE (k)	TIME (l)

PART III

N^{o} (a)	ENABLING OBJECTIVES (b)	CONDITIONS (c)	STANDARDS (d)	REFERENCE (e)
2.1	State the methods used to indicate the ohmic value of a resistor.	In a classroom.	Correctly.	AP3302 Pt 1, Sect 1, Ch 4.
2.2	Use the "colour code" method to determine the value of a selection of resistors. End of 2.0	In a classroom, given a selection of resistors and a colour chart.	Correctly.	

PART III

TRADE TRAINING

SECTION: P4 ELECTRICAL PRINCIPLES

SUBJECT: 3. DIRECT CURRENT AND ALTERNATING CURRENT

TRAINING OBJECTIVE (a)	REFERENCE (b)	ALLOCATION OF PERIODS (c)	Syll Hrs (e)	No of CELLS (f)	INSTR HOURS (g)
3.0 Explain the difference between direct current and alternating current systems.	BTEC 14575F A1.	Classroom	1.00	1	1.00
		Practical	0.00		0.00
		Total	1.00		1.00

EQUIPMENT (h)	PUBLICATIONS (i)
	1. Course manual 2. AP 3302

FILMS/VIDEOS		
Nº (j)	TITLE (k)	TIME (l)

PART III

N^{o} (a)	ENABLING OBJECTIVES (b)	CONDITIONS (c)	STANDARDS (d)	REFERENCE (e)
3.1	State the meaning of the terms direct current and alternating current.	In a classroom.	Correctly.	AP3302 Pt 1, Sect 3, Ch 1.
3.2	Explain the meaning of the terms waveform and frequency.	In a classroom.	Correctly.	AP3302 Pt 1, Sect 3, Ch 1.
3.3	Identify direct current and alternating current waveforms and symbols.	In a classroom, given examples.	Correctly.	AP3302 Pt 1, Sect 3, Ch 1 and BS 3939.
3.4	State the advantages and disadvantages of direct current and alternating current in electrical systems. End of 3.0	In a classroom.	Correctly.	

PART III

TRADE TRAINING

SECTION: P4 ELECTRICAL PRINCIPLES

SUBJECT: 4. ELECTROMAGNETISM

TRAINING OBJECTIVE (a)	REFERENCE (b)	ALLOCATION OF PERIODS (c)	Syll Hrs (e)	No of CELLS (f)	INSTR HOURS (g)
4.0 Explain the nature of a magnetic field and the behaviour and applications of electromagnetic circuits.	BTEC 14575F A1.	Classroom	2.00	1	2.00
		Practical	2.00	2	4.00
		Total	4.00		6.00

EQUIPMENT (h)	PUBLICATIONS (i)
	1. Course manual 2. AP 3302

FILMS/VIDEOS		
Nº (j)	TITLE (k)	TIME (l)

PART III

N^{o} (a)	ENABLING OBJECTIVES (b)	CONDITIONS (c)	STANDARDS (d)	REFERENCE (e)
4.1	Explain what is meant by magnetic poles and a magnetic field.	In a classroom.	Correctly.	AP3302 Pt 1, Sect 2, Ch 1 to 3 inc.
4.2	Describe the magnetic effects of an electric current in a straight conductor.	In a classroom.	Correctly.	
4.3	Describe the magnetic effects of an electric current in a coiled conductor: a. Without an iron core. b. With an iron core.	In a classroom.	Correctly.	
4.4	Explain the terms permeability and hysteresis	In a classroom.	Correctly.	
4.5	Interpret a simple circuit to demonstrate the effects described in EO 4.2 and 4.3.	In a classroom, given an instructor demonstration.	Correctly.	
4.6	Determine the direction and magnitude of the force acting on a current carrying conductor situated in a magnetic field (F = BIl).	In a classroom, given the necessary information.	Correctly.	
4.7	Explain how the principle described in EO 4.6 can be adapted to form an electric motor.	In a classroom.	Correctly.	
4.8	Identify the relay as an example of the effects described in EO 4.3 End of 4.0	In a classroom, given examples.	Correctly, under the guidance of the instructor.	

PART III

TRADE TRAINING

SECTION: P4 ELECTRICAL PRINCIPLES

SUBJECT: 5. ELECTROMAGNETIC INDUCTION

TRAINING OBJECTIVE (a)	REFERENCE (b)	ALLOCATION OF PERIODS (c)	Syll Hrs (e)	No of CELLS (f)	INSTR HOURS (g)
5.0 Explain the principles of electromagnetic induction and relate them to practical applications.	BTEC 14575F A1	Classroom	2.00	1	2.00
		Practical	2.00	2	4.00
		Total	4.00		6.00

EQUIPMENT (h)	PUBLICATIONS (i)
	1. Course manuals 2. AP 3302

FILMS/VIDEOS

Nº (j)	TITLE (k)	TIME (l)

PART III

N^{o} (a)	ENABLING OBJECTIVES (b)	CONDITIONS (c)	STANDARDS (d)	REFERENCE (e)
5.1	Describe the principles of electromagnetic induction	In a classroom.	Correctly.	AP3302 Pt 1, Sect 2, Chap 4 and 5.
5.2	Determine the direction and magnitude of the electromotive force (emf) induced in a conductor when it is moved at right angles to a magnetic field.	In a classroom, given all relevant data required to calculate the result.	Correctly.	
5.3	Explain how the principles described in EO 5.1 and EO 5.2 can be adapted to produce a generator.	In a classroom.	Correctly.	
5.4	Interpret a simple circuit to demonstrate the effects described in EO 5.2.	In a classroom, given an Instructor demonstration.	Correctly.	
5.5	Describe the processes of self and mutual induction.	In a classroom.	Correctly.	
5.6	Identify a transformer as an example of mutual inductance. End of 5.0	In a classroom, given examples.	Correctly.	

PART III

TRADE TRAINING

SECTION: P4 ELECTRICAL PRINCIPLES

SUBJECT: 6. ELECTRONIC DEVICES

TRAINING OBJECTIVE (a)	REFERENCE (b)	ALLOCATION OF PERIODS (c)	Syll Hrs (e)	No of CELLS (f)	INSTR HOURS (g)
6.0 Identify and explain the functions of selected electronic devices.	BTEC 14575F E5	Classroom	3.00	1	3.00
		Practical	3.00	2	6.00
		Total	6.00		9.00

EQUIPMENT (h)	PUBLICATIONS (i)
	1. Course manual 2. AP 3302 3. AP 3373 4. BS 3939 5. US Mil Std 806B

FILMS/VIDEOS		
N^{o} (j)	TITLE (k)	TIME (l)

PART III

N° (a)	ENABLING OBJECTIVES (b)	CONDITIONS (c)	STANDARDS (d)	REFERENCE (e)
6.1	Identify the following semi-conductor devices: a. Diode. b. Bipolar transistor. c. Thyristor. d. Operational amplifier.	In a classroom, given examples.	Correctly.	AP3302 Pt 1, Sect 6, Ch 2 and 3.
6.2	State the safety precautions to be observed when handling static sensitive devices to avoid damage from electrostatic discharge.	In a classroom.	Without error.	AP 3373 sect 5, Ch 7.
6.3	Describe the behaviour of a p-n junction diode when connected to an AC supply.	In a classroom.	Correctly.	
6.4	Construct a simple circuit to demonstrate the behaviour as described in EO 6.3	In a classroom, given a relevant circuit diagram.	Correctly.	
6.5	Describe the behaviour of a bipolar transistor as an amplifier.	In a classroom.	Correctly.	AP 3302 Pt 1, Sect 9, Chap 4.
6.6	Demonstrate the behaviour of a bipolar transistor as described in EO 6.5.	In a classroom, given required equipment.	Correctly.	
6.7	Describe the behaviour of a thyristor as a power control device.	In a classroom.	Correctly.	AP 3302 Pt 1, Sect 6, Chap 5.
6.8	Demonstrate the behaviour of a thyristor as described in EO 6.7.	In a classroom, given required equipment.	Correctly.	
6.9	State the factors which determine the relationship between the input and output voltages in a selection of operational amplifiers.	In a classroom.	Correctly.	AP 3302 Pt 1, Sect 9, Chap 3.
6.10	Construct simple circuits to demonstrate EO 6.9.	In a classroom, given relevant circuit diagrams.	Correctly.	
6.11	Describe the function of the five basic logic gates: a. AND. b. OR. c. NOT. d. NAND. e. NOR.	In a classroom.	Correctly.	
6.12	State the truth tables for the following logic gates: a. AND. b. OR. c. NOT. d. NAND. e. NOR.	In a classroom.	Correctly.	

PART III

Nº (a)	ENABLING OBJECTIVES (b)	CONDITIONS (c)	STANDARDS (d)	REFERENCE (e)
6.13	Test each type of gate on a logic tutor and verify the truth tables of EO 6.12. End of 6.0	In a classroom, given a selection of logic gates and a logic tutor.	Correctly.	

PART III

TRADE TRAINING

SECTION: P4 ELECTRICAL PRINCIPLES

SUBJECT: 7. CAPACITANCE

TRAINING OBJECTIVE (a)	REFERENCE (b)	ALLOCATION OF PERIODS (c)	Syll Hrs (e)	No of CELLS (f)	INSTR HOURS (g)
7. Explain the behaviour and applications of capacitors	BTEC 14575F A1 and E5.	Classroom	2.00	1	2.00
		Practical	4.00	2	8.00
		Total	6.00		10.00

EQUIPMENT (h)	PUBLICATIONS (i)
	1. Course manual 2. AP 3302

FILMS/VIDEOS		
Nº (j)	TITLE (k)	TIME (l)

PART III

N^{o} (a)	ENABLING OBJECTIVES (b)	CONDITIONS (c)	STANDARDS (d)	REFERENCE (e)
7.1	State what is meant by capacitance and the factors which affect it.	In a classroom.	Correctly.	AP3302 Pt 1, Sect 1, Ch 9.
7.2	State the relationship between capacitance, charge and voltage.	In a classroom.	Correctly.	
7.3	Explain what is meant by the direct current working voltage of a capacitor.	In a classroom.	Correctly.	
7.4	State the precautions which must be observed when handling a capacitor.	In a classroom.	Without error.	
7.5	Describe how voltage and current vary when a capacitor is charged/discharged via a resistor.	In a classroom.	Correctly.	1. Course Manuals 3. Chap 3 para 3.1-5
7.6	Explain what is meant by the `time constant` of a capacitive resistive (CR) circuit and the factors which affect it.	In a classroom.	Correctly.	
7.7	Construct a circuit to enable EO 7.5 and EO 7.6 to be verified.	In a classroom, given a relevant circuit diagram.	Correctly.	
7.8	Explain the following applications of capacitors: a. Navigation lights flashing units. b. High energy igniter units. End of 7.0	In a classroom.	Correctly.	

PART III

TRADE TRAINING

SECTION: P4 ELECTRICAL PRINCIPLES

SUBJECT: 8. PRINTED CIRCUIT BOARDS

TRAINING OBJECTIVE (a)	REFERENCE (b)	ALLOCATION OF PERIODS (c)	Syll Hrs (e)	No of CELLS (f)	INSTR HOURS (g)
8.0 Describe the construction of elementary printed circuit boards.	BTEC 14575F E5	Classroom	1.00	1	1.00
		Practical	0.00		0.00
		Total	1.00		1.00

EQUIPMENT (h)	PUBLICATIONS (i)
	1. Course manual

FILMS/VIDEOS		
Nº (j)	TITLE (k)	TIME (l)

PART III

N^{o} (a)	ENABLING OBJECTIVES (b)	CONDITIONS (c)	STANDARDS (d)	REFERENCE (e)
8.1	Identify single, double and multi-layer printed circuit boards.	In a classroom, given examples.	Correctly.	Course Manual
8.2	Identify the main features of printed circuit boards. a. Etched conductor pattern/tracks and lands. b. Dual in-line connectors. c. Plated through holes and eyelets. d. Edge connectors. End of 8.0	In a classroom, given a typical printed circuit board.	Correctly.	

PART III

TRADE TRAINING

SECTION: P4 ELECTRICAL PRINCIPLES

SUBJECT: 9. VHF RADIO SYSTEMS

TRAINING OBJECTIVE (a)	REFERENCE (b)	ALLOCATION OF PERIODS (c)	Syll Hrs (e)	No of CELLS (f)	INSTR HOURS (g)
9.0 Describe the basic principle of operation of a VHF radio system.	BTEC 14575F/G7.	Classroom	2.00	1	2.00
		Practical	0.00		0.00
		Total	2.00		2.00

EQUIPMENT (h)	PUBLICATIONS (i)
	1. Course manual

FILMS/VIDEOS		
Nº (j)	TITLE (k)	TIME (l)

PART III

N^{o} (a)	ENABLING OBJECTIVES (b)	CONDITIONS (c)	STANDARDS (d)	REFERENCE (e)
9.1	State the need for a VHF radio system in an aircraft.	In a classroom.	Correctly.	
9.2	State the difference between radio waves and sound waves.	In a classroom.	Correctly.	
9.3	Describe, in general terms, how sound waves are converted into radio waves and vice versa	In a classroom.	Correctly.	
9.4	State the dangers that occur during VHF radio transmissions.	In a classroom.	Correctly.	
9.5	State the precautions to be observed when in the vicinity of a transmitting VHF radio. End of 9.0	In a classroom.	Without error.	

PART III

TRADE TRAINING

SECTION: P4 ELECTRICAL PRINCIPLES

SUBJECT: 10. END OF PHASE EXAMINATION

TRAINING OBJECTIVE (a)	REFERENCE (b)	ALLOCATION OF PERIODS (c)	Syll Hrs (e)	No of CELLS (f)	INSTR HOURS (g)
10.0 Obtain a satisfactory result in an examination of P4 electrical principles.		Classroom	2.00	1	2.00
		Practical	0.00		0.00
		Total	0.00		2.00

EQUIPMENT (h)	PUBLICATIONS (i)		
		FILMS/VIDEOS		
	Nº (j)	TITLE (k)	TIME (l)

PART III

N° (a)	ENABLING OBJECTIVES (b)	CONDITIONS (c)	STANDARDS (d)	REFERENCE (e)
10.1	Complete an end of phase examination. End of 10.0	In a classroom, under examination conditions.	Attaining the examination pass mark.	

TRADE TRAINING

SECTION: P20 INTRODUCTION TO MAINTENANCE

SUBJECT: 1. PERSONNEL SAFETY

TRAINING OBJECTIVE (a)	REFERENCE (b)	ALLOCATION OF PERIODS (c)	Syll Hrs (e)	No of CELLS (f)	INSTR HOURS (g)
1.0 State the precautions to be observed to safeguard personnel in a workshop and hangar environment.		Classroom	1.00	1	1.00
		Practical	0.00		0.00
		Total	1.00		1.00

EQUIPMENT (h)	PUBLICATIONS (i)
Safety signs to BS 5378:1980	AP 100B-01 Fire: MOD Poster 2 GAI 5012 Noise (General guidelines) AP 1269A Chap 6, annex C JSP 375 AP 3242B Vol 5

FILMS/VIDEOS		
Nº (j)	TITLE (k)	TIME (l)

N^{o} (a)	ENABLING OBJECTIVES (b)	CONDITIONS (c)	STANDARDS (d)	REFERENCE (e)
1.1	State the purpose of workshop safety posters and notices.	In a classroom, given examples.	Correctly.	AP100B-01 Order 1710
1.2	State the measures necessary to safeguard yourself and other personnel in respect of: a. Tidiness of work area. b. Personal cleanliness. c. Protective clothing. d. Fire prevention. e. Noise hazards. f. Manual – handling of equipment.	In a classroom.	Without error.	JSP 375 Vols1, 2 & 3
1.3	State the need to know the location of the following emergency aids: a. Telephone. b. First aid kit. c. Fire alarm. d. Fire appliances. e. Emergency exits. f. Eye wash facility. g. Mains isolation switch.	In a workshop environment, given a tour of the working area.	Without error.	AP3242 Vol5 AP100B-01 Order 1710
1.4	State the action to be taken in the following emergencies: a. Fire. b. Emergency evacuation.	In a classroom/workshop environment.	Without error, stating the emergency telephone number.	MOD Poster 2
1.5	State the regulations governing colour perception (CP) standards for engineering trades. End of 1.0	In a classroom.	Correctly.	AP100B-01 Order 0121 AP1269A Chap. 6

TRADE TRAINING

SECTION: P20 INTRODUCTION TO MAINTENANCE

SUBJECT: 2. AIRCRAFT MAINTENANCE

TRAINING OBJECTIVE (a)	REFERENCE (b)	ALLOCATION OF PERIODS (c)	Syll Hrs (e)	No of CELLS (f)	INSTR HOURS (g)
2.0 Describe the aircraft maintenance organisation within the RAF and the need for recording.		Classroom	1.00	1	1.00
		Practical	0.00		0.00
		Total	1.00		1.00

EQUIPMENT (h)	PUBLICATIONS (i)
	AP 3402 AP 100A-01 AP 3373

FILMS/VIDEOS		
Nº (j)	TITLE (k)	TIME (l)

N^{o} (a)	ENABLING OBJECTIVES (b)	CONDITIONS (c)	STANDARDS (d)	REFERENCE (e)
2.1	State the need for aircraft maintenance.	In a classroom.	Correctly.	AP3402 Sect. 3 Chap. 1 Para.1-2
2.2.	Describe the chain of command of a station engineering organisation.	In a classroom.	Correctly.	AP3402 Sect. 3 Chap. 1 Figs. 1 & 2
2.3	Describe in general terms the lines of maintenance, and the depth and type of work carried out at each.	In a classroom.	Correctly.	AP100A-01 Lft.156 AP3402 Sect. 3 Chap. 1 Paras.10-15
2.4	State the need for recording all aircraft maintenance tasks.	In a classroom.	Correctly.	AP3402 Sect. 3 Chap. 4 Para.1
2.5	Define the basic meanings of the following routine maintenance: a. Flight servicing. b. Scheduled maintenance. c. Out-of-phased maintenance. d. Condition based maintenance. e. Anti-deterioration.	In a classroom.	Correctly.	AP3402 Sect. 3 Chap. 1 Paras.28-29 AP100A-01 Lft.311 Paras.31-37
2.6	Explain the reason for the different aircraft maintenance as listed in EO 2.5a to 2.5c.	In a classroom.	Correctly.	AP3402 Sect. 3 Chap. 1 Paras.10-39
2.7	State the purpose of computer aided management systems in the Royal Air Force.	In a classroom.	Correctly.	
2.8	Explain the use of maintenance schedules, Topic 5.	In a classroom.	Correctly.	
2.9	State the purpose of the following engineering orders. a. AP100A-01. b. AP100B-01. c. Command Engineering Staff Instructions. d. Station Engineering Orders and Responsibilities (SEORs). e. Defence Council Instructions (DCIs). f. General and Administrative Instructions (GAIs). End of 2.0	In a classroom, given examples.	Correctly.	AP3373 Sect. 3 Chap. 2 Para.17

TRADE TRAINING

SECTION: P20 INTRODUCTION TO MAINTENANCE

SUBJECT: 3. AIR PUBLICATIONS

TRAINING OBJECTIVE (a)	REFERENCE (b)	ALLOCATION OF PERIODS (c)	Syll Hrs (e)	No of CELLS (f)	INSTR HOURS (g)
3.0 Describe the engineering Air Publication system.		Classroom	2.00	1	2.00
		Practical	0.00		0.00
		Total	2.00		2.00

EQUIPMENT (h)	PUBLICATIONS (i)
	AD 100Z-0001-D1A AD 100Z-0001-D1B AP 100B-01

FILMS/VIDEOS		
Nº (j)	TITLE (k)	TIME (l)

N^{o} (a)	ENABLING OBJECTIVES (b)	CONDITIONS (c)	STANDARDS (d)	REFERENCE (e)
3.1	State the need for engineering Air Publications (APs).	In a classroom.	Correctly.	AP3402 Chap. 2 Para.1
3.2	Describe how APs are identified using the coded system.	In a classroom.	Correctly.	AD100Z-0001-D1A & D1B
3.3	State the general content to be found in Topic 1-6 of aircraft APs.	In a classroom.	Correctly.	AP100C-06 Lft.200
3.4	Identify the security classification of publications.	In a classroom, given examples.	Correctly.	AP3402 Chap. 2 Paras.6-7
3.5	State the limitations of the use of Course Manuals and manufacturer's information documents when carrying out maintenance tasks.	In a classroom.	Correctly.	
3.6	Identify and explain the following methods used to keep APs up to date:- a. Amendment Leaflets (ALs). b. Advance Information Leaflets (AILs).	In a classroom, given examples.	Correctly.	AP100B-01 Order 0505
3.7	State the importance of reporting unsatisfactory features in APs.	In a classroom.	Correctly.	AP100B-01 Order 0504
3.8	State who is responsible for ensuring APs are kept fully amended.	In a classroom.	Correctly.	AP3402 Chap. 2 Para.12
3.9	Describe the procedure and incorporate an amendment (AL) into an AP. End of 3.0	In a classroom.	Correctly.	AP3402 Chap. 2 Para.11

TRADE TRAINING

SECTION: P20 INTRODUCTION TO MAINTENANCE

SUBJECT: 4. MAINTENANCE DOCUMENTATION

TRAINING OBJECTIVE (a)	REFERENCE (b)	ALLOCATION OF PERIODS (c)	Syll Hrs (e)	No of CELLS (f)	INSTR HOURS (g)
4.0 Describe the overall concept of servicing/maintenance documentation in the RAF.		Classroom	4.00	1	4.00
		Practical	0.00		0.00
		Total	4.00		4.00

EQUIPMENT (h)	PUBLICATIONS (i)
	AP 100B-01 AP 100C-02 AP 100C-06 AP 100C-20 JSP 110 MOD F799/1

FILMS/VIDEOS		
Nº (j)	TITLE (k)	TIME (l)

Nº (a)	ENABLING OBJECTIVES (b)	CONDITIONS (c)	STANDARDS (d)	REFERENCE (e)
4.1	State the need for documentation to record servicing/maintenance tasks.	In a classroom.	Correctly.	
4.2	State the responsibilities of engineering tradesmen in respect of management, supervision and production.	In a classroom.	Correctly.	AP100B-01 Order 0121
4.3	State the purpose of the signatures in engineering documentation.	In a classroom.	Correctly.	
4.4	State the legal implications of signing an engineering document.	In a classroom.	Correctly.	MOD F799/1
45.	State the importance of using the correct pen type and colour ink when making entries on maintenance documents.	In a classroom.	Correctly.	AP100C-02 Chap. 1 Para.18
4.6	Describe the purpose of the F707 series and its uses.	In a classroom.	Correctly.	AP100C-02 Chap. 1
4.7	Identify and state the purpose of the following: a. F707BE Continuation Sheet. b. F707J Additional Item Ident.	In a classroom, given examples.	Correctly.	AP100C-02
4.8	State where scheduled maintenance is recorded.	In a classroom.	Correctly.	AP100C-06 Lft.300 AP100B-01 Order 0701 Para.8a Aircraft topic 5
4.9	Identify and state the purpose of: a. MOD Form 707MP and F707MS maintenance records. b. F707MC Maintenance Record Identification Sheet.	In a classroom, given examples.	Correctly.	AP100C-06 Lft.300 AP100B-01 Order 0701
4.10	State the purpose of the tradesman's certificate in the MOD F707MP, F707MS and F707MC.	In a classroom.	Correctly.	AP100C-06 Lft.300 AP100B-01 Order 0701
4.11	On discovering a fault during a scheduled task, take the appropriate reporting and recording action.	In a classroom, given a F707A, F707B, aircraft Topics 1 and 3, and a simulated task.	Correctly.	AP100C-06 Chap. 3 Para.8a
4.12	State the significance of a Structurally Significant Item (SSI) – previously 'Y' coded items – in a Maintenance Schedule.	In a classroom.	Correctly.	AP100A-01 Lft.316 Para.30
4.13	State the purpose of Logistic Support Services (LSS).	In a classroom.	Correctly.	AP100A-01 Lft.220
4.14	Identify F707A SNOW numbers.	In a classroom, given examples.	Correctly.	AP100C-02 Chap. 2-2
4.15	State the purpose of the F731.	In a classroom.	Correctly.	AP100C-02 Chap. 4
4.16	Describe the progression of the documentation on a Unit and onto LSS.	In a classroom.	Correctly.	

Nº (a)	ENABLING OBJECTIVES (b)	CONDITIONS (c)	STANDARDS (d)	REFERENCE (e)
4.17	State where the following engineering terms can be found: a. Inspect b. Check c. Test d. Examine e. Examine as far as possible. f. Function g. Verify h. NB i. Note	In a classroom.	Correctly.	Topic 5A2 JSP110 AP100A-01
4.18	Interpret the following engineering terms and state where they can be found: a. Replenish b. Fit c. Refit d. Replace e. Disconnect f. Reconnect	In a classroom.	Correctly.	Topic 5A2 JSP110 AP100A-01
4.19	State where to obtain the information regarding completion of aircraft maintenance documentation. End of 4.0	In a classroom.	Correctly.	MOD F799 Poster 300 AP100C-02

TRADE TRAINING

SECTION: P20 INTRODUCTION TO MAINTENANCE

SUBJECT: 5. DOCUMENTATION

TRAINING OBJECTIVE (a)	REFERENCE (b)	ALLOCATION OF PERIODS (c)	Syll Hrs (e)	No of CELLS (f)	INSTR HOURS (g)
5.0 Identify, state the purpose of and use documentation to maintain aircraft and aircraft engines.		Classroom	10.00	1	10.00
		Practical	2.00	1	2.00
		Total	12.00		12.00

EQUIPMENT (h)	PUBLICATIONS (i)
	AP 100B-01 AP 100C-02 AP 100C-06 AP 100C-20

FILMS/VIDEOS		
Nº (j)	TITLE (k)	TIME (l)

N^{o} (a)	ENABLING OBJECTIVES (b)	CONDITIONS (c)	STANDARDS (d)	REFERENCE (e)
5.1	Describe a F700C and use a F707A/707B.	In a classroom.	Correctly.	AP100C-06
5.2	State the purpose of a countersignature on a maintenance document.	In a classroom.	Correctly.	AP100B-01 Order 0701
5.3	State who may authorise:- a. A Junior Technician to countersign work carried out by a junior tradesman. b. Tradesmen to carry out and sign for maintenance tasks outside their trade boundary.	In a classroom.	Correctly.	AP100B-01 Order 0701
5.4	State how the authorisations in EO 5.3 above are given.	In a classroom.	Correctly.	AP100B-01 Order 0701
5.5	State the regulations applying to countersigning when a concession has been granted as specified in EO 5.3.	In a classroom.	Correctly.	AP100B-01 Order 0701
5.6	State who is responsible for countersigning work carried out and signed for by a trade NCO.	In a classroom.	Correctly.	AP100B-01 Order 0701
5.7	Describe the recording action to be taken when a competent NCO is not available to countersign the work.	In a classroom.	Correctly.	AP100B-01 Order 0701
5.8	State when an NCO may supervise and countersign for maintenance tasks outside his trade boundary.	In a classroom.	Correctly.	AP100B-01 Order 0701
5.9	State where the regulations relating to countersignatures may be found.	In a classroom.	Correctly.	AP100B-01 Order 0701
5.10	State the purpose of the independent checking of aircraft/engine control systems.	In a classroom.	Correctly.	AP100B-01 Order 3975
5.11	State where control systems subject to independent checks are defined.	In a classroom.	Correctly.	AP100B-01 Order 3975
5.12	State the importance and requirement of the tradesman to inform his work supervisor whenever a control system has been disturbed.	In a classroom.	Correctly.	AP100B-01 Order 0121
5.13	State the responsibilities of a technician when undertaking work in a self-supervisory capacity. End of 5.0	In a classroom.	Correctly.	AP100B-01 Order 0122

TRADE TRAINING

SECTION: P20 INTRODUCTION TO MAINTENANCE

SUBJECT: 6. SUPPLY

TRAINING OBJECTIVE (a)	REFERENCE (b)	ALLOCATION OF PERIODS (c)	Syll Hrs (e)	No of CELLS (f)	INSTR HOURS (g)
6.0 Explain the function of a supply organisation and identify an item of equipment.		Classroom	3.00	1	3.00
		Practical	3.00	2	6.00
		Total	6.00		9.00

EQUIPMENT (h)	PUBLICATIONS (i)
	AP 3373

FILMS/VIDEOS		
Nº (j)	TITLE (k)	TIME (l)

Nº (a)	ENABLING OBJECTIVES (b)	CONDITIONS (c)	STANDARDS (d)	REFERENCE (e)
6.1	State the need for a supply organisation.	In a classroom.	Correctly.	AP3373 Chap. 2 Para.2
6.2	Describe the functions and broad responsibilities of each of the flights, sections and sub-sections comprising a unit Supply Squadron.	In a classroom.	Correctly.	AP3373 Chap. 2 Para.3
6.3	Describe the general alpha/numeric system used to identify items of RAF equipment.	In a classroom.	Correctly.	AP3373 Chap. 2 Para.9-11
6.4	State the need for FAP 1086 microfiche system.	In a classroom.	Correctly.	AP3373 Chap. 2 Para.12
6.5	Operate and carry out maintenance tasks on a Microfiche Reader/Printer.	In a classroom, given a microfiche reader/printer.	Correctly.	
6.6	State the meaning of the following terms: a. Denomination of quantity. b. Class of store. c. V&A equipment.	In a classroom.	Correctly.	AP3373 Chap. 2 Para.11
6.7	Recognise the following: a. Management code and stock number. b. Manufactures reference, part or drawing number. c. NATO stock number.	In a classroom, given examples.	Correctly.	AP3373 Chap. 2 Para.9-11
6.8	State the need for inventories.	In a classroom.	Correctly.	AP3373 Chap. 2 Para.24
6.9	State the responsibilities of individuals who have equipment on loan.	In a classroom.	Correctly.	
6.10	State the purpose of:: a. F108 Receipt for equipment on Temporary Loan. b. F668 Record Card-Loans to Individuals. c. F664B Internal Repayment Voucher. d. F7109 RAF Supply Demand Proforma. e. Internal issue Voucher (F600 – VDU Station Supply Voucher). f. F676 RAF Supply-Internal Voucher.	In a classroom, given examples.	Correctly.	AP3373 Chap. 2
6.11	Determine the management code and stock number of an item of equipment.	In a classroom, given an item of equipment, Topic 3, FAP1086 and reader.	Correctly.	AP3373 Chap. 2 Para.9-11
6.12	State the information required by a Supply Squadron to process a demand.	In a classroom.	Correctly.	AP3373 Chap. 2 Para.31
6.13	Use the information gained in EOs 6.1 to 6.12 to place a demand and complete all documentation in a simulated task. End of 6.0	In a classroom, given a simulated task and all relevant documentation.	Correctly.	

TRADE TRAINING

SECTION: P20 INTRODUCTION TO MAINTENANCE

SUBJECT: 7. ENGINEERING SUPPORT FACILITY

TRAINING OBJECTIVE (a)	REFERENCE (b)	ALLOCATION OF PERIODS (c)	Syll Hrs (e)	No of CELLS (f)	INSTR HOURS (g)
7.0 Explain the role of typical engineering support facilities.		Classroom	1.00	1	1.00
		Practical	0.00		0.00
		Total	1.00		1.00

EQUIPMENT (h)	PUBLICATIONS (i)
	AP 3402

FILMS/VIDEOS		
Nº (j)	TITLE (k)	TIME (l)

N^{o} (a)	ENABLING OBJECTIVES (b)	CONDITIONS (c)	STANDARDS (d)	REFERENCE (e)
7.1	State the need for engineering support facilities.	In a classroom.	Correctly.	AP3402 Sect. 3 Chap. 1
7.2	List the following engineering support facilities a. General Engineering Flight (GEF). b. Electronic Engineering Squadron, (EES). c. Machanical Transport Squadron. (MTS). d. Armament Flight.	In a classroom.	Correctly.	AP3402 Sect. 3 Chap. 1
7.3	State the nature of the support that is available from the facilities listed in EO.7.2 End of 7.0	In a classroom.	Correctly.	AP3402 Sect. 3 Chap. 1

TRADE TRAINING

SECTION: P20 INTRODUCTION TO MAINTENANCE

SUBJECT: 8. NON-DESTRUCTIVE TESTING

TRAINING OBJECTIVE (a)	REFERENCE (b)	ALLOCATION OF PERIODS (c)	Syll Hrs (e)	No of CELLS (f)	INSTR HOURS (g)
8.0 Explain the need for Non-Destructive Testing (NDT) and describe the different types available.		Classroom	2.00	1	2.00
		Practical	0.00		0.00
		Total	2.00		2.00

EQUIPMENT (h)	PUBLICATIONS (i)
	AP 119A-20001-1 AP 110A-0601-1 AP 100A-01 AP 3402

FILMS/VIDEOS		
Nº (j)	TITLE (k)	TIME (l)

N^{o} (a)	ENABLING OBJECTIVES (b)	CONDITIONS (c)	STANDARDS (d)	REFERENCE (e)
8.1	Define the term NDT and explain the reason for testing non-destructively in terms of economic factors.	In a classroom.	Correctly.	AP100A-01 Lft.318
8.2	Explain how NDT assists in: a. Quality during production. b. Final product quality. c. Aircraft inspection.	In a classroom.	Correctly.	
8.3	List types of defects and give examples.	In a classroom.	Correctly.	
8.4	State that NDT can differentiate between materials from the point of view of composition, mechanical and thermal treatments.	In a classroom.	Correctly.	
8.5	State that NDT may be used to determine material dimensions.	In a classroom.	Correctly.	
8.6	Explain the different types of NDT methods techniques to include: a. Penetrant flaw detection. b. Magnetic particle. c. Electrical methods. d. Radiography. e. Ultrasonic.	In a classroom.	Correctly.	AP100A-01 Lft.318 Para.17 AP3402 Chap. 3
8.7	State who is authorised to carry out the techniques listed at EO 8.6.	In a classroom.	Correctly.	AP100A-01 Lft.318
8.8	Give examples of where the different methods would be used and any limitations of use to be considered.	In a classroom.	Correctly.	AP100A-01 Lft.318
8.9	Recognise the international warning signs indicating radiographic equipment is in operation.	In a classroom, given an example.	Correctly.	AP100B-01 Order 1710
8.10	State the precautions to be taken when radiography is in progress. End of 8.0	In a classroom.	Without error.	AP110A-0601-1

TRADE TRAINING

SECTION: P20 INTRODUCTION TO MAINTENANCE

SUBJECT: 9. GROUND SUPPORT EQUIPMENT

TRAINING OBJECTIVE (a)	REFERENCE (b)	ALLOCATION OF PERIODS (c)	Syll Hrs (e)	No of CELLS (f)	INSTR HOURS (g)
9.0 Interpret and apply the maintenance policy for Ground Support Equipment (GSE).		Classroom	2.00	1	2.00
		Practical	0.00		0.00
		Total	2.00		2.00

EQUIPMENT (h)	PUBLICATIONS (i)
	AP 100E-10 AP 119F-2100-1 AP 119F-2006-1 AP 119F-2009-1

FILMS/VIDEOS		
N^{o} (j)	TITLE (k)	TIME (l)

N^{o} (a)	ENABLING OBJECTIVES (b)	CONDITIONS (c)	STANDARDS (d)	REFERENCE (e)
9.1	State the need for GSE.	In a classroom.	Correctly.	AP3402 Chap. 5
9.2	Describe the classifications of GSE.	In a classroom, given examples.	Correctly.	AP3402 Chap. 5
9.3	State the responsibility for and the extent of pre-use checks.	In a classroom.	Without error.	AP3402 Chap. 5
9.4	Identify and state the purpose of the F755E.	In a classroom, given examples.	Correctly.	AP3402 Chap. 5
9.5	Recognise and describe the use of the following types of platforms and ladders: a. Ladder, flat top 6 foot. b. Aircraft maintenance ladder 'Giraffe'. c. Aircraft maintenance platform, mobile, adjustable Mk 2. d. Lightweight maintenance structure (Hi-way staging).	In a classroom, given examples.	Correctly.	AP3402 Chap. 5
9.6	State the safety precautions to be observed when using maintenance platforms and ladders listed at EO 9.5. a. Selecting the most suitable platform ladder. b. Position and stabilise the platform or ladder. c. Carry out the pre-use checks. d. Raising and lowering the platform or ladder. End of 9.0	In a classroom.	Without error.	AP119F-2008-15F Chap.2 Para.1 AP119F-2009-15F Chap.2 Para.1 AP119F-2010-15F Chap.2 Para.1 AP119F-2100-1 Chap.2

TRADE TRAINING

SECTION: P20 INTRODUCTION TO MAINTENANCE

SUBJECT: 10. OPERATE GSE

TRAINING OBJECTIVE (a)	REFERENCE (b)	ALLOCATION OF PERIODS (c)	Syll Hrs (e)	No of CELLS (f)	INSTR HOURS (g)
10.0 Operate selected Ground Support Equipment GSE).		Classroom	3.00	1	3.00
		Practical	4.00	2	8.00
		Total	7.00		11.00

EQUIPMENT (h)	PUBLICATIONS (i)
Safety Helmet Maintenance Platform 'A' Frame Ladder Jaguar Cockpit Access Platform	AP 100E-10 AP 119F-2100-1 AP 119F-2006-1 AP 119F-2009-1

FILMS/VIDEOS		
Nº (j)	TITLE (k)	TIME (l)

N^{o} (a)	ENABLING OBJECTIVES (b)	CONDITIONS (c)	STANDARDS (d)	REFERENCE (e)
10.1	State the user unit, flight/section responsibility for the GSE on charge.	In a classroom.	Correctly.	
10.2	Identify and state the purpose of documentation used to record maintenance of GSE.	In a classroom, given examples.	Correctly.	AP3402 Chap. 5 Para.6
10.3	Interpret the information recorded on MOD F755E pre-use checks.	In a classroom, given examples.	Correctly.	AP3402 Chap. 5 Para.6
10.4	Use selected items of GSE. End of 10.0	In a workshop.	Correctly.	

TRADE TRAINING

SECTION: P20 INTRODUCTION TO MAINTENANCE

SUBJECT: 11. LAMPS, TORCHES AND FLOODLIGHTS

TRAINING OBJECTIVE (a)	REFERENCE (b)	ALLOCATION OF PERIODS (c)	Syll Hrs (e)	No of CELLS (f)	INSTR HOURS (g)
11.0 Operate inspection lamps, torches and floodlights		Classroom	1.00	1	1.00
		Practical	1.00	2	2.00
		Total	2.00		3.00

EQUIPMENT (h)	PUBLICATIONS (i)
FLP Torch	AP 100E-10 AP 113A-0201-1 AP 120M-0401-2 AP 120M-0401-1 AP 120M-0404-1 AP 3275 AP 3402

FILMS/VIDEOS		
N^{o} (j)	TITLE (k)	TIME (l)

N^{o} (a)	ENABLING OBJECTIVES (b)	CONDITIONS (c)	STANDARDS (d)	REFERENCE (e)
11.1	State the safety precautions to be observed when: a. Handling/operating inspection lamps and floodlights. b. Routeing cables.	In a classroom.	Correctly.	AP100E-10 Sect. 2 Order 21 AP120M-0401-1Chap. 1 Para.5
11.2	Recognise and state the following classes of lamps and torches in use: a. Flameproof. b. Non-flameproof.	In a classroom, given examples.	Correctly.	AP3402 Sect. 3 Chap. 7 Para.13
11.3	State the limitations in the use of non-flameproof lamps and torches.	In a classroom.	Correctly.	AP3373 Sect. 2 Chap. 6 Para.39
11.4	Recognise and state the use of: a. Inspection lamps. b. Fluorescent inspection lamps. c. Portable floodlights. d. Power distribution boxes. e. Torches.	In a classroom or workshop, given examples.	Correctly.	AP3275 Pt. 3 Sect. 3 Chap. 2 Fig.3.2.1 AP120M-0401-1Chap. 1 Fig.1
11.5	Carry out pre-use checks on inspection lamps, floodlights and torches.	In a classroom or workshop, given the equipment, a pre-use checklist and a composite tool kit.	Correctly.	AP120M-0401-1Chap. 2
11.6	Position inspection lamps and floodlights.	In a workshop, given a simulated task and the equipment.	Correctly.	AP120M-0401-1Chap. 2
11.7	Route supply and interconnecting cables.	In a workshop, given a simulated task and the equipment.	Correctly.	AP100E-10 Sect. 2 Order 21 AP120M-0401-1Chap. 1 Para.5
11.8	Connect inspection lamps and floodlights to appropriate power supplies.	In a workshop, given a simulated task, the equipment and the appropriate power supply.	Without error.	AP3402 Sect. 3 Chap. 7 Para.15
11.9	State the purpose of the earth protection devices and how they can be tripped.	In a classroom or workshop.	Correctly.	

N^{o} (a)	ENABLING OBJECTIVES (b)	CONDITIONS (c)	STANDARDS (d)	REFERENCE (e)
11.10	State the procedure for resetting a tripped earth protection device.	In a classroom or workshop.	Correctly.	
11.11	State the procedure for replacing batteries in flameproof torches.	In a classroom or workshop, given a flameproof torch, assembly tool and demonstration.	Correctly.	
11.12	Carry out a practical task to operate items in EO 11.4 End of 11.0	In a workshop, given lamps, floodlight, torch and task.	Correctly.	

TRADE TRAINING

SECTION: P20 INTRODUCTION TO MAINTENANCE

SUBJECT: 12. LIFTING JACKS

TRAINING OBJECTIVE (a)	REFERENCE (b)	ALLOCATION OF PERIODS (c)	Syll Hrs (e)	No of CELLS (f)	INSTR HOURS (g)
12.0 Operate aircraft screw or hydraulic jacks to lift a load.		Classroom	2.00	1	2.00
		Practical	4.00	1	4.00
		Total	6.00		6.00

EQUIPMENT (h)	PUBLICATIONS (i)
	AP 119K-0126-15F6 Aircraft AP Topic 1 AP 3402 AP 3278

FILMS/VIDEOS		
Nº (j)	TITLE (k)	TIME (l)

N^{o} (a)	ENABLING OBJECTIVES (b)	CONDITIONS (c)	STANDARDS (d)	REFERENCE (e)
12.1	State the reasons for raising an aircraft on jacks.	In a classroom.	Correctly.	AP3402 Sect. 3 Chap. 7 Para.27
12.2	State the principle of operation of a hydraulic lifting jack.	In a classroom.	Correctly.	AP3278 Sect. 2 Chap. 2 Paras.7-8
12.3	Recognise and state the purpose of: a. Pump. b. Release Valve. c. Air Valve. d. Safety Support Collar	In a classroom or workshop, given examples.	Correctly.	
12.4	State the purpose of the pressure relief valve.	In a classroom or workshop.	Correctly.	
12.5	Recognise the following types of lifting jacks. a. Pillar. b. Bipod. c. Tripod. d. Four legged. E Traversing.	In a classroom or workshop, given examples.	Correctly.	AP3402 Sect. 3 Chap. 7 Paras.28-30
12.6	Recognise and state the purpose of: a. Jacking pads. b. Jacking adapters.	In a classroom or workshop, given examples.	Correctly.	AP3402 Sect. 3 Chap. 7 Para.30
12.7	State the safety precautions to be observed when operating aircraft jacks.	In a classroom or workshop.	Without error.	
12.8	State why it is essential to position the jack on a firm, level surface.	In a classroom or workshop.	Correctly.	
12.9	Locate the aircraft jacking and trestling points.	In a workshop, given a training aircraft.	Correctly.	AP3402 Sect. 3 Chap. 3 Para.28 Aircraft topic 1
12.10	Select appropriate jacks, jacking adapters, pads and formers.	In a workshop, given a training aircraft, the aircraft topic 1 and a selection of jacking equipment.	Correctly.	Aircraft topics 1 & 3
12.11	Carry out pre-use checks on the jacks.	In a workshop, given aircraft jacks.	Correctly.	AP119K-0126-15F6

Nº (a)	ENABLING OBJECTIVES (b)	CONDITIONS (c)	STANDARDS (d)	REFERENCE (e)
12.12	State where the jacking procedure can be found.	In a workshop, given the relevant APs.	Correctly.	Aircraft topic 4A3/5A3
12.13	Position the aircraft lifting jacks.	In a workshop, given a training aircraft, and equipment.	Correctly.	Aircraft topic 1 AP3278 Sect. 2 Chap. 2 Paras.6-13
12.14	Raise the aircraft on jacks.	In a workshop, given a training aircraft, jacking equipment and composite tool kit.	Correctly.	Aircraft topic 1
12.15	Lower the aircraft onto its wheels. End of 12.0	In a workshop, given a training aircraft, jacking equipment and composite tool kit.	Correctly.	

TRADE TRAINING

SECTION: P20 INTRODUCTION TO MAINTENANCE

SUBJECT: 13. AIRCRAFT TRESTLES

TRAINING OBJECTIVE (a)	REFERENCE (b)	ALLOCATION OF PERIODS (c)	Syll Hrs (e)	No of CELLS (f)	INSTR HOURS (g)
13.0 Recognise, assemble and position aircraft trestles to support light aircraft/aircraft structure during maintenance.		Classroom	1.00	1	1.00
		Practical	2.00	3	6.00
		Total	3.00		7.00

EQUIPMENT (h)	PUBLICATIONS (i)
	AP 119F-0602-01 Relevant Aircraft Topics 1 & 5

FILMS/VIDEOS		
Nº (j)	TITLE (k)	TIME (l)

N^{o} (a)	ENABLING OBJECTIVES (b)	CONDITIONS (c)	STANDARDS (d)	REFERENCE (e)
13.1	Operate aircraft screw hydraulic jacks to lift an aircraft.	On a training aircraft, under supervision, given jacks, equipment and composite tool kit.	Correctly.	Aircraft topic 1
13.2	Describe the construction of aircraft trestles.	In a classroom or workshop, in his own words.	Correctly.	Aircraft topics 1 & 5
13.3	State the safety precautions to be observed when assembling aircraft trestles.	In a classroom or workshop, in his own words.	Without error.	AP119F-0602-1
13.4	State the source of information which gives the dimensions and permissible loads of aircraft trestles.	In a classroom or workshop, in his own words.	Correctly.	AP119F-0602-1
13.5	Select and assemble suitable aircraft trestles for supporting an aircraft raised on jacks.	In a workshop, given a selection of trestles.	Correctly.	
13.6	Raise an aircraft on jacks and position aircraft trestles.	On a training aircraft, under supervision, given jacks and trestles.	Correctly.	Aircraft topics 1 & 5.
13.7	Remove aircraft trestles, lower aircraft onto its wheels and remove jacks. End of 13.0	On a training aircraft, under supervision.	Correctly.	

TRADE TRAINING

SECTION: P20 INTRODUCTION TO MAINTENANCE

SUBJECT: 14. HI-WAY STAGING

TRAINING OBJECTIVE (a)	REFERENCE (b)	ALLOCATION OF PERIODS (c)	Syll Hrs (e)	No of CELLS (f)	INSTR HOURS (g)
14.0 Describe Hi-way staging and its applications.		Classroom	1.00	1	1.00
		Practical	0.00		0.00
		Total	1.00		1.00

EQUIPMENT (h)	PUBLICATIONS (i)
Safety Helmet Hi-way staging	AP 119F-2100-125F AP 100E-10 AP 113A-0201-1

FILMS/VIDEOS		
Nº (j)	TITLE (k)	TIME (l)

N^{o} (a)	ENABLING OBJECTIVES (b)	CONDITIONS (c)	STANDARDS (d)	REFERENCE (e)
14.1	Describe the construction of Hi-way staging.	In a classroom.	Correctly.	
14.2	State the safety precautions necessary to prevent damage to aircraft/equipment and injury to personnel when erecting/dismantling Hi-way staging.	In a classroom, or workshop.	Correctly.	
14.3	Electrically bond staging structures.	In a workshop, given Hi-way staging and bonding equipment.	Correctly.	
14.4	Carry out weekly maintenance, recognise and replace faulty components, sign for completion on MOD F755E. End of 14.0	In a workshop, given Hi-way staging, schedules and documentation.	Correctly.	

TRADE TRAINING

SECTION: P20 INTRODUCTION TO MAINTENANCE

SUBJECT: 15. STIs, SIs, PWIs, LEIs, MODIFICATION LEAFLETS AND STFs

TRAINING OBJECTIVE (a)	REFERENCE (b)	ALLOCATION OF PERIODS (c)	Syll Hrs (e)	No of CELLS (f)	INSTR HOURS (g)
15.0 State the purpose of STIs, SIs, PWIs, LEIs, Modification Leaflets and STF Instructions.		Classroom	2.00	1	2.00
		Practical	0.00		0.00
		Total	2.00		2.00

EQUIPMENT (h)	PUBLICATIONS (i)
	AP 100B-01 AP 100C-02

FILMS/VIDEOS		
Nº (j)	TITLE (k)	TIME (l)

N^{o} (a)	ENABLING OBJECTIVES (b)	CONDITIONS (c)	STANDARDS (d)	REFERENCE (e)
15.1	Recognise and state the purpose of the following instructions: a. STI b. SI c. PWI d. LEI e. MODS f. STF	In a classroom, given examples.	Correctly.	AP100B-01 Orders 1003 & 1120
15.2	State the method of using the Supplementary Flight Servicing Certificate/Register for calling up subsequent application of an SI.	In a classroom, given examples.	Correctly.	AP100C-02 Chap. 1 Para.28
15.3	State the purpose of the F760 and F761.	In a classroom, given examples.	Correctly.	AP100B-01 Order 0901
15.4	State the purpose of a Serious Fault Signal (SFS). End of 15.0	In a classroom, given examples.	Correctly.	AP100B-01 Order 0901

TRADE TRAINING

SECTION: P20 INTRODUCTION TO MAINTENANCE

SUBJECT: 16. STIs, SIs, PWIs LEIs, MODIFICATION LEAFLETS AND STFs

TRAINING OBJECTIVE (a)	REFERENCE (b)	ALLOCATION OF PERIODS (c)	Syll Hrs (e)	No of CELLS (f)	INSTR HOURS (g)
16.0 Interpret information in STIs, SIs, PWIs, LEIs Modification Leaflets and STF Instructions.		Classroom	2.00	1	2.00
		Practical	0.00		0.00
		Total	2.00		2.00

EQUIPMENT (h)	PUBLICATIONS (i)
	AP 100B-01 AP 100A-01

FILMS/VIDEOS		
Nº (j)	TITLE (k)	TIME (l)

N^{o} (a)	ENABLING OBJECTIVES (b)	CONDITIONS (c)	STANDARDS (d)	REFERENCE (e)
16.1	Interpret the information contained within STIs, SIs, PWIs and STFs in particular: a. Title. b. Applicability c. Work required d. Recording action.	In a classroom, given examples.	Correctly.	AP100B-01 Orders 1003 & 1120
16.2	State the purpose and limitations of a Local Engineering Instruction (LEI). End of 16.0	In a classroom, given examples.	Correctly.	AP100A-01 Lft142 Paras11-14

TRADE TRAINING

SECTION: P20 INTRODUCTION TO MAINTENANCE

SUBJECT: 17. STIs, SIs, PWIs LEIs, MODIFICATION LEAFLETS AND STFs

TRAINING OBJECTIVE (a)	REFERENCE (b)	ALLOCATION OF PERIODS (c)	Syll Hrs (e)	No of CELLS (f)	INSTR HOURS (g)
17.0 Satisfy STIs, SIs, PWIs, LEIs Modification Leaflets or STF and record compliance.		Classroom	0.00		0.00
		Practical	2.00	4	8.00
		Total	2.00		8.00

EQUIPMENT (h)	PUBLICATIONS (i)
	AP 100B-01 AP 100A-01

FILMS/VIDEOS		
Nº (j)	TITLE (k)	TIME (l)

N^{o} (a)	ENABLING OBJECTIVES (b)	CONDITIONS (c)	STANDARDS (d)	REFERENCE (e)
17.1	Satisfy a given STI, SI, PWI, LEI, modification or STF.	In a workshop, given tools and an example STI, SI, PWI, LEI, modification or STF.	Correctly.	AP100B-01 Orders 1003 & 1120 AP100A-01 Lft142
17.2	Record compliance of the task detailed in EO 17.1 on associated MOD Form series paperwork. End of 17.0	In a classroom or workshop.	Correctly.	AP100B-01 AP100C-02

TRADE TRAINING

SECTION: P20 INTRODUCTION TO MAINTENANCE

SUBJECT: 18. ZONAL SURVEY

TRAINING OBJECTIVE (a)	REFERENCE (b)	ALLOCATION OF PERIODS (c)	Syll Hrs (e)	No of CELLS (f)	INSTR HOURS (g)
18.0 State the regulations pertaining to aircraft zonal survey.		Classroom	2.00	1	2.00
		Practical	0.00		0.00
		Total	2.00		2.00

EQUIPMENT (h)	PUBLICATIONS (i)
	AP 100A-01 AP 100C-22 AP 100C-20

FILMS/VIDEOS		
Nº (j)	TITLE (k)	TIME (l)

N^{o} (a)	ENABLING OBJECTIVES (b)	CONDITIONS (c)	STANDARDS (d)	REFERENCE (e)
18.1	Describe what is meant by a zonal examination plan.	In a classroom.	Correctly.	
18.2	State where the information regarding zonal survey can be found.	In a classroom.	Correctly.	Aircraft topic 5
18.3	State the regulations pertaining to aircraft zonal surveys.	In a classroom.	Correctly.	
18.4	State who is authorised to carry out and sign for zonal survey.	In a classroom.	Correctly.	AP100A-01 Lft311
18.5	Describe the aircraft zone referencing system as contained in British Standard (BS) M43.	In a classroom.	Correctly.	
18.6	State the meaning of Maintenance Significant Item (MSI).	In a classroom.	Correctly.	AP100A-01 Lft315
18.7	State the meaning of Structurally Significant Item (SSI).	In a classroom.	Correctly.	
18.8	State who is authorised to sign for an SSI in a maintenance schedule.	In a classroom.	Correctly.	AP100A-01 Lft315
18.9	State the method of carrying out a zonal survey.	In a classroom.	Correctly.	
18.10	State the documentation used to record a zonal survey. End of 18.0	In a classroom.	Correctly.	AP100C-20 AP100C-22

TRADE TRAINING

SECTION: P20 INTRODUCTION TO MAINTENANCE

SUBJECT: 19. EXAMINATION

TRAINING OBJECTIVE (a)	REFERENCE (b)	ALLOCATION OF PERIODS (c)	Syll Hrs (e)	No of CELLS (f)	INSTR HOURS (g)
19.0 Obtain a pass mark in an examination.		Classroom	2.00	1	2.00
		Practical	0.00		0.00
		Total	2.00		2.00

EQUIPMENT (h)	PUBLICATIONS (i)

FILMS/VIDEOS		
Nº (j)	TITLE (k)	TIME (l)

N^{o} (a)	ENABLING OBJECTIVES (b)	CONDITIONS (c)	STANDARDS (d)	REFERENCE (e)
19.1	Complete an end of phase examination. End of 19.0	In a classroom, under examination conditions.	Attain the examination pass mark.	

TRADE TRAINING

SECTION: P20 INTRODUCTION TO MAINTENANCE

SUBJECT: 20. DEBRIEF

TRAINING OBJECTIVE (a)	REFERENCE (b)	ALLOCATION OF PERIODS (c)	Syll Hrs (e)	No of CELLS (f)	INSTR HOURS (g)
20.0 Participate in a debrief of P20.		Classroom	2.00	1	2.00
		Practical	0.00		0.00
		Total	2.00		2.00

EQUIPMENT (h)	PUBLICATIONS (i)

FILMS/VIDEOS		
Nº (j)	TITLE (k)	TIME (l)

N° (a)	ENABLING OBJECTIVES (b)	CONDITIONS (c)	STANDARDS (d)	REFERENCE (e)
20.1	Participate in a debrief of training carried out during the P20 phase. End of 20.0	In a classroom		

AMENDMENT RECORD

AL No. (a)	Date of Amendment (b)	Incorporated by (c)	Date Incorporated (d)
1			
2			
3			
4			
5			
6			
7			
8			
9			
10			
11			
12			
13			
14			
15			
16			
17			

PART I

INTRODUCTION

1. Aim of the Course. The aim of the course, in conjunction with respective basic trade training courses CN1202, CN1203, CN1204, CN1205, CN1206 and CN1209, is to train airmen to Leading Aircraftman standard in their respective trade as specified in the AP 3376 series, and to develop the skills, knowledge and attitudes to enable them to be effective members of the RAF.

2. Security Classification. The contents of this course are up to and including RESTRICTED. The Instructional Specification (IS) is for OFFICIAL USE ONLY.

3. Purpose. The IS defines in detail the required student achievements for the successful progress and subsequent completion of the course. The information in this IS will enable the training management to determine the precise employment of instructional staff and the utilisation of material resources. It will provide the instructional staff with a precise brief on what is required from the student, together with the constraints of time and method within which the instructors must operate.

4. Breakdown. The IS is produced in a series of training sections, e.g. “Introduction to Maintenance”, which are further sub-divided into Training Objectives (TOs) and Enabling Objectives (EOs). Because of the large amount of course material it is not practicable to produce the IS in one volume. The number of cells for classroom and practical work is as stated in the introductory table at part two of this document. Each TO and EO is to be read as being prefaced with the phrase "On completion of this training objective the student must be able to .....". For "he" and "his" read also "she" and "hers" when appropriate.

5. Abbreviations.

AAES	Aircraft Assisted Escape System.
C	Classroom.
CM	Course Manual.
COSHH	Control of Substances Hazardous to Health.
DL	Distance Learning.
DES	Dangerous Engineering Substance.
EO	Enabling Objective.
EP	Environmental Protection.
HSW	Health and Safety at Work etc 1974.
IS	Instructional Specification.
JPS	Job Performance Statement.
MCOQ	Multiple Choice Objective Questions.
NDT	Non Destructive Testing.
NVQ	National Vocational Qualification.
P	Practical.
QA	Quality Assurance.
T	Total.
TO	Training Objective.

PART I

6. Relationship of IS to Syllabus. The Syllabus lists the TOs and the major resources needed to implement training. It is intended for use by managers, supervisors and planners. The IS provides instructors with a detailed brief on what is required from students, together with the constraints of time and guidance as to method. To enable an instructor to appreciate the constitution of the course as a whole and the relationship of his own to other subjects it is suggested that Part III of the Syllabus be made available to instructors. The instructors would thus gain an overview of the whole course which would reduce duplication or omission of information given to students.

7. References. The references given in column (e) of Part III are given to expand on the related EO and to clarify for the instructor what is required from the student. The reference is not necessarily a publication held by the student who will normally only be issued with a Course Manual (CM).

8. Films. The films listed in Part III can be shown if required to support the instruction. Instructors should plan them in at the most appropriate point in their lessons. Instructors should show only the films listed; if other films are required a check should be made through the subsequent IS's to ensure that a later lesson is not pre-empted by premature showing of a film.

9. Metrication. Throughout the course both Imperial and Metric systems are to be employed and practised for dimensions, working tolerances and units of weight, force, area and pressure. As a general rule, unless otherwise specified the units to be used primarily are those in the relevant aircraft or equipment AP, where this is not clear, SI units are preferred. English, American and Metric standards are to be covered for thread forms, bolt and spanner sizes and torque loading.

10. Page Numbering. The reference in the bottom left hand corner of the page is for Word Processor use only and is a disk reference number. Amended pages will bear the Amendment List number and date in the bottom right hand corner.

11. Students' Vocabulary. It should be noted that the students' knowledge of technical words will be limited. Words or phrases such as hygroscopic and effervesce, although familiar to instructors, are unlikely to be in a student's vocabulary. Instructors, when using technical words or phrases in their instruction, should stop and explain their meaning before proceeding with the lesson.

PART I

12. Trade Testing. The system of testing and monitoring the performance and progress of the student is by:

    a. Completion of all JPS objectives as appropriate.

    b. Satisfactory performance of practical objectives which must be individually assessed and marked by instructors.

    c. Achieving a pass mark in the examination at the end of each training section.

    d. Achieving a pass mark in the skill of hand test job, the consolidation and final examinations.

13. Standards. The standards required from a student in the performance of Job Performance Statement objectives are specified against the objectives. The pass mark for examinations will be decided and promulgated by the OC Training Secretariat (OC TSec). In addition, the students' attitude is all important and should be constantly monitored by the instructor and recorded on the students' documents.

SAFETY. THE OBJECTIVES REGARDING SAFETY ARE IDENTIFIED BY "WITHOUT ERROR" IN THE STANDARDS COLUMN. PRACTICAL EXERCISES MUST BE CARRIED OUT OBSERVING ALL RELEVANT SAFETY PRECAUTIONS AND THE STUDENT MUST BE ASSESSED AS BEING SAFE OR UNSAFE TO WORK ON AIRCRAFT.

PART I

14. Attitudes. The attitude goals are:

a. Safety. The student must be aware of Flight Safety practices to safeguard aircraft, equipment and personnel. He must also be aware of his responsibilities under the Health and Safety at Work etc Act 1974 and the Environmental Protection Act 1990 to safeguard himself and his colleagues at the workface. These requirements can best be measured by observing the student on a practical task, e.g. does he check the AAES safety device positions on entering a cockpit?

b. Industry. In classroom lessons the student is expected to display motivation towards a progressive acquisition of knowledge. During practical tasks he is expected to work in accordance with his briefing and authoritative references, to reason out the solution to simple problems, be aware of his role within the team and show a keenness to bring the task to a satisfactory conclusion. A student who carries out only the immediate order and rests on completion or when confronted with a small problem would merit a low industry mark. However, the instructor should expect the student to report significant difficulties or arisings and all faults, real or suspected, in aircraft or equipment.

c. Reliability. The student is expected to demonstrate self discipline by regulating his self study to maintain satisfactory progress in the course and by being satisfied only with his best attainment in the performance of a practical task. He should display the appropriate self confidence in setting himself a high standard and determination while achieving it.

d. Service Life. The student is expected to demonstrate an awareness of his role as a team member within the RAF, and that he has integrated into a service lifestyle by showing consideration for all people he comes into contact with. He should show a responsible attitude towards, and a proper concern for the reputation of, his flight, squadron, station and RAF in general.

15. Amendment Action. This IS is issued on the authority of the OC Training Design and Support Squadron (TDSS). Suggestions for amendment action are to be submitted in accordance with RAF Cosford Training Instructions.

16. Additional Information.

a. Quality Assurance. Throughout the course the student will be working within a Quality Assurance (QA) environment and will be expected to comply with all current regulations. In addition to the formal training on QA, this will help reinforce the service ethos and commitment to quality systems.

b. Health and Safety at Work and Environmental Protection. Specific trade related safety precautions and all statutory guidance concerning individual responsibilities for Health and Safety at Work (HSW) and Environmental Protection (EP) are included within this IS.

PART II

ALLOCATION OF HOURS

P21. ENGINEERING SKILLS

		Number of cells	C	P	T	Instructor
21.1	State the precautions to be observed to safeguard personnel in a workshop and hanger environment.	1	1.00	0.00	1.00	1.00
21.2	Interpret information contained in approved engineering drawings.	1	5.00	0.00	5.00	5.00
21.3	Interpret the limit systems used in the manufacture of engineering components.	1	1.00	0.00	1.00	1.00
21.4	State the effects and causes of corrosion.	1	4.00	0.00	4.00	4.00
21.5	Examine methods of protection for material used in aircraft structures.	1	3.00	1.00	4.00	4.00
21.6	Explain the methods of preventing corrosion in aircraft.	1	3.00	1.00	4.00	4.00
21.7	Explain the procedures for detecting and neutralising spillages of corrosive fluids.	1	2.00	0.00	2.00	2.00
21.8	State the nature of and identify common forms of aircraft corrosion.	1	2.00	0.00	2.00	2.00
21.9	Describe the procedures for preparation and carry out application of approved cleaning and de-greasing agents.	1/2	2.00	2.00	4.00	6.00
21.10	Examine materials for corrosion.	1/2	1.00	2.00	3.00	5.00
21.11	Carry out the removal of corrosion using hand and mechanical methods.	1/2	4.00	2.00	6.00	8.00
21.12	Identify metals and alloys and explain the effect of heat treatment on metal specifications.	1	1.00	0.00	1.00	1.00
21.13	State the characteristics, composition, and uses for fibre reinforced plastic materials in aircraft and aircraft engine components.	1	2.00	0.00	2.00	2.00
21.14	Measure, mark, cut and shape light alloy block to broad tolerances to within ± 0.4mm (1/64") (0.016") of stated measurements and ± 1deg of stated angles.	1/2	6.00	18.00	24.00	42.00
21.15	Apply identification markings to metals.	1/2	0.50	0.50	1.00	1.50
21.16	Check round work for distortion.	1	1.00	1.00	2.00	2.00
21.17	Identify selected screw thread systems.	1	2.00	0.00	2.00	2.00
21.18	Identify and use metric and imperial precision measuring instruments.	1/4	8.00	4.00	12.00	24.00
21.19	Select and use non-adjustable gauges.	1/2	1.00	1.00	2.00	3.00
21.20	Drill and countersink holes using a hand brace and a vertical floor mounted electrical drilling machine and the universal countersink tool.	1/2	2.00	4.00	6.00	10.00

PART II

		Number of cells	C	P	T	Instructor
21.21	Identify, state the purpose of, and carry out the assembly and dismantling of aircraft threaded fasteners using the correct tools.	1/2	4.00	3.00	7.00	10.00
21.22	Select and use locking devices.	1/2	2.00	2.00	4.00	6.00
21.23	Carry out wire locking tasks.	1/2	1.00	3.50	4.50	8.00
21.24	Lock nut and bolt assemblies by peening.	1/2	0.50	0.50	1.00	1.50
21.25	State the hazards associated with, describe the use of and the methods of mixing and applying typical adhesives.	1	2.00	0.00	2.00	2.00
21.26	Select and use reamers.	1/2	1.00	1.00	2.00	3.00
21.27	State the procedures for, and carry out the fitting and removal of taper pins.	1/2	0.50	1.00	1.50	2.50
21.28	Repair internal and external screw threads.	1/2	2.00	2.00	4.00	6.00
21.29	Select, set and use torque tools.	1/2	2.00	3.00	5.00	8.00
21.30	Remove broken or damaged studs.	1/2	0.50	1.50	2.00	3.50
21.31	Fit and remove wire thread inserts.	1/2	2.00	2.00	4.00	6.00
21.36	Carry out a practical task to consolidate the skills taught in P21.	2	0.00	16.00	16.00	32.00
21.37	Obtain a pass mark in an exam.	1	2.00	0.00	2.00	2.00
21.38	Attend an end of phase de-brief on content and assessment.	1	2.00	0.00	2.00	2.00
	Total		74.00	71.00	145.00	222.00

TRADE TRAINING

SECTION: P21 ENGINEERING SKILLS

SUBJECT: 1. WORKSHOP SAFETY PRECAUTIONS

TRAINING OBJECTIVE (a)	REFERENCE (b)	ALLOCATION OF PERIODS			
		(c)	Syll Hrs (d)	No of CELLS (e)	INSTR HOURS (f)
1.0 State the precautions to be observed to safeguard personnel in a workshop and hanger environment.	4921F/1 & 1457F/A1.	Classroom	1.00	1	1.00
		Practical	0.00		0.00
		Total	1.00		1.00

EQUIPMENT (g)	PUBLICATIONS (h)
	AP 100B – 01. AP 100B-10. GAI 1512. Course Manual. AP 119A-0512-1.

FILMS/VIDEOS		
N^{o} (i)	TITLE (j)	TIME (k)

TRADE TRAINING

Nº (a)	ENABLING OBJECTIVES (b)	CONDITIONS (c)	STANDARDS (d)	REFERENCE (e)
1.1	State the safety precautions necessary to prevent injury to him self and other personnel in the workshop in respect of tidiness and cleanliness.	In his own words.	Without error.	Course Manual.
1.2	State the dangers associated with: a. Loose clothing. b. Inadequate lighting. c. Fluorescent lighting, stroboscopic effect. d. Littered and/or slippery floors. e. The operation of machines by unauthorised personnel.	In a training environment.	Without error.	Course Manual.
1.3	State the general safety precautions necessary to prevent injury to personnel and damage to equipment when using workshop equipment, i.e.: a. Guillotine. b. Bench shears. c. Power drilling machine.	In a training environment.	Without error.	Course Manual.
1.4	Explain the purpose of guards or fences fitted to machines listed in EO 1.3.	In a training environment.	Without error.	Course Manual.
1.5	Recognise machinery that is being maintained and/or should not be started. End of 1.0	Shown examples of warning notices.	Without error.	Course Manual.

TRADE TRAINING

SECTION: P21 ENGINEERING SKILLS

SUBJECT: 2. DRAWING INTERPRETATION

TRAINING OBJECTIVE (a)	REFERENCE (b)	ALLOCATION OF PERIODS (c)	Syll Hrs (d)	No of CELLS (e)	INSTR HOURS (f)
2.0 Interpret information contained in approved engineering drawings.		Classroom	5.00	1	5.00
		Practical	0.00		0.00
		Total	5.00		5.00

EQUIPMENT (g)	PUBLICATIONS (h)
	BS308 Parts 1, 2 and 3. Course Manual.

FILMS/VIDEOS		
Nº (i)	TITLE (j)	TIME (k)

TRADE TRAINING

Nº (a)	ENABLING OBJECTIVES (b)	CONDITIONS (c)	STANDARDS (d)	REFERENCE (e)
2.1	Identify and state the purpose of orthographic projection.	Given examples, in a training environment.	Correctly.	Course Manual.
2.2	Recognise first angle projection.	Given examples.	Correctly.	Course Manual.
2.3	Recognise third angle projection.	Given examples.	Correctly.	Course Manual.
2.4	Recognise and state the purpose of auxiliary views.	Given examples, in a training environment.	Correctly.	Course Manual.
2.5	Recognise and state the purpose of sectional views.	Given examples, in a training environment.	Correctly.	Course Manual.
2.6	State the purpose of isometric views.	In a training environment.	Correctly.	Course Manual.
2.7	State the purpose of oblique views.	In a training environment.	Correctly.	Course Manual.
2.8	Recognise isometric and oblique views.	Given examples, in a training environment.	Correctly.	Course Manual.
2.9	Recognise and state the purpose of the following lines: a. Visible outlines. b. Dimension and leader lines. c. Limit of view lines. d. Hidden detail. e. Centre lines and extremity of movement lines. f. Cutting planes. g. Special surface representation.	Given examples, in a training environment.	Correctly.	Course Manual.

Nº (a)	ENABLING OBJECTIVES (b)	CONDITIONS (c)	STANDARDS (d)	REFERENCE (e)
2.10	Recognise and state the purpose of the following symbols: a. Diameter. b. Machining. c. Projection system. d. Taper. e. Welding. f. Screwthreads.	Given examples, in a training environment.	Correctly.	Course Manual.
2.11	Recognise and state the purpose of the following arrangements of dimensions: a. Angular. b. Linear. c. Small item. d. Circle and radius. e. Diameter.	Given examples, in a training environment.	Correctly.	Course Manual.
2.12	State the purpose of workshop drawings.	In a training environment.	Correctly.	Course Manual.
2.13	Interpret a selection of workshop drawings as follows: a. Determine the dimensions of the completed item. b. State the finish required. c. State the meaning of tolerance. d. State the tolerance allowed. e. List the materials and components required for manufacture.	Given examples, in a training environment.	Correctly.	Course Manual.
2.14	State the purpose of the title block.	In a training environment.	Correctly.	Course Manual.
2.15	List the contents of the title block.	In a training environment.	Correctly.	Course Manual.
2.16	Interpret scales given in a title block. End of 2.0	In a training environment.	Correctly.	Course Manual.

TRADE TRAINING

SECTION: P21 ENGINEERING SKILLS

SUBJECT: 3. LIMIT SYSTEMS

TRAINING OBJECTIVE (a)	REFERENCE (b)	ALLOCATION OF PERIODS (c)	Syll Hrs (d)	No of CELLS (e)	INSTR HOURS (f)
3.0 Interpret the limit systems used in the manufacture of engineering components.		Classroom	1.00	1	1.00
		Practical	0.00		0.00
		Total	1.00		1.00

EQUIPMENT (g)	PUBLICATIONS (h)
	BS 4500 Part 1. AP 101B – 4401 – 6A. AP 102C – 0701 – 6A. Course Manual.

FILMS/VIDEOS		
Nº (i)	TITLE (j)	TIME (k)

Nº (a)	ENABLING OBJECTIVES (b)	CONDITIONS (c)	STANDARDS (d)	REFERENCE (e)
3.1	Explain how limit systems govern: a. Interchangeability of components. b. Efficiency of moving parts.	In a training environment.	Correctly.	Course Manual.
3.2	Define the term tolerance.	In a training environment.	Correctly.	Course Manual.
3.3	Explain the difference between unilateral and bilateral systems of tolerances.	In a training environment.	Correctly.	Course Manual.
3.4	Define the term 'Fit'.	In a training environment.	Correctly.	Course Manual.
3.5	Explain the following types of fits: a. Clearance. b. Interference. c. Transition.	In a training environment.	Correctly.	Course Manual.
3.6	Describe the following limit systems in use: a. British Standard system. b. ISO. c. American. d. A manufacturers system. End of 3.0	In a training environment.	Correctly.	Course Manual.

TRADE TRAINING

SECTION: P21 ENGINEERING SKILLS

SUBJECT: 4. CORROSION

TRAINING OBJECTIVE (a)	REFERENCE (b)	ALLOCATION OF PERIODS (c)	Syll Hrs (d)	No of CELLS (e)	INSTR HOURS (f)
4.0 State the effects and causes of corrosion.	14578F/C3.	Classroom	4.00	1	4.00
		Practical	0.00		0.00
		Total	4.00		4.00

EQUIPMENT (g)	PUBLICATIONS (h)
	AP119A-0200-1. Course Manual.

FILMS/VIDEOS		
Nº (i)	TITLE (j)	TIME (k)

Nº (a)	ENABLING OBJECTIVES (b)	CONDITIONS (c)	STANDARDS (d)	REFERENCE (e)
4.1	Describe the adverse effect of corrosion on aircraft: a. Structural members. b. Highly stressed members. c. Fatigue life.	In a training environment.	Correctly.	Course Manual.
4.2	Define the term corrosion.	In a training environment.	Correctly.	Course Manual.
4.3	Explain the two corrosion phenomenon: a. Dry oxidation b. Electro chemical, galvanic action.	In a training environment.	Correctly.	Course Manual.
4.4	Explain how the following contribute towards corrosion: a. Oxygen b. Moisture c. Lack of protective treatments d. Dirt and contaminants e. Environments End of 4.0	In a training environment.	Correctly.	Course Manual.

TRADE TRAINING

SECTION: P21 ENGINEERING SKILLS

SUBJECT: 5. CORROSION CONSIDERATIONS AND PROTECTION

TRAINING OBJECTIVE (a)	REFERENCE (b)	ALLOCATION OF PERIODS (c)	Syll Hrs (d)	No of CELLS (e)	INSTR HOURS (f)
5.0 Examine methods of protection for material used in aircraft structures.	14578F/C3.	Classroom	3.00	1	3.00
		Practical	1.00	1	1.00
		Total	4.00		4.00

EQUIPMENT (g)	PUBLICATIONS (h)
	AP119A-0200-1. Course Manual.

FILMS/VIDEOS		
Nº (i)	TITLE (j)	TIME (k)

Nº (a)	ENABLING OBJECTIVES (b)	CONDITIONS (c)	STANDARDS (d)	REFERENCE (e)
5.1	Explain why sharp changes in section and profile of structures should be avoided.	In a training environment.	Correctly.	Course Manual.
5.2	Describe the problems caused by mechanical fastening devices relating to fatigue and corrosion.	In a training environment.	Correctly.	Course Manual.
5.3	Recognise and describe the purpose of the following permanent corrosion treatments a. Cladding b. Anodic treatment c. Chromate films d. Electro plating e. Stove enamelling	In a training environment.	Correctly.	Course Manual.
5.4	Recognise and describe the purpose of the following supplementary corrosion protection measures a. Paint and primers. b. Varnishes and laquers. c. Jointing compounds. d. Sealants.	Given examples, in the classroom and on an aircraft.	Correctly.	Course Manual.
5.5	List and describe the purposes of the following temporary protectives a. Fluid protective PX-24. b. Fluid protective PX-32. c. Oils and greases.	In a training environment.	Correctly.	Course Manual.
5.6	Describe the following design factors intended to protect against the onset of corrosion a. Drain holes. b. Ribs and stringers. c. Sealing of structures. End of 5.0	In a training environment.	Correctly.	Course Manual.

TRADE TRAINING

TRADE TRAINING

SECTION: P21 ENGINEERING SKILLS

SUBJECT: 6. CORROSION PREVENTION MEASURES

TRAINING OBJECTIVE (a)	REFERENCE (b)	ALLOCATION OF PERIODS (c)	Syll Hrs (d)	No of CELLS (e)	INSTR HOURS (f)
6.0 Explain the methods of preventing corrosion in aircraft.	14578F/C3 & 14578F/C3.	Classroom	3.00	1	3.00
		Practical	1.00	1	1.00
		Total	4.00		4.00

EQUIPMENT (g)	PUBLICATIONS (h)
	AP119A-0200-1. Course Manual. AD119A-0200-10.

FILMS/VIDEOS		
Nº (i)	TITLE (j)	TIME (k)

Nº (a)	ENABLING OBJECTIVES (b)	CONDITIONS (c)	STANDARDS (d)	REFERENCE (e)
6.1	Define aircraft husbandry.	In a training environment.	Correctly.	Course Manual.
6.2	Describe the importance of the following husbandry measures: a. Maintaining cleanliness and dryness. b. Maintaining protective coatings.	In a training environment, given AD119A-0200-10.	Correctly.	Course Manual.
6.3	Explain the method of cleaning aircraft, to include the following: a. Procedures. b. Equipment. c. Cleaning agents. d. Environmental considerations.	In a training environment.	Correctly.	Course Manual.
6.4	State the precautions to be observed to maintain protective surfaces with respect to: a. Protective covers and Blanks. b. Replenishment hoses. c. Parking aircraft into wind. d. Wearing approved footwear. e. Storage of removed panels. f. Aircraft washing. g. Water drain holes. h. Restoring protective films. i. Checking hidden areas.	In a training environment.	Without error.	Course Manual.
6.5	Explain the need for reporting all instances where corrosion is recognised or suspected and describe the reporting procedure.	In a training environment.	Correctly.	Course Manual.
6.6	List and indicate areas in which corrosion is most likely to be found. End of 6.0	In a training environment.	Correctly.	Course Manual.

TRADE TRAINING

SECTION: P21 ENGINEERING SKILLS

SUBJECT: 7. CORROSIVE FLUIDS

TRAINING OBJECTIVE (a)	REFERENCE (b)	ALLOCATION OF PERIODS (c)	Syll Hrs (d)	No of CELLS (e)	INSTR HOURS (f)
7.0 Explain the procedures for detecting and neutralising spillages of corrosive fluids.	14578F/C3 & 14578F/C3.	Classroom	2.00	1	2.00
		Practical	0.00		0.00
		Total	2.00		2.00

EQUIPMENT (g)	PUBLICATIONS (h)
	AP119A0512-1. AP100B-10. Course Manual.

FILMS/VIDEOS		
Nº (i)	TITLE (j)	TIME (k)

TRADE TRAINING

Nº (a)	ENABLING OBJECTIVES (b)	CONDITIONS (c)	STANDARDS (d)	REFERENCE (e)
7.1	Explain the need for protecting aircraft skin, structure and components from contamination by a. Battery acids b. Battery alkalis c. Organic chemicals d. Mercury	In a training environment.	Correctly.	Course Manual.
7.2	List the probable sources of contaminates (in EO 7.1).	In a training environment.	Correctly.	Course Manual.
7.3	Explain the importance of immediate treatment of spilled chemicals.	In a training environment.	Correctly.	Course Manual.
7.4	Describe the procedures used for detecting a. Acid contamination. b. Alkali contamination. c. Microbiological contamination. d. Mercury contamination.	In a training environment.	Correctly.	Course Manual.
7.5	State the safety precautions to be observed when working with: a. Mercury b. Acids c. Alkalis End of 7.0	In a training environment.	Without error.	Course Manual.

TRADE TRAINING

SECTION: P21 ENGINEERING SKILLS

SUBJECT: 8. FORMS OF CORROSION

TRAINING OBJECTIVE (a)	REFERENCE (b)	ALLOCATION OF PERIODS (c)	Syll Hrs (d)	No of CELLS (e)	INSTR HOURS (f)
8.0 State the nature of and identify common forms of aircraft corrosion.	14578F/C3 & 14578F/C3.	Classroom	2.00	1	2.00
		Practical	0.00		0.00
		Total	2.00		2.00

EQUIPMENT (g)	PUBLICATIONS (h)
	AP119A-0200-1. Course Manual.

FILMS/VIDEOS		
Nº (i)	TITLE (j)	TIME (k)

Nº (a)	ENABLING OBJECTIVES (b)	CONDITIONS (c)	STANDARDS (d)	REFERENCE (e)
8.1	Recognise the following early signs of corrosion on materials used in the RAF: a. Damp spots, stagnant areas and must odours. b. Discoloration of protective finishes. c. Blistering and flaking surface finishes. d. Cracking, pitting or powdery deposits. e. Loose rivets. f. Pungent odours associated with battery bays.	In a training environment, shown examples.	Correctly.	Course Manual.
8.2	Recognise the products of corrosion on the following: a. Aluminium. b. Magnesium. c. Copper. d. Ferrous metals. e. Zinc. f. Cadmium.	In a training environment, given examples.	Correctly	Course Manual.
8.3	Identify the following forms of corrosion and describe their causes and effects: a. Surface. b. Pitting. c. Crevice. d. Fretting. e. Filiform. f. Intergranular. g. Exfoliation. h. Stress Corrosion Cracking. i. Fatigue Corrosion. End of 8.0	In a training environment, given examples.	Correctly	Course Manual.

TRADE TRAINING

SECTION: P21 ENGINEERING SKILLS

SUBJECT: 9. CLEANING & DEGREASING

TRAINING OBJECTIVE (a)	REFERENCE (b)	ALLOCATION OF PERIODS (c)	Syll Hrs (d)	No of CELLS (e)	INSTR HOURS (f)
9.0 Describe the procedures for preparation and carry out application of approved cleaning and de-greasing agents.		Classroom	2.00	1	2.00
		Practical	2.00	2	4.00
		Total	4.00		6.00

EQUIPMENT (g)	PUBLICATIONS (h)
	AP100B-10. AP119A-0512-1. Course Manual.

FILMS/VIDEOS		
Nº (i)	TITLE (j)	TIME (k)

TRADE TRAINING

Nº (a)	ENABLING OBJECTIVES (b)	CONDITIONS (c)	STANDARDS (d)	REFERENCE (e)
9.1	Describe the purpose of the following cleaning and de-greasing agents: a. Organic. b. Emulsifiable. c. Activated.	In a training environment.	Correctly.	Course Manual.
9.2	State the safety precautions to be used when working with the cleaning and de-greasing agents listed in EO.9.1.	In a training environment.	Without error.	Course Manual.
9.3	State the meaning of the following: a. POL. b. “In-use quantity”.	In a training environment.	Correctly.	Course Manual.
9.4	State where information can be found regarding the correct selection for use, of cleaning/de-greasing.	In a training environment.	Correctly.	Course Manual.
9.5	Describe the procedures for using cleaning and de-greasing agents with reference to: a. Mixing and use. b. Containers/vessels. c. Disposal.	In a training environment.	Correctly.	Course Manual.
9.6	State the need for correct storage of dangerous engineering substances.	In a training environment.	Without error.	Course Manual.
9.7	State the safety precautions associated with the use of compressed air.	In a training environment.	Without error.	Course Manual.
9.8	Carry out a cleaning and degreasing task.	Given cleaning and de-greasing agents, application equipment, protective clothing and a selection of components.	Correctly.	Course Manual.

TRADE TRAINING

SECTION: P21 ENGINEERING SKILLS

SUBJECT: 10. VISUAL EXAMINATION

TRAINING OBJECTIVE (a)	REFERENCE (b)	ALLOCATION OF PERIODS (c)	Syll Hrs (d)	No of CELLS (e)	INSTR HOURS (f)
10.0 Examine materials for corrosion.	14574F/D4.	Classroom	1.00	1	1.00
		Practical	2.00	2	4.00
		Total	3.00		5.00

EQUIPMENT (g)	PUBLICATIONS (h)
	AP119A-0200-1. Course Manual. ESTS Corrosion Bench Package.

FILMS/VIDEOS		
Nº (i)	TITLE (j)	TIME (k)

TRADE TRAINING

Nº (a)	ENABLING OBJECTIVES (b)	CONDITIONS (c)	STANDARDS (d)	REFERENCE (e)
10.1	Explain the need for visual examination, when corrosion is suspected.	In a training environment.	Correctly.	Course Manual.
10.2	Identify, and state the use and application of: a. Magnifying devices. b. Fibrescopes and endoscopes with light source boxes and cables.	In a training environment, given a selection of equipment.	Correctly.	Course Manual.
10.3	Describe the methods of using equipment listed in EO 10.2.	In a training environment.	Correctly.	Course Manual.
10.4	Visually examine components for corrosion using the aids listed in EO 10.2.	In a training environment, given a selection of components and equipment.	Correctly.	ESTS Corrosion Bench Package.
10.5	Explain the limitations of the information obtained by use of the aids listed in EO 10.2.	In a training environment.	Correctly.	Course Manual.
10.6	List other methods used to detect corrosion: a. Dye penetrants. b. Magnetic particle method. c. Radiography gamma/x-rays. d. Ultrasound. e. Eddy current method. End of 10.0	In a training environment.	Correctly.	Course Manual.

TRADE TRAINING

SECTION: P21 ENGINEERING SKILLS

SUBJECT: 11. CORROSION REMOVAL

TRAINING OBJECTIVE (a)	REFERENCE (b)	ALLOCATION OF PERIODS (c)	Syll Hrs (d)	No of CELLS (e)	INSTR HOURS (f)
11.0 Carry out the removal of corrosion using hand and mechanical methods.	4921F/3.	Classroom	4.00	1	4.00
		Practical	2.00	2	4.00
		Total	6.00		8.00

EQUIPMENT (g)	PUBLICATIONS (h)
	AP119A-0200-1. Course Manual. ESTS Corrosion Bench Package.

FILMS/VIDEOS		
Nº (i)	TITLE (j)	TIME (k)

Nº (a)	ENABLING OBJECTIVES (b)	CONDITIONS (c)	STANDARDS (d)	REFERENCE (e)
11.1	Describe the general procedures for the removal of corrosion using hand and mechanical methods.	In a training environment.	Correctly.	Course Manual.
11.2	State the safety precautions to be observed when carrying out hand and mechanical methods of corrosion removal.	In a training environment.	Without error.	Course Manual.
11.3	List the following hand abrasives that can be used for the removal of light corrosion a. Bristle and wire brushes. b. Scotchbright abrasive pads. c. Silicon carbide, waterproof abrasive paper. d. Aluminium and steel wool. e. Abrasive pens.	In a training environment.	Correctly.	Course Manual.
11.4	State the limitations on the use of abrasives for removing corrosion from common aircraft materials.	In a training environment.	Correctly.	Course Manual.
11.5	State the purpose and general procedures for corrosion removal using the portable Vacublast junior and minor abrasive blasting machines.	In a training environment, given examples.	Correctly.	Course Manual.
11.6	List the protective clothing to be worn when using abrasive blasting methods of corrosion removal.	In a training environment.	Without error.	Course Manual.
11.7	Carry out corrosion removal using the portable abrasive blasting equipment.	In a training environment, given blasting equipment and examples.	Correctly.	ESTS Corrosion Bench Package
11.8	Explain the need for immediate restoration of protective finishes when: a. Damaged. b. Removed. End of 11.0	In a training environment.	Correctly.	Course Manual.

TRADE TRAINING

SECTION: P21 ENGINEERING SKILLS

SUBJECT: 12. METAL IDENTIFICATION

TRAINING OBJECTIVE (a)	REFERENCE (b)	ALLOCATION OF PERIODS (c)	Syll Hrs (d)	No of CELLS (e)	INSTR HOURS (f)
12.0 Identify metals and alloys and explain the effect of heat treatment on metal specifications.	4921F/2.	Classroom	1.00	1	1.00
		Practical	0.00		0.00
		Total	1.00		1.00

EQUIPMENT (g)	PUBLICATIONS (h)
	AP 119G-0002-1. AP 119A – 0301 - D1. AP 119A – 0301 – 1. Course Manual. AP 1086.

FILMS/VIDEOS		
Nº (i)	TITLE (j)	TIME (k)

Nº (a)	ENABLING OBJECTIVES (b)	CONDITIONS (c)	STANDARDS (d)	REFERENCE (e)
12.1	State how the composition and quality of metals are controlled by: a. British Standards Institution (BS). b. Directorate of Development (DTD). c. Ministry of Defence (Def Stans). d. Society of British Aerospace Companies (SBAC) Ltd (AS Specs).	In a training environment.	Correctly.	Course Manual.
12.2	Recognise and state the purpose of: a. Standard Wire Gauge (SWG). b. Metric Sheet Metal gauges.	In a training environment, given examples of gauges.	Correctly.	Course Manual.
12.3	Recognise the specification markings on sheet metal.	In a training environment, given examples of sheet metal.	Correctly.	Course Manual.
12.4	State the purpose of the Standard Colour Scheme.	In a training environment.	Correctly.	Course Manual.
12.5	Recognise Standard Colour Scheme marking on sheet metal and explain how the Standard Colour Scheme is applied to the following: a. Ferrous metal. b. Non-ferrous metal. c. Bars and tubes. d. Rods and coiled wire.	In a training environment, given examples of sheet metal.	Correctly.	Course Manual.
12.6	Identify given metals by specification and gauge.	In a training environment, given metal gauge and AD119A-0301-D1	Correctly.	Course Manual.
12.7	Explain how heat treatment affects the specification of metal.	In a training environment.	Correctly.	Course Manual.

TRADE TRAINING

N^{o} (a)	ENABLING OBJECTIVES (b)	CONDITIONS (c)	STANDARDS (d)	REFERENCE (e)
12.8	Describe the following methods used to heat treat metal when bending or forming is necessary: a. Annealing. b. Solution treatment. c. Natural age hardening. d. Artificial age hardening.	In a training environment.	Correctly.	Course Manual.
12.9	Explain how metal should be cut to ensure that identification marks are not destroyed.	In a training environment.	Correctly.	Course Manual.
12.10	Describe the characteristics and typical engineering uses of: a. Aluminium alloy. b. Mild/medium/high/stainless steels. c. Titanium, copper and their alloys. End of 12.0	In a training environment.	Correctly.	Course Manual.

TRADE TRAINING

SECTION: P21 ENGINEERING SKILLS

SUBJECT: 13. FIBRE REINFORCED PLASTICS

TRAINING OBJECTIVE (a)	REFERENCE (b)	ALLOCATION OF PERIODS (c)	Syll Hrs (d)	No of CELLS (e)	INSTR HOURS (f)
13.0 State the characteristics, composition and uses for fibre reinforced plastic materials in aircraft and aircraft engine components	1457F/A1.	Classroom	2.00	1	2.00
		Practical	0.00		0.00
		Total	2.00		2.00

EQUIPMENT (g)	PUBLICATIONS (h)
	AP101A-0601-1. Course Manual.

	FILMS/VIDEOS		
	Nº (i)	TITLE (j)	TIME (k)

Nº (a)	ENABLING OBJECTIVES (b)	CONDITIONS (c)	STANDARDS (d)	REFERENCE (e)
13.1	Recognise the following materials and describe typical applications: a. Glass reinforced plastic (GRP). b. Carbon fibre reinforced plastic (CFRP). c. Kevlar reinforced plastic (KRP).	In a training environment, given examples.	Correctly.	Course Manual.
13.2	Explain the health hazards present and safety precautions required when handling: a. Glass reinforced plastic (GRP) b. Carbon fibre reinforced plastic (CFRP) c. Kevlar reinforced plastic (KRP)	In a training environment.	Without error.	Course Manual.
13.3	State where the information can be found regarding the safety precautions required when working with: a. Glass reinforced plastic (GRP). b. Carbon fibre reinforced plastic (CFRP). c. Kevlar reinforced plastic (KRP).	In a training environment.	Correctly.	Course Manual.
13.4	State the precautions necessary to prevent damage when working on or near carbon fibre composite structures or components. End of 13.0	In a training environment.	Correctly.	Course Manual.

TRADE TRAINING

SECTION: P21 ENGINEERING SKILLS

SUBJECT: 14. CUTTING AND FILING ALLOY BAR TO BROAD TOLERANCES

TRAINING OBJECTIVE (a)	REFERENCE (b)	ALLOCATION OF PERIODS (c)	Syll Hrs (d)	No of CELLS (e)	INSTR HOURS (f)
14.0 Measures, mark, cut and shape light alloy block to broad tolerances to within ± 0.4mm (1/64") (0.016") of stated measurements and ± 1 deg of stated angle.		Classroom	6.00	1	6.00
		Practical	18.00	2	36.00
		Total	24.00		42.00

EQUIPMENT (g)	PUBLICATIONS (h)
	Course Manual. ESTS Bench Package.

FILMS/VIDEOS		
Nº (i)	TITLE (j)	TIME (k)

Nº (a)	ENABLING OBJECTIVES (b)	CONDITIONS (c)	STANDARDS (d)	REFERENCE (e)
14.1	Recognise and describe the purpose of the following measuring, marking, cutting and shaping hand tools: a. Bench vices. b. Hand vice. c. Tool makers clamp. d. Hammers ball-pein, cross-pein and straight-pein. e. Hammers, nylon faced and hide-faced f. Engineers steel rule. g. Fitters square. h. Scriber. i. Spring dividers. j. Callipers internal, external and oddleg. k. Centre punch. l. Hacksaw, 8/10/12/inch. m. Hacksaw, junior. n. Abrafile. o. Files. p. Sheet metal punches. q. Chisels flat, crosscut, diamond point half round. r. File scratch card.	In a training environment, given examples.	Correctly.	Course Manual.
14.2	Explain how the tools listed at EO 14.1 are classified.	In a training environment.	Correctly.	Course Manual.
14.3	Recognise faulty tools and state the action to be taken regarding tools listed in EO 14.1.	In a training environment.	Correctly.	Course Manual.
14.4	State the reasons for careful handling and storage of tools listed in EO 14.1.	In a training environment.	Correctly.	Course Manual.
14.5	State the reasons for fitting protectors on sharply pointed tools.	In a training environment.	Without error.	Course Manual.

TRADE TRAINING

N^{o} (a)	ENABLING OBJECTIVES (b)	CONDITIONS (c)	STANDARDS (d)	REFERENCE (e)
14.6	Demonstrate the method of checking fitters square for accuracy.	In a training environment, given a fitters square, straight edge and a composite tool kit.	Correctly.	Course Manual.
14.7	Describe the limitations in use of a scriber for marking of aluminium alloy.	In a training environment.	Correctly.	Course Manual.
14.8	Describe the limitations in use of graphite pencils for marking of aluminium alloy.	In a training environment.	Correctly.	Course Manual.
14.9	Explain the need to protect metal from damage during fabrication.	In a training environment.	Correctly.	Course Manual.
14.10	State precautions to be observed to maintain protective finish during fabrication.	In a training environment.	Correctly.	Course Manual.
14.11	Identify and state the purpose of the following: a. Marking-off table. b. Surface plate. c. Vee blocks. d. Scribing blocks. e. Marking colour.	In a training environment, given examples.	Correctly.	Course Manual.
14.12	Explain how the tools listed at EO 14.11 c to d are classified.	In a training environment.	Correctly.	Course Manual.
14.13	State the precautions to be taken to prevent damage to the tools listed at EO 14.11.	In a training environment.	Correctly.	Course Manual.
14.14	Identify and explain the uses of the following parts of a combination set: a. Square head. b. Centre head. c. Protractor head. d. Rule.	In a training environment, given a combination set.	Correctly.	Course Manual.
14.15	State the precautions to be taken to prevent damage to the combination set.	In a training environment.	Correctly.	Course Manual.

TRADE TRAINING

N^{o} (a)	ENABLING OBJECTIVES (b)	CONDITIONS (c)	STANDARDS (d)	REFERENCE (e)
14.16	Select and use tools listed in EO 14.1 and EO 14.11 to measure, mark, cut and shape a light alloy block End of 14.0	In a training environment, given metal, a composite tool kit and an engineering drawing.	Correctly.	ESTS Bench Package.

TRADE TRAINING

SECTION: P21 ENGINEERING SKILLS

SUBJECT: 15. MARKING OF METALS

TRAINING OBJECTIVE (a)	REFERENCE (b)	ALLOCATION OF PERIODS (c)	Syll Hrs (d)	No of CELLS (e)	INSTR HOURS (f)
15.0 Apply identification markings to metals.		Classroom	0.5	1	0.5
		Practical	0.5	2	1.00
		Total	1.00		1.50

EQUIPMENT (g)	PUBLICATIONS (h)
	AP119A-0301-3. Course Manual. ESTS Bench Package.

FILMS/VIDEOS		
Nº (i)	TITLE (j)	TIME (k)

TRADE TRAINING

Nº (a)	ENABLING OBJECTIVES (b)	CONDITIONS (c)	STANDARDS (d)	REFERENCE (e)
15.1	Identify the following metal marking tools: a. Metal stamps. b. Vibratory Percussion Marker.	In a training environment, given examples.	Correctly.	Course Manual.
15.2	State the safety precautions to be observed when marking metals using tools listed at EO 15.1.	In a training environment.	Without error.	Course Manual.
15.3	Describe the limitations on use of metal stamps and etching tool.	In a training environment.	Correctly.	Course Manual.
15.4	State the action to be taken when marking and etching have damaged protective finishes.	In a training environment.	Correctly.	Course Manual.
15.5	Describe the types of fault caused by incorrect use of metal stamps.	In a training environment.	Correctly.	Course Manual.
15.6	Carry out a practical task to mark metal using: a. Metal stamps. b. Vibratory Percussion Marker.	In a training environment, given a metal etching tool and metal stamps.	Correctly.	ESTS Bench Package.
15.7	Carry out protective measures after marking metal. End of 15.0	In a training environment, given finishing materials.	Correctly.	Course Manual.

TRADE TRAINING

SECTION: P21 ENGINEERING SKILLS

SUBJECT: 16. CHECKING FOR DISTORTION

TRAINING OBJECTIVE (a)	REFERENCE (b)	ALLOCATION OF PERIODS (c)	Syll Hrs (d)	No of CELLS (e)	INSTR HOURS (f)
16.0 Check round work for distortion.	4921F/6.	Classroom	2.00	1	2.00
		Practical	0.00		0.00
		Total	2.00		2.00

EQUIPMENT (g)	PUBLICATIONS (h)
	Course Manual.

FILMS/VIDEOS		
Nº (i)	TITLE (j)	TIME (k)

TRADE TRAINING

Nº (a)	ENABLING OBJECTIVES (b)	CONDITIONS (c)	STANDARDS (d)	REFERENCE (e)
16.1	Explain the need to check round work for ovality and bowing.	In a training environment.	Correctly.	Course Manual.
16.2	Use the following tools to check round bar for ovality and bowing: a. Vee blocks. b. Dial test indicator. c. Surface table. d. Scribing block. End of 16.0	In a training environment, given a selection of shafts and tools.	Correctly.	Course Manual.

TRADE TRAINING

SECTION: P21 ENGINEERING SKILLS

SUBJECT: 17. SCREW THREAD SYSTEMS

TRAINING OBJECTIVE (a)	REFERENCE (b)	ALLOCATION OF PERIODS (c)	Syll Hrs (d)	No of CELLS (e)	INSTR HOURS (f)
17.0 Identify selected screw thread systems.		Classroom	2.00	1	2.00
		Practical	0.00		0.00
		Total	2.00		2.00

EQUIPMENT (g)	PUBLICATIONS (h)
	Course Manual.

	FILMS/VIDEOS		
	Nº (i)	TITLE (j)	TIME (k)

Nº (a)	ENABLING OBJECTIVES (b)	CONDITIONS (c)	STANDARDS (d)	REFERENCE (e)
17.1	Explain the principles of a screw thread.	In a training environment.	Correctly.	Course Manual.
17.2	Define the following Screwthread terms: a. Crest. b. Root. c. Thread angle. d. Flanks. e. Pitch. f. Lead. g. Threads per inch (TPI). h. Major diameter. i. Minor diameter. j. Depth. k. Right hand thread. l. Left hand thread.	In a training environment.	Correctly.	Course Manual.
17.3	Explain the meaning of single start and multiple start threads.	In a training environment.	Correctly.	Course Manual.
17.4	Define the lead of a multiple start thread.	In a training environment.	Correctly.	Course Manual.
17.5	Explain the meaning of thread profile or form.	In a training environment.	Correctly.	Course Manual.
17.6	Recognise the following types of thread profiles: a. Vee. b. Square. c. Buttress. d. Acme.	In a training environment, given examples.	Correctly.	Course Manual.
17.7	Explain the use of the thread profiles listed in EO 17.6.	In a training environment.	Correctly.	Course Manual.
17.8	Identify and describe the purpose of screw pitch gauges.	In a training environment, given examples.	Correctly.	Course Manual.

N^{o} (a)	ENABLING OBJECTIVES (b)	CONDITIONS (c)	STANDARDS (d)	REFERENCE (e)
17.9	Describe the uses of the following screwthread systems: a. British Standard Whitworth (BSW). b. British Standard Fine (BSF). c. British Association (BA). d. British Standard Pipe (BSP). e. American National Course (ANC). f. American National Fine (ANF). g. Unified Coarse (UNC). h. Unified Fine (UNF). i. Metric. End of 17.0	In a training environment.	Correctly.	Course Manual.

TRADE TRAINING

SECTION: P21 ENGINEERING SKILLS

SUBJECT: 18. PRECISION MEASURING INSTRUMENTS

TRAINING OBJECTIVE (a)	REFERENCE (b)	ALLOCATION OF PERIODS (c)	Syll Hrs (d)	No of CELLS (e)	INSTR HOURS (f)
18.0 Identify and use metric and imperial precision measuring instruments.	4921F/6.	Classroom	8.00	1	8.00
		Practical	4.00	4	16.00
		Total	12.00		24.00

EQUIPMENT (g)	PUBLICATIONS (h)
	Course Manual. ESTS Bench Package.

FILMS/VIDEOS		
Nº (i)	TITLE (j)	TIME (k)

TRADE TRAINING

Nº (a)	ENABLING OBJECTIVES (b)	CONDITIONS (c)	STANDARDS (d)	REFERENCE (e)
18.1	Explain the need for accurate measurement in the production and maintenance of aircraft components.	In a training environment.	Correctly.	Course Manual.
18.2	Identify and describe the purpose of external Imperial and Metric micrometers.	In a training environment.	Correctly.	Course Manual.
18.3	Explain the procedure for reading: a. Imperial external Micrometers. b. Metric external micrometers.	In a training environment, given a selection of PMI.	Correctly.	Course Manual.
18.4	Carry out the pre-use checks and zero checks on Imperial and Metric external micrometers.	In a training environment, given a micrometer and test pieces.	Correctly.	Course Manual.
18.5	Explain the need for eliminating play in the spindle thread of external micrometer.	In a training environment.	Correctly.	Course Manual.
18.6	Explain the need to report faults found on pre-use checks and during use of PMI.	In a training environment.	Correctly.	Course Manual.
18.7	Explain the need for careful handling and storage of precision measuring instruments.	In a training environment.	Correctly.	Course Manual.
18.8	Explain the need for periodic re-calibration of precision measuring instruments.	In a training environment.	Correctly.	Course Manual.
18.9	Measure external dimensions using: a. Imperial external micrometer. b. Metric external micrometer.	In a training environment, given Imperial and Metric external micrometer and selected test pieces.	To within 0.02mm (0.001”) of true dimensions.	ESTS Bench Package.
18.10	Identify and describe the purpose of internal Imperial and Metric micrometers.	In a training environment, given a selection of PMI.	Correctly.	Course Manual.
18.11	Explain the procedure for reading: a. Imperial internal micrometer. b. Metric internal micrometer.	In a training environment, given the micrometers.	To within 0.02mm (0.001”) of true dimensions.	Course Manual.

TRADE TRAINING

N^{o} (a)	ENABLING OBJECTIVES (b)	CONDITIONS (c)	STANDARDS (d)	REFERENCE (e)
18.12	Identify; describe the purpose of and procedure for reading a digital micrometer.	In a training environment, given a digital micrometer.	Correctly.	Course Manual.
18.13	Explain the principle of the Vernier scale.	In a training environment.	Correctly.	Course Manual.
18.14	Explain the procedure for reading external Vernier micrometers, both Imperial and Metric.	In a training environment, given both micrometers.	Correctly.	Course Manual.
18.15	Identify, describe the purpose of and procedure for reading: a. Imperial Vernier calipers. b. Metric Vernier calipers.	In a training environment, given a selection of measuring instruments.	Correctly.	Course Manual.
18.16	Carry out pre-use and zero checks on a Vernier caliper.	In a training environment, given a vernier caliper.	Correctly.	Course Manual.
18.17	Measure external and internal dimensions using Vernier calipers (Imperial and Metric scales).	In a training environment, given test pieces and Vernier calipers.	To within 0.02mm (0.001”) of a true dimension.	ESTS Bench Package.
18.18	Identify and describe the use of Vernier Bevel Protractors.	In a training environment, given the protractor.	Correctly.	Course Manual.
18.19	Explain the procedure for reading a bevel protractor	In a training environment, given the protractor.	Correctly.	Course Manual.
18.20	Describe the procedure for checking the accuracy of a Vernier bevel protractor	In a training environment, given the protractor.	Correctly.	Course Manual.
18.21	Measure given angles using a Vernier bevel protractor	In a training environment, given the protractor.	Correctly.	ESTS Bench Package.
18.22	Identify and describe the purpose of Imperial and Metric Dial Test Indicators (DTI).	In a training environment.	Correctly.	Course Manual.

TRADE TRAINING

N^{o} (a)	ENABLING OBJECTIVES (b)	CONDITIONS (c)	STANDARDS (d)	REFERENCE (e)
18.23	Operate DTI as follows: a. Fit the instrument to stand. b. Position the item to be measured. c. Measure variations in the test item.	In a training environment, given a DTI, a surface plate and selected test pieces.	To within 0.02mm 0.001" of a true dimension.	ESTS Bench Package.
18.24	Identify and describe the purpose of a cylinder gauge.	In a training environment, given a cylinder gauge.	Correctly.	Course Manual.
18.25	Explain the procedure for using a cylinder gauge.	In a training environment, given a cylinder gauge.	Correctly.	Course Manual.
18.26	Operate a cylinder gauge.	In a training environment, given a cylinder gauge.	Correctly.	Course Manual.
18.27	Identify and describe the purpose of the following metric and imperial height and depth gauges: a. Micrometer depth gauges. b. Vernier depth gauges. c. Vernier height gauges.	In a training environment, given a selection of measuring instruments.	Correctly.	Course Manual.
18.28	Carry out pre-use checks on the instruments listed in EO 18.27.	In a training environment, given a selection of measuring instruments.	Correctly.	Course Manual.
18.29	Operate and read the instruments listed in EO 18.27, using imperial and metric scales.	In a training environment, given test pieces and a selection of measuring instruments.	Correctly.	ESTS Bench Package.
18.30	Use the Vernier height gauge to measure and mark out. End of 18.0	In a training environment, given a Vernier height gauge, metal, a composite tool kit and a drawing.	Correctly.	ESTS Bench Package.

TRADE TRAINING

SECTION: P21 ENGINEERING SKILLS

SUBJECT: 19. NON ADJUSTABLE GAUGES

TRAINING OBJECTIVE (a)	REFERENCE (b)	ALLOCATION OF PERIODS (c)	Syll Hrs (d)	No of CELLS (e)	INSTR HOURS (f)
19.0 Select and use non-adjustable gauges.	14578F/D4.	Classroom	1.00	1	1.00
		Practical	1.00	2	1.00
		Total	2.00		3.00

EQUIPMENT (g)	PUBLICATIONS (h)
	Course Manual. ESTS Bench Package.

FILMS/VIDEOS		
Nº (i)	TITLE (j)	TIME (k)

TRADE TRAINING

Nº (a)	ENABLING OBJECTIVES (b)	CONDITIONS (c)	STANDARDS (d)	REFERENCE (e)
19.1	Explain the general purpose of non-adjustable gauges.	In a training environment.	Correctly.	Course Manual.
19.2	Describe the purpose of the following types of non-adjustable gauges: a. Plug. b. Caliper. c. Profile.	In a training environment.	Correctly.	Course Manual.
19.3	Explain the need for careful handling and storage of non-adjustable gauges.	In a training environment.	Correctly.	Course Manual.
19.4	Identify and describe the use of the following gauges a. Go/No Go. b. Feeler (Imperial/Metric). c. Radius. d. Screw Pitch.	In a training environment, given the gauges.	Correctly.	Course Manual.
19.5	Select and use non adjustable gauges End of 19.0	In a training environment, given the gauges.	Correctly.	ESTS Bench Package.

TRADE TRAINING

SECTION: P21 ENGINEERING SKILLS

SUBJECT: 20. DRILLS AND DRILLING

TRAINING OBJECTIVE (a)	REFERENCE (b)	ALLOCATION OF PERIODS (c)	Syll Hrs (d)	No of CELLS (e)	INSTR HOURS (f)
20.0 Drill and countersink holes using a hand brace and a vertical floor mounted electrical drilling machine and the universal countersink tool.		Classroom	2.00	1	2.00
		Practical	4.00	2	8.00
		Total	6.00		10.00

EQUIPMENT (g)	PUBLICATIONS (h)
	Course Manual. ESTS Bench Package.

FILMS/VIDEOS		
Nº (i)	TITLE (j)	TIME (k)

Nº (a)	ENABLING OBJECTIVES (b)	CONDITIONS (c)	STANDARDS (d)	REFERENCE (e)
20.1	Explain the need for drilling accurately positioned holes in components and structures.	In a training environment.	Correctly.	Course Manual.
20.2	Explain the purpose of the following features of a twist drill: a. Shank. b. Land. c. Flute. d. Grinding angle (Cutting angle). e. Web angle. f. Clearance angle.	In a training environment.	Correctly.	Course Manual.
20.3	Identify twist drills by size and grade.	In a training environment, given examples.	Correctly.	Course Manual.
20.4	Describe how to accurately position holes with a centre punch.	In a training environment.	Correctly.	Course Manual.
20.5	Centre pop the position of holes to be drilled.	In a training environment, given a composite tool kit.	Correctly.	Course Manual.
20.6	Explain the purpose of a pilot hole.	In a training environment.	Correctly.	Course Manual.
20.7	Explain the need for lubrication when drilling.	In a training environment.	Correctly.	Course Manual.
20.8	Describe which lubricants are to be used when drilling the following material: a. Mild steel. b. Aluminium alloy. c. High carbon and alloy steels. d. Brass. e. Cast iron.	In a training environment.	Correctly.	Course Manual.
20.9	Identify the following types of drilling machine: a. Hand brace. b. Vertical floor mounted electric.	In a training environment, given examples.	Correctly.	Course Manual.

TRADE TRAINING

N^{o} (a)	ENABLING OBJECTIVES (b)	CONDITIONS (c)	STANDARDS (d)	REFERENCE (e)
20.10	State precautions to be observed when using the vertical floor mounted electric drilling machines.	In a training environment.	Without error.	Course Manual.
20.11	Explain the need and be able to set the correct speed of vertical floor mounted electric drilling machines.	In a training environment.	Correctly.	Course Manual.
20.12	Identify the Universal Countersinking tool.	In a training environment, given an example.	Correctly.	Course Manual.
20.13	Describe the procedure for: a. Changing the cutter in the Universal Countersinking tool. b. Adjusting the depth of cut.	In a training environment.	Correctly.	Course Manual.
20.14	Describe the method of stopping the following items of machinery in an emergency: a. Bench mounted pillar drill. b. Floor mounted pillar drill.	In a training environment.	Without error.	Course Manual.
20.15	Carry out a drilling task. End of 20.0	In a training environment, given the appropriate equipment.	Correctly.	ESTS Bench Package.

TRADE TRAINING

SECTION: P21 ENGINEERING SKILLS

SUBJECT: 21. AIRCRAFT THREADED FASTENERS AND ASSOCIATED TOOLS

TRAINING OBJECTIVE (a)	REFERENCE (b)	ALLOCATION OF PERIODS (c)	Syll Hrs (d)	No of CELLS (e)	INSTR HOURS (f)
21.0 Identify, state the purpose of, and carry out the assembly and dismantling of aircraft threaded fasteners using the correct tools.	14578F/D4.	Classroom	4.00	1	4.00
		Practical	3.00	2	6.00
		Total	7.00		10.00

EQUIPMENT (g)	PUBLICATIONS (h)
	AP119A-0428-1. Course Manual. ESTS Bench Package.

FILMS/VIDEOS		
Nº (i)	TITLE (j)	TIME (k)

TRADE TRAINING

Nº (a)	ENABLING OBJECTIVES (b)	CONDITIONS (c)	STANDARDS (d)	REFERENCE (e)
21.1	Define the following: a. Bolt. b. Screw. c. Stud. d. Length of bolt. e. Length of screw.	In a training environment, given examples.	Correctly.	Course Manual.
21.2	Recognise the following types of bolt and screw heads: a. Hexagonal. b. Roundhead. c. Countersunk. d. Raised countersunk. e. Hi-Torque Fastener. f. Cheese head. g. Mushroom head.	In a training environment, given examples.	Correctly.	Course Manual.
21.3	Recognise and describe the uses of: a. Standard plain nuts. b. Thin plain nuts. c. Slotted nuts. d. Castellated nuts.	In a training environment, given examples.	Correctly.	Course Manual.
21.4	Recognise and describe the uses of: a. Standard plain washers. b. Thin plain washers. c. Thick plain washers. d. Captive washers.	In a training environment, given examples.	Correctly.	Course Manual.
21.5	Identify the length, diameter and thread of nuts and bolts by code markings or part number.	In a training environment, given examples.	Correctly.	Course Manual.

TRADE TRAINING

N^{o} (a)	ENABLING OBJECTIVES (b)	CONDITIONS (c)	STANDARDS (d)	REFERENCE (e)
21.6	Identify plain washers by: a. Material. b. Thickness. c. Bolt diameter.	In a training environment, given examples.	Correctly.	Course Manual.
21.7	Explain the reason for preserving package identification of on coded nuts and bolts.	In a training environment.	Correctly.	Course Manual.
21.8	State the reason for replacing nuts and bolts with items of identical specification.	In a training environment, given examples.	Correctly.	Course Manual.
21.9	Describe the purpose and limitations on the use of aluminium alloy nuts and bolts.	In a training environment.	Correctly.	Course Manual.
21.10	Identify by type and describe the uses of: a. Standard studs. b. Waisted studs. c. Stepped studs. d. Shouldered studs.	In a training environment, given examples.	Correctly.	Course Manual.
21.11	Describe methods of fitting and removing studs using: a. Stud box. b. Stud insertion and extraction tool. c. Lock nuts.	In a training environment, given examples.	Correctly.	Course Manual.
21.12	Recognise and explain the purpose of: a. Spanners open ended, ring, adjustable, strap, peg, and splined, 'C' type, flare nut and combination. b. Sockets, ratchet handle, 'T' bar, extension bars and speed brace. c. Universal joint, step-up and step-down adapters. d. Allen keys.	In a training environment, given examples.	Correctly.	Course Manual.
21.13	Identify spanners and sockets by size markings.	In a training environment, given examples.	Correctly.	Course Manual.
21.14	State the safety precautions to be observed when using spanners and sockets.	In a training environment.	Without error.	Course Manual.

TRADE TRAINING

N^{o} (a)	ENABLING OBJECTIVES (b)	CONDITIONS (c)	STANDARDS (d)	REFERENCE (e)
21.15	State the limitations of and precautions when using adjustable wrenches.	In a training environment.	Without error.	Course Manual.
21.16	Recognise and explain the purpose of the following types of screwdriver: a. Ratchet handle. b. Common or general purpose. c. Cross point.	In a training environment, given examples.	Correctly.	Course Manual.
21.17	State the precautions to be observed when using screwdrivers.	In a training environment.	Without error.	Course Manual.
21.18	Describe how screwdrivers are classified.	In a training environment.	Correctly.	Course Manual.
21.19	Recognise unserviceable tools.	In a training environment, given examples.	Correctly.	Course Manual.
21.20	Explain the consequences of using damaged, faulty or the incorrect tool for the task.	In a training environment.	Correctly.	Course Manual.
21.21	Select and use tools listed in EO 21.12, 21.13 and 21.16 to remove and fit bolts, screws, studs, nuts and washers. End of 21.0	In a training environment, given appropriate tools and selected pieces.	Correctly.	ESTS Bench Package.

TRADE TRAINING

SECTION: P21 ENGINEERING SKILLS

SUBJECT: 22. LOCKING DEVICES

TRAINING OBJECTIVE (a)	REFERENCE (b)	ALLOCATION OF PERIODS (c)	Syll Hrs (d)	No of CELLS (e)	INSTR HOURS (f)
22.0 Select and use locking devices.	14578F/D4.	Classroom	2.00	1	2.00
		Practical	2.00	2	4.00
		Total	4.00		6.00

EQUIPMENT (g)	PUBLICATIONS (h)
	AP 101A – 0001 – 1. AP 119A – 0428 – 1. Course Manual. ESTS Bench Package.

FILMS/VIDEOS		
Nº (i)	TITLE (j)	TIME (k)

TRADE TRAINING

Nº (a)	ENABLING OBJECTIVES (b)	CONDITIONS (c)	STANDARDS (d)	REFERENCE (e)
22.1	Explain the purpose and importance of locking devices.	In a training environment.	Correctly.	Course Manual.
22.2	Identify and describe the uses of the following locking devices: a. Split pins. b. Spring washers. c. Shakeproof washers. d. Tab washers. e. Locking plates. f. Circlips. g. Self locking nuts.	In a training environment, given examples.	Correctly.	Course Manual.
22.3	Recognise and explain the purpose of: a. Pliers side-cutting, round nose and flat nose. b. Nippers, diagonal. c. Circlip pliers.	In a training environment, given examples.	Correctly.	Course Manual.
22.4	Describe how pliers and nippers are classified.	In a training environment.	Correctly.	Course Manual.
22.5	State the precautions to be observed when using pliers and nippers.	In a training environment.	Without error.	Course Manual.
22.6	Recognise and explain the purpose of: a. Parallel pin punch. b. Tapered pin punch. c. Steel drift. d. Soft metal drift.	In a training environment, given examples.	Correctly.	Course Manual.
22.7	Describe how punches and drifts are classified.	In a training environment.	Correctly.	Course Manual.
22.8	State the precautions to be observed when using punches and drifts.	In a training environment.	Without error.	Course Manual.

TRADE TRAINING

N^{o} (a)	ENABLING OBJECTIVES (b)	CONDITIONS (c)	STANDARDS (d)	REFERENCE (e)
22.9	Identify and describe the uses of the following: a. Self-tapping screws. b. Stiff nuts. c. Anchor nuts. d. Anchor nut strip. e. Locking nuts.	In a training environment, given examples.	Correctly.	Course Manual.
22.10	List those locking devices that can be used repeatedly and describe the conditions governing re-use.	In a training environment.	Correctly.	Course Manual.
22.11	Describe the typical uses and methods of application of Loctite sealant.	In a training environment.	Correctly.	Course Manual.
22.12	Select and use the following locking devices to lock given assemblies: a. Split pin. b. Spring washers. c. Shakeproof washers. d. Tab washers. e. Locking plates. f. Stiff nuts.	In a training environment, given examples.	Correctly.	ESTS Bench Package.
22.13	Examine assemblies locked with the devices listed in EO 22.2 and check for correct fitment.	In a training environment, given examples.	Correctly.	ESTS Bench Package.
22.14	Explain the implications for flight safety of dropped, lost, broken or unaccounted for locking devices. End of 22.0	In a training environment.	Without error.	Course Manual.

TRADE TRAINING

SECTION: P21 ENGINEERING SKILLS

SUBJECT: 23. WIRE LOCKING

TRAINING OBJECTIVE (a)	REFERENCE (b)	ALLOCATION OF PERIODS (c)	Syll Hrs (d)	No of CELLS (e)	INSTR HOURS (f)
23.0 Carry out wire locking tasks.	14578F/D4.	Classroom	1.00	1	1.00
		Practical	3.50	2	7.00
		Total	4.50		8.00

EQUIPMENT (g)	PUBLICATIONS (h)
	AP101A-0001-1. Course Manual. ESTS Bench Package.

FILMS/VIDEOS		
Nº (i)	TITLE (j)	TIME (k)

TRADE TRAINING

Nº (a)	ENABLING OBJECTIVES (b)	CONDITIONS (c)	STANDARDS (d)	REFERENCE (e)
23.1	Explain the purposes of wire locking.	In a training environment.	Correctly.	Course Manual.
23.2	Identify locking wire by material and gauge.	In a training environment, given examples.	Correctly.	Course Manual.
23.3	Identify locking wire pliers.	In a training environment, given examples.	Correctly.	Course Manual.
23.4	Explain the procedures used to carry out the following approved methods of wire locking: a. Single strand with twist. b. Double twist.	In a training environment.	Correctly.	Course Manual.
23.5	Wire lock the following components: a. Hexagonal nuts and bolt heads to locking tabs. b. Hexagonal nuts and bolt heads in groups of two or more. c. Cheese head screws in groups of two or more. d. Pipe unions: (1) Straight. (2) Tee union. e. Caps and covers. f. Stowage clips and fasteners.	In a training environment, given locking wire, components, a composite tool kit and examples.	Correctly.	ESTS Bench Package.
23.6	Recognise incorrect wire locking.	In a training environment, given examples.	Correctly.	Course Manual.
23.7	Explain the implications for flight safety of stray pieces of locking wire. End of 23.0	In a training environment.	Without error.	Course Manual.

TRADE TRAINING

SECTION: P21 ENGINEERING SKILLS

SUBJECT: 24. PEENING

TRAINING OBJECTIVE (a)	REFERENCE (b)	ALLOCATION OF PERIODS (c)	Syll Hrs (d)	No of CELLS (e)	INSTR HOURS (f)
24.0 Lock nut and bolt assemblies by peening.	14578F/D4.	Classroom	0.50	1	0.50
		Practical	0.50	2	1.00
		Total	1.00		1.50

EQUIPMENT (g)	PUBLICATIONS (h)
	AP101A-0001-1. Course Manual. ESTS Bench Package.

FILMS/VIDEOS		
Nº (i)	TITLE (j)	TIME (k)

TRADE TRAINING

Nº (a)	ENABLING OBJECTIVES (b)	CONDITIONS (c)	STANDARDS (d)	REFERENCE (e)
24.1	Explain the need for locking assemblies by peening.	In a training environment.	Correctly.	Course Manual.
24.2	Explain the methods of peening nut and bolt assemblies.	In a training environment.	Correctly.	Course Manual.
24.3	Explain the method of locking a slotted screw by burring.	In a training environment.	Correctly.	Course Manual.
24.4	Lock nut and bolt assemblies by peening. End of 24.0	In a training environment, given materials, composite tool kit and engineering drawing.	Correctly.	ESTS Bench Package.

TRADE TRAINING

SECTION: P21 ENGINEERING SKILLS

SUBJECT: 25. ADHESIVES, GLAZING AND SEALING COMPOUNDS

TRAINING OBJECTIVE (a)	REFERENCE (b)	ALLOCATION OF PERIODS (c)	Syll Hrs (d)	No of CELLS (e)	INSTR HOURS (f)
25.0 State the hazards associated with and describe the use of and the methods of mixing and applying typical adhesives.	14578F/D4 & 14574/A1.	Classroom	2.00	1	2.00
		Practical	0.00		0.00
		Total	2.00		2.00

EQUIPMENT (g)	PUBLICATIONS (h)
	AP119A-0504-1. AP100B-10. Course Manual.

FILMS/VIDEOS		
Nº (i)	TITLE (j)	TIME (k)

Nº (a)	ENABLING OBJECTIVES (b)	CONDITIONS (c)	STANDARDS (d)	REFERENCE (e)
25.1	Describe the purpose of the following adhesives: a. Solvent base. b. Water base. c. Powder form. d. Chemically reactive.	In a training environment.	Correctly.	Course Manual.
25.2	List some typical applications of the adhesives listed at EO 25.1.	In a training environment.	Correctly.	Course Manual.
25.3	State the hazards associated with the use of the adhesives listed at EO 25.1.	In a training environment.	Without error.	Course Manual.
25.4	State the safety precautions to be observed when using the adhesives listed at EO 25.1.	In a training environment.	Without error.	Course Manual.
25.5	List the typical uses of:- a. Rubber resin cements and adhesives. b. Synthetic resin adhesives. c. Bostik and Boscoprene glazing compounds. d. Loctite sealant. e. Gasket sealing compounds. f. Pressure cabin-sealing compounds. g. PRC Elastomers h. Walkway finishes	In a training environment.	Correctly.	Course Manual.
25.6	Describe where the procedures for mixing the adhesives listed in EO 25.5 can be found End of 25.0	In a training environment.	Correctly.	Course Manual.

TRADE TRAINING

SECTION: P21 ENGINEERING SKILLS

SUBJECT: 26. REAMING

TRAINING OBJECTIVE (a)	REFERENCE (b)	ALLOCATION OF PERIODS (c)	Syll Hrs (d)	No of CELLS (e)	INSTR HOURS (f)
26.0 Select and use reamers.		Classroom	1.00	1	1.00
		Practical	1.00	2	1.00
		Total	2.00		3.00

EQUIPMENT (g)	PUBLICATIONS (h)
	Course Manual. ESTS Bench Package.

FILMS/VIDEOS		
Nº (i)	TITLE (j)	TIME (k)

TRADE TRAINING

Nº (a)	ENABLING OBJECTIVES (b)	CONDITIONS (c)	STANDARDS (d)	REFERENCE (e)
26.1	Explain the necessity for accurate dimensions when working to produce close tolerance holes.	In a training environment.	Correctly.	Course Manual.
26.2	Identify, describe the purpose of and the limitations of the following types of reamer: a. Parallel, straight fluted. b. Parallel, Spiral fluted. c. Expanding. d. Taper Imperial (1 in 48). e. Taper Metric (1 in 50).	In a training environment, given examples.	Correctly.	Course Manual.
26.3	Explain why imperial and metric taper reamers and pins are incompatible.	In a training environment.	Correctly.	Course Manual.
26.4	Explain how imperial and metric taper reamers are classified.	In a training environment.	Correctly.	Course Manual.
26.5	Explain how to adjust and check the size setting on an expanding reamer.	In a training environment.	Correctly.	Course Manual.
26.6	State who is authorised to adjust an expanding reamer.	In a training environment.	Without error.	Course Manual.
26.7	Explain the procedures for using the reamers listed at EO 26.2.	In a training environment.	Correctly.	Course Manual.
26.8	Select and use parallel reamers. End of 26.0	In a training environment, given examples.	Correctly.	ESTS Bench Package.

TRADE TRAINING

SECTION: P21 ENGINEERING SKILLS

SUBJECT: 27. TAPER PINS

TRAINING OBJECTIVE (a)	REFERENCE (b)	ALLOCATION OF PERIODS (c)	Syll Hrs (d)	No of CELLS (e)	INSTR HOURS (f)
27.0 State the procedures for, and carry out the fitting and removal of taper pins.	4921F/7.	Classroom	0.50	1	0.50
		Practical	1.00	2	2.00
		Total	1.50		2.50

EQUIPMENT (g)	PUBLICATIONS (h)
	Course Manual. ESTS Bench Package.

FILMS/VIDEOS		
Nº (i)	TITLE (j)	TIME (k)

TRADE TRAINING

Nº (a)	ENABLING OBJECTIVES (b)	CONDITIONS (c)	STANDARDS (d)	REFERENCE (e)
27.1	Describe the purpose of taper pins.	In a training environment.	Correctly.	Course Manual.
27.2	Identify taper pins by size and type.	In a training environment, given examples.	Correctly.	Course Manual.
27.3	Describe the procedure used for fitting and removing taper pins.	In a training environment.	Correctly.	Course Manual.
27.4	Carry out a fit and removal task. End of 27.0	In a training environment, given a selection of taper pins and appropriate tools.	Correctly.	ESTS Bench Package.

TRADE TRAINING

SECTION: P21 ENGINEERING SKILLS

SUBJECT: 28. SCREW THREAD MANUFACTURE AND REPAIR

TRAINING OBJECTIVE (a)	REFERENCE (b)	ALLOCATION OF PERIODS (c)	Syll Hrs (d)	No of CELLS (e)	INSTR HOURS (f)
28.0 Repair internal and external screw threads.		Classroom	2.00	1	2.00
		Practical	2.00	2	4.00
		Total	4.00		6.00

EQUIPMENT (g)	PUBLICATIONS (h)
	Course Manual. ESTS Bench Package.

FILMS/VIDEOS		
Nº (i)	TITLE (j)	TIME (k)

TRADE TRAINING

Nº (a)	ENABLING OBJECTIVES (b)	CONDITIONS (c)	STANDARDS (d)	REFERENCE (e)
28.1	Identify and describe the purpose of the following tools used to manufacture and repair screwthreads: a. Taps. b. Tap wrench.	In a training environment, given examples.	Correctly.	Course Manual.
28.2	Identify and describe the purpose of the following taps: a. Taper. b. Middle or second. c. Plug.	In a training environment, given examples.	Correctly.	Course Manual.
28.3	Explain the method of cutting an internal Screwthread using taps listed at EO 28.2.	In a training environment.	Correctly.	Course Manual.
28.4	Describe how to repair damaged male threads using a die nut.	In a training environment.	Correctly.	Course Manual.
28.5	Select and use the drills, taps and correct lubricant to produce internal screw threads. End of 28.0	In a training environment, given materials, composite tool kit and engineering drawing.	Correctly.	ESTS Bench Package.

TRADE TRAINING

SECTION: P21 ENGINEERING SKILLS

SUBJECT: 29. TORQUE TOOLS

TRAINING OBJECTIVE (a)	REFERENCE (b)	ALLOCATION OF PERIODS (c)	Syll Hrs (d)	No of CELLS (e)	INSTR HOURS (f)
29.0 Select, set and use torque tools.	4921F/8.	Classroom	2.00	1	2.00
		Practical	3.00	2	6.00
		Total	5.00		8.00

EQUIPMENT (g)	PUBLICATIONS (h)
	AP 119G – 0128 – 1. AP 119G – 0428 – 1. Course Manual. ESTS Bench Package.

FILMS/VIDEOS		
Nº (i)	TITLE (j)	TIME (k)

TRADE TRAINING

Nº (a)	ENABLING OBJECTIVES (b)	CONDITIONS (c)	STANDARDS (d)	REFERENCE (e)
29.1	Define the term "Torque" as in torque loading.	In a training environment.	Correctly.	Course Manual.
29.2	State the need for correct torque loading of threaded fasteners.	In a training environment.	Correctly.	Course Manual.
29.3	State the units in which torque is measured and calculate torque from given force/distance figures.	In a training environment.	Correctly.	Course Manual.
29.4	State the precautions to be observed to safeguard torque tools from damage.	In a training environment.	Correctly.	Course Manual.
29.5	Recognise the following types of torque tools: a. Indication. b. Setting.	In a training environment given examples.	Correctly.	Course Manual.
29.6	Recognise Left Hand; Right Hand or Left/Right hand torque tools.	In a training environment, given a selection of torque tools.	Correctly.	Course Manual.
29.7	Identify and explain the purpose of: a. Acratork test rig. b. Digital torque test analyser.	In a training environment, given examples.	Correctly.	Course Manual.
29.8	State the occasions when torque tools are checked.	In a training environment.	Correctly.	Course Manual.
29.9	Describe how to check the setting of torque tools.	In a training environment, given an acrotork test rig or digital torque analyser and a selection of torque tools.	Correctly.	Course Manual.
29.10	Describe the effect of torque tool extension adapters and torque multipliers and the limitations in their use.	In a training environment.	Correctly.	Course Manual.
29.11	Differentiate between indicated and true torque.	In a training environment.	Correctly.	Course Manual.

TRADE TRAINING

N^{o} (a)	ENABLING OBJECTIVES (b)	CONDITIONS (c)	STANDARDS (d)	REFERENCE (e)
29.12	Differentiate between lubricated torque and dry torque.	In a training environment.	Correctly.	Course Manual.
29.13	Describe the procedure to determine the serviceability of a stiffnut.	In a training environment.	Correctly.	Course Manual.
29.14	Describe the procedure for torque loading a retaining device, which is to be locked with a tab washer, split pin or locking plate.	In a training environment.	Correctly.	Course Manual.
29.15	Carry out practical tasks using selected torque tools.	In a training environment, given a selection of torque tools, components for torque loading and a composite tool kit.	Correctly.	ESTS Bench Package.
29.16	Describe the procedure for checking and setting the following torque wrenches/tools to specific torque loads: a. Indicating. b. Setting.	In a training environment.	Correctly.	Course Manual.
29.17	Describe the recording action taken after checking or adjusting preset torque wrench tools.	In a training environment.	Correctly.	Course Manual.
29.18	Explain the need for regular testing and calibration of the following: a. Torque wrench tool. b. Torque wrench tool test and setting rig. c. Digital torque analyser.	In a training environment.	Correctly.	Course Manual.
29.19	State the occasions when the following types of torque wrench tools are to be checked: a. Indicating. b. Setting.	In a training environment.	Correctly.	Course Manual.
29.20	Differentiate between total torque and run down torque.	In a training environment.	Correctly.	Course Manual.
29.21	Set torque wrench/tools to specified torque loads.	Given acrotork test rig or digital torque analyser and torque wrench tools.	Correctly.	ESTS Bench Package.

TRADE TRAINING

N^{o} (a)	ENABLING OBJECTIVES (b)	CONDITIONS (c)	STANDARDS (d)	REFERENCE (e)
29.22	Calculate the metered torque when using extension adapters and torque multipliers.	In a training environment, given examples.	Correctly.	Torque loading tables from AP119G-0128-1 ESTS Bench Package.
29.23	Carry out a practical task using selected torque wrench tools extension adapters and torque multipliers. End of 29.0	Given torque wrenches tools, extension adapters and torque multipliers.	Correctly.	ESTS Bench Package.

TRADE TRAINING

SECTION: P21 ENGINEERING SKILLS

SUBJECT: 30. BROKEN STUDS

TRAINING OBJECTIVE (a)	REFERENCE (b)	ALLOCATION OF PERIODS (c)	Syll Hrs (d)	No of CELLS (e)	INSTR HOURS (f)
30.0 Remove broken or damaged studs.	4921F/7 & 8.	Classroom	0.50	1	0.50
		Practical	1.50	2	3.00
		Total	2.00		3.50

EQUIPMENT (g)	PUBLICATIONS (h)
	Snap On Tools instruction manual. Course Manual. ESTS Bench Package.

FILMS/VIDEOS		
Nº (i)	TITLE (j)	TIME (k)

Nº (a)	ENABLING OBJECTIVES (b)	CONDITIONS (c)	STANDARDS (d)	REFERENCE (e)
30.1	Recognise broken studs that are: a. Broken above the level of the component. b. Broken flush with or below the surface of the component.	In a training environment, given examples.	Correctly.	Course Manual.
30.2	Describe the procedures for removing studs broken above the surface by using: a. Stud insertion and extraction tool. b. Filing flats. c. Cutting a slot.	In a training environment.	Correctly.	Course Manual.
30.3	Describe the procedures for removing studs broken flush with or below the surface by using: a. `Rigid' extractor set (IG5401416). b. Easy outs. c. Drilling and re-tapping.	In a training environment.	Correctly.	Course Manual.
30.4	State the precautions to be observed when drilling during procedures listed at EO 30.3(a) and 30.3(b).	In a training environment.	Without error.	Course Manual.
30.5	Remove a stud broken flush with or below the surface. End of 30.0	Given extractors and a composite tool kit.	Correctly.	ESTS Bench Package.

TRADE TRAINING

SECTION: P21 ENGINEERING SKILLS

SUBJECT: 31. WIRE THREAD INSERTS

TRAINING OBJECTIVE (a)	REFERENCE (b)	ALLOCATION OF PERIODS (c)	Syll Hrs (d)	No of CELLS (e)	INSTR HOURS (f)
31.0 Fit and remove wire thread inserts.	4921F/7.	Classroom	2.00	1	2.00
		Practical	2.00	2	4.00
		Total	4.00		6.00

EQUIPMENT (g)	PUBLICATIONS (h)
	AP119A-0428-1. Course Manual. ESTS Bench Package.

FILMS/VIDEOS		
Nº (i)	TITLE (j)	TIME (k)

TRADE TRAINING

Nº (a)	ENABLING OBJECTIVES (b)	CONDITIONS (c)	STANDARDS (d)	REFERENCE (e)
31.1	Describe the purpose of wire thread inserts and the limitations in their use.	In a training environment.	Correctly.	Course Manual.
31.2	Identify selected wire thread inserts by type, size and thread form.	In a training environment, given examples.	Correctly.	Course Manual.
31.3	Identify a wire thread insert tool kit and explain the purpose of the tools.	In a training environment, given examples.	Correctly.	Course Manual.
31.4	Describe the procedures for a. Fitting a wire thread insert to a blind hole. b. Fitting a wire thread insert to a through hole. c. Removing a wire thread insert.	In a training environment.	Correctly.	Course Manual.
31.5	Describe the procedure for testing the run down torque of a thread insert.	In a training environment.	Correctly.	Course Manual.
31.6	State the limitations and authority governing the use of threaded inserts	In a training environment.	Correctly.	Course Manual.
31.7	Carry out a practical task to fit and remove a thread insert. End of 31.0	In a training environment, given a wire thread insert, insertion kit, a composite tool kit and a drawing.	Correctly.	ESTS Bench Package.

TRADE TRAINING

SECTION: P21 ENGINEERING SKILLS

SUBJECT: 36. CONSOLIDATION TASK

TRAINING OBJECTIVE (a)	REFERENCE (b)	ALLOCATION OF PERIODS (c)	Syll Hrs (d)	No of CELLS (e)	INSTR HOURS (f)
36.0 Carry out a practical task to consolidate skills taught in P21.		Classroom	0.00		0.00
		Practical	16.00	2	32.00
		Total	16.00		32.00

EQUIPMENT (g)	PUBLICATIONS (h)
	Course Manual.

	FILMS/VIDEOS		
	Nº (i)	TITLE (j)	TIME (k)

Nº (a)	ENABLING OBJECTIVES (b)	CONDITIONS (c)	STANDARDS (d)	REFERENCE (e)
36.1	Carry out a practical task to include the following: a. Cutting and shaping light alloy block. b. Drilling correctly positioned holes. c. Preparation and fitting of wire thread inserts. d. Reaming. End of 36.0	Given light alloy block, a composite tool kit and an engineering drawing.	Correctly, with metal shaping to within ± 0.4mm (1/64”) of stated dimensions and ± 1 deg of stated angles. Hole positioning to be within ± 0.4mm (1/64”) of stated dimensions.	

TRADE TRAINING

SECTION: P21 ENGINEERING SKILLS

SUBJECT: 37. EXAMINATION

TRAINING OBJECTIVE (a)	REFERENCE (b)	ALLOCATION OF PERIODS (c)	Syll Hrs (d)	No of CELLS (e)	INSTR HOURS (f)
37.0 Obtain a pass mark in an exam.		Classroom	2.00	1	2.00
		Practical	0.00		0.00
		Total	2.00		2.00

EQUIPMENT (g)	PUBLICATIONS (h)
	RAF Cosford Training Instructions.

FILMS/VIDEOS		
Nº (i)	TITLE (j)	TIME (k)

TRADE TRAINING

Nº (a)	ENABLING OBJECTIVES (b)	CONDITIONS (c)	STANDARDS (d)	REFERENCE (e)
37.1	Obtain a pass in an examination testing knowledge of P21 Basic Engineering. End of 37.0	In a classroom without references.	To a minimum pass mark in accordance with current RAF Cosford Training Instructions.	RAF Cosford Training Instructions.

TRADE TRAINING

SECTION: P21 ENGINEERING SKILLS

SUBJECT: 38. END OF PHASE DEBRIEF

TRAINING OBJECTIVE (a)	REFERENCE (b)	ALLOCATION OF PERIODS (c)	Syll Hrs (d)	No of CELLS (e)	INSTR HOURS (f)
38.0 Attend an end of phase debrief on content and assessment.		Classroom	2.00	1	2.00
		Practical	0.00		0.00
		Total	2.00		2.00

EQUIPMENT (g)	PUBLICATIONS (h)
	RAF Cosford Training Instructions.

FILMS/VIDEOS		
Nº (i)	TITLE (j)	TIME (k)

TRADE TRAINING

Nº (a)	ENABLING OBJECTIVES (b)	CONDITIONS (c)	STANDARDS (d)	REFERENCE (e)
38.1	Complete a debrief on phase content and assessment. End of 38.0	In a classroom.	In accordance with current RAF Cosford Training Instructions.	RAF Cosford Training Instructions.

TRADE TRAINING

SECTION: P22 TRADE ELECTRICS

SUBJECT: 1. SAFETY PRECAUTIONS

TRAINING OBJECTIVE (a)	REFERENCE (b)	ALLOCATION OF PERIODS (c)	Syll Hrs (e)	No of CELLS (f)	INSTR HOURS (g)
1.0 State the safety precautions necessary to safeguard personnel and equipment in an electrical workshop.	BTEC 14574 A1	Classroom	1.00	1	1.00
		Practical	0.00		0.00
		Total	1.00		1.00

EQUIPMENT (h)	PUBLICATIONS (i)

FILMS/VIDEOS		
Nº (j)	TITLE (k)	TIME (l)

Nº (a)	ENABLING OBJECTIVES (b)	CONDITIONS (c)	STANDARDS (d)	REFERENCE (e)
1.1	State the safety precautions necessary to safeguard personnel and equipment in the Electrical training section (ETTF). End of 1.0	In a classroom.	Without error.	

TRADE TRAINING

SECTION: P22 TRADE ELECTRICS

SUBJECT: 2. WIRING DIAGRAMS

TRAINING OBJECTIVE (a)	REFERENCE (b)	ALLOCATION OF PERIODS (c)	Syll Hrs (e)	No of CELLS (f)	INSTR HOURS (g)
2.0 Interpret simple aircraft wiring diagrams.	BTEC 14575 A1	Classroom	2.00	1	2.00
		Practical	0.00		0.00
		Total	2.00		2.00

EQUIPMENT (h)	PUBLICATIONS (i)

FILMS/VIDEOS		
Nº (j)	TITLE (k)	TIME (l)

Nº (a)	ENABLING OBJECTIVES (b)	CONDITIONS (c)	STANDARDS (d)	REFERENCE (e)
2.1	State the purpose of an electrical circuit diagram.	In a classroom.	Correctly.	
2.2	Differentiate between and explain the uses of : a. Block diagrams. b. Schematic diagrams. c. Wiring diagrams. d. Location diagrams.	In a classroom with reference to APs.	Correctly.	
2.3	Interpret a simple aircraft circuit diagram and describe the operation of the circuit. End of 2.0	In a classroom with reference to APs.	Correctly.	

TRADE TRAINING

SECTION: P22 TRADE ELECTRICS

SUBJECT: 3. FUSES AND CIRCUIT BREAKERS

TRAINING OBJECTIVE (a)	REFERENCE (b)	ALLOCATION OF PERIODS (c)	Syll Hrs (e)	No of CELLS (f)	INSTR HOURS (g)
3.0 Identify and recognise selected fuses and circuit breakers in both modes of operation.		Classroom	0.50	1	0.50
		Practical	0.00		0.00
		Total	0.50		0.50

EQUIPMENT (h)	PUBLICATIONS (i)

FILMS/VIDEOS		
Nº (j)	TITLE (k)	TIME (l)

Nº (a)	ENABLING OBJECTIVES (b)	CONDITIONS (c)	STANDARDS (d)	REFERENCE (e)
3.1	State the purpose of a fuse and the importance of using the correct type and rating when replacing an aircraft fuse.	In a classroom.	Correctly.	
3.2	Identify and state the purpose of red and yellow dummy fuses.	In a classroom, given examples.	Correctly.	
3.3	Recognise the following types of fuse holder: a. Panel mounted. b. Chassis mounted.	Given examples.	Correctly.	
3.4	State the precautions which must be observed when a fuse is replaced or refitted.	In a classroom.	Without error.	
3.5	State the purpose of an automatically tripped circuit breaker.	In a classroom.	Correctly.	
3.6	State the purpose of circuit breaker clips/guards.	In a classroom.	Correctly.	
3.7	State the actions to be taken before manually tripping a circuit breaker. End of 3.0	In a classroom.	Correctly.	

TRADE TRAINING

SECTION: P22 TRADE ELECTRICS

SUBJECT: 4. FAILURES

TRAINING OBJECTIVE (a)	REFERENCE (b)	ALLOCATION OF PERIODS (c)	Syll Hrs (e)	No of CELLS (f)	INSTR HOURS (g)
4.0 State the actions to be taken in the event of a failure being identified.		Classroom	0.50	1	0.50
		Practical	0.00		0.00
		Total	0.50		0.50

EQUIPMENT (h)	PUBLICATIONS (i)

FILMS/VIDEOS		
Nº (j)	TITLE (k)	TIME (l)

Nº (a)	ENABLING OBJECTIVES (b)	CONDITIONS (c)	STANDARDS (d)	REFERENCE (e)
4.1	Recognise a tripped circuit breaker.	Given examples.	Correctly.	
4.2	State the action to be taken on discovering a tripped circuit breaker.	On a training aircraft or training aid, given examples.	Correctly.	
4.3	Explain why he must only replace a ruptured fuse or make a circuit breaker when directed to do so.	In a classroom.	Correctly.	
4.4	Explain the significance of a tripped auto circuit breaker or overload protection device, and the blowing of fuses. End of 4.0	In a classroom.	Correctly.	

TRADE TRAINING

SECTION: P22 TRADE ELECTRICS

SUBJECT: 5. CABLES AND CONNECTORS

TRAINING OBJECTIVE (a)	REFERENCE (b)	ALLOCATION OF PERIODS (c)	Syll Hrs (e)	No of CELLS (f)	INSTR HOURS (g)
5.0 Identify and state the uses of cables and connectors and relate them to their area of application.		Classroom	4.00	1	4.00
		Practical	0.00		0.00
		Total	4.00		4.00

EQUIPMENT (h)	PUBLICATIONS (i)		
		FILMS/VIDEOS	
	Nº (j)	TITLE (k)	TIME (l)

Nº (a)	ENABLING OBJECTIVES (b)	CONDITIONS (c)	STANDARDS (d)	REFERENCE (e)
5.1	State the purpose, construction and use of electrical cables.	In a classroom.	Correctly.	
5.2	Recognise cables and conductors by their external markings or cross-sectional appearance for the following purposes: a. Aircraft general wiring. b. Equipment wiring. c. Working in high temperature. d. Working in corrosive or oily conditions. e. Working in conditions requiring a high degree of flexibility.	Given examples.	Correctly.	
5.3	Identify the following parts of electrical cables: a. Insulation. b. Braiding. c. Protective covering. d. Screening. e. Dielectric (coaxial cables).	Given examples.	Correctly.	
5.4	State the factors that cause damage and deterioration to cables.	In a classroom.	Correctly.	
5.5	State the factors that determine and the manner in which they affect the following features of electrical cables and conductors: a. Current carrying capacity. b. Maximum operating voltage. c. Maximum working temperature. d. Degree of flexibility. e. Type of protective covering used. f. Insulation breakdown. End of 5.0	In a classroom.	Correctly.	

TRADE TRAINING

SECTION: P22 TRADE ELECTRICS

SUBJECT: 6. TYPES OF CONNECTOR

TRAINING OBJECTIVE (a)	REFERENCE (b)	ALLOCATION OF PERIODS (c)	Syll Hrs (e)	No of CELLS (f)	INSTR HOURS (g)
6.0 Identify the main types of connector. Connect and disconnect electrical connectors.		Classroom	4.00	1	4.00
		Practical	4.00	4	16.00
		Total	8.00		20.00

EQUIPMENT (h)	PUBLICATIONS (i)

FILMS/VIDEOS		
Nº (j)	TITLE (k)	TIME (l)

Nº (a)	ENABLING OBJECTIVES (b)	CONDITIONS (c)	STANDARDS (d)	REFERENCE (e)
6.1	Recognise, examine, disconnect and connect selected electrical connectors and terminations.	Given examples.	Correctly.	
6.2	Identify the component parts of plugs, sockets and plockets.	Given examples.	Correctly.	
6.3	State the importance of using only the specified tools for assembly and the dismantling of connectors and insertion/extraction of contacts.	In a classroom.	Correctly.	
6.4	State the factors that determine contact size and separation. End of 6.0	In a classroom.	Correctly.	

TRADE TRAINING

SECTION: P22 TRADE ELECTRICS

SUBJECT: 7. ELECTRICAL SYSTEMS

TRAINING OBJECTIVE (a)	REFERENCE (b)	ALLOCATION OF PERIODS (c)	Syll Hrs (e)	No of CELLS (f)	INSTR HOURS (g)
7.0 Explain the need for electrical systems.		Classroom	1.00	1	1.00
		Practical	0.00		0.00
		Total	1.00		1.00

EQUIPMENT (h)	PUBLICATIONS (i)

FILMS/VIDEOS		
Nº (j)	TITLE (k)	TIME (l)

Nº (a)	ENABLING OBJECTIVES (b)	CONDITIONS (c)	STANDARDS (d)	REFERENCE (e)
7.1	Describe the uses of electricity and the advantages of using electrical systems and components on aircraft.	In a classroom.	Correctly.	
7.2	State the need for primary and secondary power supply systems.	In a classroom.	Correctly.	
7.3	State the need for an emergency power supply system. End of 7.0	In a classroom.	Correctly.	

TRADE TRAINING

SECTION: P22 TRADE ELECTRICS

SUBJECT: 8. AIRCRAFT ELECTRICAL SYSTEMS

TRAINING OBJECTIVE (a)	REFERENCE (b)	ALLOCATION OF PERIODS (c)	Syll Hrs (e)	No of CELLS (f)	INSTR HOURS (g)
8.0 Explain the purpose of electrical systems fitted to aircraft.		Classroom	1.00	1	1.00
		Practical	0.00		0.00
		Total	1.00		1.00

EQUIPMENT (h)	PUBLICATIONS (i)

FILMS/VIDEOS		
Nº (j)	TITLE (k)	TIME (l)

Nº (a)	ENABLING OBJECTIVES (b)	CONDITIONS (c)	STANDARDS (d)	REFERENCE (e)
8.1	State the safety precautions to be observed when working on electrical systems.	In a classroom.	Without error.	
8.2	State the need for internal and external lighting on aircraft.	In a classroom.	Correctly.	
8.3	State the need for heating on aircraft.	In a classroom.	Correctly.	
8.4	State the need for rotary and linear movement of components on aircraft.	In a classroom.	Correctly.	
8.5	State the need for avionics communication equipment.	In a classroom.	Correctly.	
8.6	State the need for interfacing between electrical systems.	In a classroom.	Correctly.	
8.7	List typical applications of: a. Airframe electrical systems. b. Propulsion electrical systems. End of 8.0	In a classroom.	Correctly.	

TRADE TRAINING

SECTION: P22 TRADE ELECTRICS

SUBJECT: 9. SWITCHES, INDICATORS AND LAMPS

TRAINING OBJECTIVE (a)	REFERENCE (b)	ALLOCATION OF PERIODS (c)	Syll Hrs (e)	No of CELLS (f)	INSTR HOURS (g)
9.0 Recognise and explain the purpose and principle of operation of selected switches, indicators and lamps.		Classroom	2.00	1	2.00
		Practical	1.00	4	4.00
		Total	3.00		6.00

EQUIPMENT (h)	PUBLICATIONS (i)		
		FILMS/VIDEOS	
	Nº (j)	TITLE (k)	TIME (l)

Nº (a)	ENABLING OBJECTIVES (b)	CONDITIONS (c)	STANDARDS (d)	REFERENCE (e)
9.1	Recognise and state the purpose of the following manually operated switches: a. Toggle. b. Push button. c. Rotary selector. d. Rheostat.	Given examples.	Correctly.	
9.2	Recognise and state the purpose of the following mechanically operated switches: a. Micro-switch. b. Inertia switch. c. Thermally operated switch.	Given examples.	Correctly.	
9.3	Recognise filament lamp type indicators.	Given examples.	Correctly.	
9.4	State the advantages and disadvantages of the filament lamp type indicator.	In a classroom.	Correctly.	
9.5	Identify selected filament lamps by the following: a. End cap fitting. b. Voltage. c. Wattage. d. Colour.			
9.6	State the precautions to be taken when handling or disposing of filament lamps.	In a classroom.	Without error.	
9.7	State the safety precautions that must be observed before removing or replacing lamps.	In a classroom.	Without error.	
9.8	Replace selected filament lamps.	On a training aircraft or training aid, given examples.	Correctly.	
9.9	Recognise the following electro-magnetic type of indicators: a. Ball type (Doll's eye). b. Drum type. c. Prism type. End of 9.0	Given examples.	Correctly.	

TRADE TRAINING

SECTION: P22 TRADE ELECTRICS

SUBJECT: 10. MICRO-SWITCHES

TRAINING OBJECTIVE (a)	REFERENCE (b)	ALLOCATION OF PERIODS			
		(c)	Syll Hrs (e)	No of CELLS (f)	INSTR HOURS (g)
10.0 Describe the uses, construction and basic operation of micro-switches and the trade responsibilities for their adjustment.		Classroom	1.00	1	1.00
		Practical	0.00		0.00
		Total	1.00		1.00

EQUIPMENT (h)	PUBLICATIONS (i)		
	FILMS/VIDEOS		
	Nº (j)	TITLE (k)	TIME (l)

Nº (a)	ENABLING OBJECTIVES (b)	CONDITIONS (c)	STANDARDS (d)	REFERENCE (e)
10.1	Describe the basic construction and operation of a micro-switch.	In a classroom.	Correctly.	
10.2	Explain why micro-switches form an important part of aircraft circuitry and give some examples of where they would be used.	In a classroom.	Correctly.	
10.3	Identify the circuit symbols for micro-switches.	Given circuit diagrams.	Correctly.	
10.4	State the difference between an 'external' micro-switch (or Limit switch) and an 'internal' micro-switch (or Limit switch).	In a classroom.	Correctly.	
10.5	With reference to aircraft micro-switches, state the trade responsibilities for: a. Electrical disconnection and reconnection. b. Removal and refitting or replacing. c. Adjustment.	In a classroom.	Correctly.	
10.6	State the trade responsibilities for independent checks on micro-switches. End of 10.0	In a classroom.	Correctly.	

TRADE TRAINING

SECTION: P22 TRADE ELECTRICS

SUBJECT: 11. AIRCRAFT POWER SUPPLY SYSTEM

TRAINING OBJECTIVE (a)	REFERENCE (b)	ALLOCATION OF PERIODS (c)	Syll Hrs (e)	No of CELLS (f)	INSTR HOURS (g)
11.0 Identify and describe the basic functions of the major components of an aircraft power supply system.	BTEC 14575 B2, C3	Classroom	6.00	1	6.00
		Practical	0.00		0.00
		Total	6.00		6.00

EQUIPMENT (h)	PUBLICATIONS (i)

FILMS/VIDEOS		
Nº (j)	TITLE (k)	TIME (l)

Nº (a)	ENABLING OBJECTIVES (b)	CONDITIONS (c)	STANDARDS (d)	REFERENCE (e)
11.1	Describe the major components of an aircraft power supply system.	With reference to training diagrams.	Correctly.	
11.2	Describe the basic construction and operation of a.c. and d.c. generators.	With reference to training diagrams.	Correctly.	
11.3	State the need to control the output of a generator.	In a classroom.	Correctly.	
11.4	State the need for voltage monitoring.	In a classroom.	Correctly.	
11.5	State the purpose of voltage regulators.	In a classroom.	Correctly.	
11.6	State the need for frequency monitoring.	In a classroom.	Correctly.	
11.7	State the purpose of frequency (speed) controllers.	In a classroom.	Correctly.	
11.8	Explain the following terms: a. Constant Speed Drive Unit (CSDU). b. Integrated Drive Generator (IDG). c. Frequency Wild Generator.			
11.9	State the need to rectify and smooth the output of an a.c. generator to obtain d.c..	In a classroom.	Correctly.	
11.10	State the purpose of Transformer Rectifier Units (TRUs).	In a classroom.	Correctly.	
11.11	State the purpose of inverters.	In a classroom.	Correctly.	
11.12	State the need for aircraft batteries.	In a classroom.	Correctly.	
11.13	State the safety precautions to be observed when handling aircraft batteries.	In a classroom.	Without error.	
11.14	State the purpose of the following alternative power supply sources: a. Auxiliary Power Unit (APU). b. Ram Air Turbine (RAT). c. Ground Power Unit (GPU).	In a classroom.	Correctly.	
11.15	State the purpose of earthing and bonding on aircraft and the correct earthing procedures to be adopted when connecting an external power supply to an aircraft.	In a classroom.	Correctly.	
11.16	Identify circuit symbols for the major components used in power supply circuits.	With reference to APs.	Correctly.	
11.17	State the precautions and procedures to be observed before applying electrical power to an aircraft.	In a classroom.	Without error.	
11.18	State the precautions and procedures to be observed with aircraft earthing.	In a classroom.	Without error.	
11.19	Recognise and state the purpose of a transformer rectifier unit and an electric/electric unit.	In a classroom.	Correctly.	
11.20	State the pre-use checks required on a transformer rectifier unit and an electric/electric unit.	In a classroom or hangar, given the units.	Correctly.	
11.21	State the safety precautions to be observed when connecting and operating an external power unit.	In a classroom or hangar, given the units.	Without error.	

Nº (a)	ENABLING OBJECTIVES (b)	CONDITIONS (c)	STANDARDS (d)	REFERENCE (e)
11.22	Apply a.c. and d.c. power supplies to an aircraft.	On a training aircraft, given a GPU and topic 1.	Correctly.	
11.23	Switch off and disconnect the external power from the aircraft and stow the cables. End of 11.0	On a training aircraft, given a GPU.	Correctly.	

TRADE TRAINING

SECTION: P22 TRADE ELECTRICS

SUBJECT: 12. SOLENOIDS AND RELAYS

TRAINING OBJECTIVE (a)	REFERENCE (b)	ALLOCATION OF PERIODS (c)	Syll Hrs (e)	No of CELLS (f)	INSTR HOURS (g)
12.0 Describe the uses, construction and basic operation of electrical solenoids and relays in aircraft.		Classroom	1.00	1	1.00
		Practical	0.00		0.00
		Total	1.00		1.00

EQUIPMENT (h)	PUBLICATIONS (i)

FILMS/VIDEOS		
Nº (j)	TITLE (k)	TIME (l)

Nº (a)	ENABLING OBJECTIVES (b)	CONDITIONS (c)	STANDARDS (d)	REFERENCE (e)
12.1	Describe how solenoids and relays are used in aircraft systems.	In a classroom.	Correctly.	
12.2	Describe the basic operation of electro-magnets in solenoids and relays.	In a classroom, given examples.	Correctly.	
12.3	Describe the construction of electrical solenoids and relays.	In a classroom, given examples.	Correctly.	
12.4	Describe the use of solid state relays in electrical systems.	In a classroom.	Correctly.	
12.5	Identify the circuit symbols for electro-magnets, solenoids and relays. End of 12.0	Given circuit diagrams.	Correctly.	

TRADE TRAINING

SECTION: P22 TRADE ELECTRICS

SUBJECT: 13. ACTUATORS

TRAINING OBJECTIVE (a)	REFERENCE (b)	ALLOCATION OF PERIODS (c)	Syll Hrs (e)	No of CELLS (f)	INSTR HOURS (g)
13.0 Describe the uses, construction and basic operation of actuators in aircraft systems.		Classroom	2.00	1	2.00
		Practical	0.00		0.00
		Total	2.00		2.00

EQUIPMENT (h)	PUBLICATIONS (i)		
		FILMS/VIDEOS		
	Nº (j)	TITLE (k)	TIME (l)

Nº (a)	ENABLING OBJECTIVES (b)	CONDITIONS (c)	STANDARDS (d)	REFERENCE (e)
13.1	Describe the basic construction and function of linear and rotary actuators.	In a classroom.	Correctly.	
13.2	State some typical applications of actuators fitted to aircraft.	In a classroom.	Correctly.	
13.3	State the purpose of the following on an actuator: a. Internal limit switches. b. External limit switches. c. Friction clutch. d. Electro-magnetic brake. e. Secondary motor. End of 13.0	In a classroom.	Correctly.	

TRADE TRAINING

SECTION: P22 TRADE ELECTRICS

SUBJECT: 14. CONTENTS GAUGING

TRAINING OBJECTIVE (a)	REFERENCE (b)	ALLOCATION OF PERIODS (c)	Syll Hrs (e)	No of CELLS (f)	INSTR HOURS (g)
14.0 Describe the basic construction and operation of contents gauging systems	BTEC 14575 D4	Classroom	2.00	1	2.00
		Practical	0.00		0.00
		Total	2.00		2.00

EQUIPMENT (h)	PUBLICATIONS (i)

FILMS/VIDEOS		
Nº (j)	TITLE (k)	TIME (l)

Nº (a)	ENABLING OBJECTIVES (b)	CONDITIONS (c)	STANDARDS (d)	REFERENCE (e)
14.1	State the purpose of instrumentation on aircraft.	In a classroom.	Correctly.	
14.2	State the uses of contents gauges on aircraft.	In a classroom.	Correctly.	
14.3	Describe the basic construction of contents gauging systems.	In a classroom.	Correctly.	
14.4	Describe the basic operation of contents gauging systems. End of 14.0	In a classroom.	Correctly.	

TRADE TRAINING

SECTION: P22 TRADE ELECTRICS

SUBJECT: 15. PRESSURE GAUGING

TRAINING OBJECTIVE (a)	REFERENCE (b)	ALLOCATION OF PERIODS (c)	Syll Hrs (e)	No of CELLS (f)	INSTR HOURS (g)
15.0 Describe the basic construction and operation of pressure gauging systems	BTEC 14575 D4	Classroom	2.00	1	2.00
		Practical	0.00		0.00
		Total	2.00		2.00

EQUIPMENT (h)	PUBLICATIONS (i)		
	FILMS/VIDEOS		
	Nº (j)	TITLE (k)	TIME (l)

Nº (a)	ENABLING OBJECTIVES (b)	CONDITIONS (c)	STANDARDS (d)	REFERENCE (e)
15.1	State the uses of pressure gauges on aircraft.	In a classroom.	Correctly.	
15.2	Describe the basic construction of pressure gauges on aircraft.	In a classroom.	Correctly.	
15.3	Describe the basic operation of pressure gauging system components.	In a classroom.	Correctly.	
15.4	Identify the circuit symbols for components and gauges of a pressure gauging system. End of 15.0	In a classroom.	Correctly.	

TRADE TRAINING

SECTION: P22 TRADE ELECTRICS

SUBJECT: 16. TEMPERATURE GAUGING

TRAINING OBJECTIVE (a)	REFERENCE (b)	ALLOCATION OF PERIODS (c)	Syll Hrs (e)	No of CELLS (f)	INSTR HOURS (g)
16.0 Describe the basic construction and operation of temperature gauging systems	BTEC 14575 D4	Classroom	2.00	1	2.00
		Practical	0.00		0.00
		Total	2.00		2.00

EQUIPMENT (h)	PUBLICATIONS (i)

FILMS/VIDEOS		
Nº (j)	TITLE (k)	TIME (l)

Nº (a)	ENABLING OBJECTIVES (b)	CONDITIONS (c)	STANDARDS (d)	REFERENCE (e)
16.1	State the uses of temperature gauges on aircraft.	In a classroom.	Correctly.	
16.2	Describe the basic construction of temperature gauging systems.	In a classroom.	Correctly.	
16.3	Describe the basic operation of temperature gauging components.	In a classroom.	Correctly.	
16.4	Identify the circuit symbols for temperature gauging system components. End of 16.0	In a classroom.	Correctly.	

TRADE TRAINING

SECTION: P22 TRADE ELECTRICS

SUBJECT: 17. ENGINE SPEED INDICATORS

TRAINING OBJECTIVE (a)	REFERENCE (b)	ALLOCATION OF PERIODS (c)	Syll Hrs (e)	No of CELLS (f)	INSTR HOURS (g)
17.0 Describe the basic construction and operation of engine speed indicators.	BTEC 14575 D4	Classroom	2.00	1	2.00
		Practical	0.00		0.00
		Total	2.00		2.00

EQUIPMENT (h)	PUBLICATIONS (i)		
	FILMS/VIDEOS		
	Nº (j)	TITLE (k)	TIME (l)

Nº (a)	ENABLING OBJECTIVES (b)	CONDITIONS (c)	STANDARDS (d)	REFERENCE (e)
17.1	State the uses of engine speed indicators on aircraft.	In a classroom.	Correctly.	
17.2	Describe the basic construction of engine speed indicating systems.	In a classroom.	Correctly.	
17.3	Describe the basic operation of engine speed indicator components.	In a classroom.	Correctly.	
17.4	Describe the basic operation and use of phonic wheel speed detector systems.	In a classroom.	Correctly.	
17.5	Identify the circuit symbols for speed indicator system components. End of 17.0	In a classroom.	Correctly.	

TRADE TRAINING

SECTION: P22 TRADE ELECTRICS

SUBJECT: 18. POSITION INDICATORS

TRAINING OBJECTIVE (a)	REFERENCE (b)	ALLOCATION OF PERIODS (c)	Syll Hrs (e)	No of CELLS (f)	INSTR HOURS (g)
18.0 Describe the basic construction and operation of position indicators.	BTEC 14575 D4	Classroom	2.00	1	2.00
		Practical	0.00		0.00
		Total	2.00		2.00

EQUIPMENT (h)	PUBLICATIONS (i)

FILMS/VIDEOS		
Nº (j)	TITLE (k)	TIME (l)

Nº (a)	ENABLING OBJECTIVES (b)	CONDITIONS (c)	STANDARDS (d)	REFERENCE (e)
18.1	State the uses of position indicating with particular reference to engines in aircraft.	In a classroom.	Correctly.	
18.2	Describe the basic construction of the following (engine) position indicator systems: a. Nozzle. b. Bleed valve (micro-switch). c. Inlet guide vane.	In a classroom.	Correctly.	
18.3	Describe the basic operation of (engine) position indicator systems.	In a classroom.	Correctly.	
18.4	Describe the basic operation of Desynn transmitters and position potentiometers.	In a classroom.	Correctly.	
18.5	Identify the circuit symbols for position indicator system components. End of 18.0	In a classroom.	Correctly.	

TRADE TRAINING

SECTION: P22 TRADE ELECTRICS

SUBJECT: 19. CENTRALISED WARNING SYSTEM

TRAINING OBJECTIVE (a)	REFERENCE (b)	ALLOCATION OF PERIODS (c)	Syll Hrs (e)	No of CELLS (f)	INSTR HOURS (g)
19.0 Recognise and state the principle of operation of a centralised warning system.		Classroom	1.00	1	1.00
		Practical	0.00		0.00
		Total	1.00		1.00

EQUIPMENT (h)	PUBLICATIONS (i)		
		FILMS/VIDEOS	
	Nº (j)	TITLE (k)	TIME (l)

Nº (a)	ENABLING OBJECTIVES (b)	CONDITIONS (c)	STANDARDS (d)	REFERENCE (e)
19.1	State the purpose of a centralised warning system (CWS).	In a classroom.	Correctly.	
19.2	State the meaning of the terms: a. Primary warnings. b. Secondary warnings.	In a classroom.	Correctly.	
19.3	Recognise and state the purpose of the following components of a CWS: a. Centralised Warning Panel (CWP) primary/secondary captions. b. Attention getter lamps. c. Test/mute switch. d. Fire warning lamps. e. Night/day switch.	In a classroom, given examples.	Correctly.	
19.4	State the other method of attention getting used to inform the pilot of primary warnings.	In a classroom.	Correctly.	
19.5	Describe the function of a CWS in response to a system fault.	In a classroom.	Correctly.	
19.6	State how the attention getters are cancelled.	In a classroom.	Correctly.	
19.7	State the indications given when the test facility is operated on a CWS. End of 19.0	In a classroom.	Correctly.	

TRADE TRAINING

SECTION: P22 TRADE ELECTRICS

SUBJECT: 23. ENGINE IGNITION SYSTEMS

TRAINING OBJECTIVE (a)	REFERENCE (b)	ALLOCATION OF PERIODS (c)	Syll Hrs (e)	No of CELLS (f)	INSTR HOURS (g)
23.0 Describe the basic construction and operation of engine ignition systems and explain the safety precautions to be observed.		Classroom	2.00	1	2.00
		Practical	0.00		0.00
		Total	2.00		2.00

EQUIPMENT (h)	PUBLICATIONS (i)

FILMS/VIDEOS		
Nº (j)	TITLE (k)	TIME (l)

Nº (a)	ENABLING OBJECTIVES (b)	CONDITIONS (c)	STANDARDS (d)	REFERENCE (e)
23.1	State the uses of aircraft engine ignition systems.	In a classroom.	Correctly.	
23.2	Describe the basic construction of engine ignition systems.	In a classroom.	Correctly.	
23.3	Describe the basic construction and operation of engine igniter boxes or high energy ignition units (HEIUs).	In a classroom.	Correctly.	
23.4	State the safety precautions that must be observed when operating and working with engine ignition systems.	In a classroom.	Without error.	
23.5	Identify the circuit symbol for igniter plugs. End of 23.0	In a classroom.	Correctly.	

TRADE TRAINING

SECTION: P22 TRADE ELECTRICS

SUBJECT: 24. HUSBANDRY

TRAINING OBJECTIVE (a)	REFERENCE (b)	ALLOCATION OF PERIODS (c)	Syll Hrs (e)	No of CELLS (f)	INSTR HOURS (g)
24.0 State the need for the correct husbandry of all aircraft wiring and fibre-optic cables and explain how this is achieved.		Classroom	1.00	1	1.00
		Practical	0.00		0.00
		Total	1.00		1.00

EQUIPMENT (h)	PUBLICATIONS (i)		
		FILMS/VIDEOS		
	Nº (j)	TITLE (k)	TIME (l)

Nº (a)	ENABLING OBJECTIVES (b)	CONDITIONS (c)	STANDARDS (d)	REFERENCE (e)
24.1	State the need for the correct husbandry of all aircraft wiring and how it is achieved.	In a classroom.	Correctly.	
24.2	Demonstrate the correct method of removing cable from a cable drum.	In a classroom or maintenance facility given a cable drum containing cable.	Correctly.	
24.3	State where the information concerning the husbandry of an aircraft installation can be found.	In a classroom.	Correctly.	
24.4	Describe the correct practises to be observed to maintain the integrity of a fibre-optic installation. End of 24.0	In a classroom.	Correctly.	

TRADE TRAINING

SECTION: P22 TRADE ELECTRICS

SUBJECT: 25. AIRCRAFT WIRING

TRAINING OBJECTIVE (a)	REFERENCE (b)	ALLOCATION OF PERIODS (c)	Syll Hrs (e)	No of CELLS (f)	INSTR HOURS (g)
25.0 State the precautions to be observed when working with or in the vicinity of aircraft wiring.		Classroom	0.50	1	0.50
		Practical	0.00		0.00
		Total	0.50		0.50

EQUIPMENT (h)	PUBLICATIONS (i)

FILMS/VIDEOS		
Nº (j)	TITLE (k)	TIME (l)

Nº (a)	ENABLING OBJECTIVES (b)	CONDITIONS (c)	STANDARDS (d)	REFERENCE (e)
25.1	State the precautions to be observed when working with or in the vicinity of aircraft wiring. End of 25.0	In a classroom.	Without error.	Relevant Aircraft AP Topics 1 & 10

TRADE TRAINING

SECTION: P22 TRADE ELECTRICS

SUBJECT: 26. DAMAGE TO AIRCRAFT WIRING

TRAINING OBJECTIVE (a)	REFERENCE (b)	ALLOCATION OF PERIODS (c)	Syll Hrs (e)	No of CELLS (f)	INSTR HOURS (g)
26.0 State the actions to be taken on discovering damage to aircraft wiring.		Classroom	0.50	1	0.50
		Practical	0.00		0.00
		Total	0.50		0.50

EQUIPMENT (h)	PUBLICATIONS (i)

FILMS/VIDEOS		
Nº (j)	TITLE (k)	TIME (l)

Nº (a)	ENABLING OBJECTIVES (b)	CONDITIONS (c)	STANDARDS (d)	REFERENCE (e)
26.1	State the action to be taken on discovering damage to aircraft wiring. End of 26.0	In a classroom.	Correctly.	

TRADE TRAINING

SECTION: P22 TRADE ELECTRICS

SUBJECT: 27. TEST EQUIPMENT

TRAINING OBJECTIVE (a)	REFERENCE (b)	ALLOCATION OF PERIODS (c)	Syll Hrs (e)	No of CELLS (f)	INSTR HOURS (g)
27.0 Recognise and state the purpose and operation of selected test equipment.		Classroom	2.00	1	2.00
		Practical	0.00		0.00
		Total	2.00		2.00

EQUIPMENT (h)	PUBLICATIONS (i)		
		FILMS/VIDEOS	
	Nº (j)	TITLE (k)	TIME (l)

Nº (a)	ENABLING OBJECTIVES (b)	CONDITIONS (c)	STANDARDS (d)	REFERENCE (e)
27.1	State the need for test equipment.	In a classroom.	Correctly.	
27.2	State the safety precautions and authority required when: a. Examining or testing cables and assemblies in situ. b. Testing the insulation of electrical systems.	In a classroom.	Without error.	
27.3	Identify and state the purpose of a digital multimeter and explain its method of use.	In a classroom, shown examples.	Correctly.	
27.4	State the safety precautions to be observed when using a digital multimeter in order to avoid personal injury and/or damage to equipment.	In a classroom.	Without error.	
27.5	State the need for pre-use checks on a digital multimeter.	In a classroom.	Correctly.	
27.6	State the need to check the resistance of the insulation of electrical cables and leads.	In a classroom.	Correctly.	
27.7	Identify and state the need for an insulation tester.	In a classroom, shown examples.	Correctly.	
27.8	State the safety precautions to be observed when using an insulation tester.	In a classroom.	Without error.	
27.9	State the pre-use checks to be carried out on an insulation tester.	In a classroom.	Correctly.	
27.10	State the restrictions on the use of insulation testers on aircraft. End of 27.0	In a classroom.	Correctly.	

TRADE TRAINING

SECTION: P22 TRADE ELECTRICS

SUBJECT: 28. FAULT DIAGNOSIS

TRAINING OBJECTIVE (a)	REFERENCE (b)	ALLOCATION OF PERIODS (c)	Syll Hrs (e)	No of CELLS (f)	INSTR HOURS (g)
28.0 Carry out fault diagnosis on selected electrical circuits to measure/check/test voltage, resistance, current, continuity and resistance.		Classroom	1.00	1	1.00
		Practical	16.00	4	64.00
		Total	17.00		65.00

EQUIPMENT (h)	PUBLICATIONS (i)

FILMS/VIDEOS		
Nº (j)	TITLE (k)	TIME (l)

Nº (a)	ENABLING OBJECTIVES (b)	CONDITIONS (c)	STANDARDS (d)	REFERENCE (e)
28.1	Explain the effects of climatic conditions on insulation test readings.	In a classroom.	Correctly.	
28.2	Explain the principles of electro-magnetic compatibility (EMC) and the need for separation of wiring within installations.	In a classroom.	Correctly.	
28.3	Examine cables, conductors, conduits and cable assemblies for: a. Routing and security of attachment. b. Damage. c. Contamination. d. Corrosion. e. Overheating. f. Cuts and abrasions. g. Fatigue.	Given a selection of cables, conductors, conduits and assemblies.	Correctly.	
28.4	Carry out pre-use checks on: a. A digital multimeter. b. An insulation tester.	Given a digital multimeter and an insulation tester.	Correctly.	
28.5	Connect a digital multimeter and measure the following: a. A d.c. voltage source. b. An a.c. voltage source. c. The voltage at selected points in the circuit. d. The resistance and continuity between selected points in the circuit.	On a training aid, given a circuit diagram and a digital multimeter.	Correctly.	
28.6	Use an insulation tester to determine the serviceability of the insulation of given cables and leads.	Given demonstration, cables and leads and test equipment.	Correctly.	
28.7	Carry out simple fault finding on an aircraft type circuit, involving voltage and resistance/continuity/insulation checks only. End of 28.0	On a training aid given circuit diagram and selected test equipment.	Correctly.	

TRADE TRAINING

SECTION: P22 TRADE ELECTRICS

SUBJECT: 29. EXAMINATION

TRAINING OBJECTIVE (a)	REFERENCE (b)	ALLOCATION OF PERIODS (c)	Syll Hrs (e)	No of CELLS (f)	INSTR HOURS (g)
29.0 Obtain a pass mark in an examination.		Classroom	2.00	1	2.00
		Practical	0.00		0.00
		Total	2.00		2.00

EQUIPMENT (h)	PUBLICATIONS (i)

FILMS/VIDEOS		
Nº (j)	TITLE (k)	TIME (l)

Nº (a)	ENABLING OBJECTIVES (b)	CONDITIONS (c)	STANDARDS (d)	REFERENCE (e)
29.1	Pass an examination on the contents of P22. End of 29.0	In a classroom.	Achieving a pass mark.	

TRADE TRAINING

SECTION: P22 TRADE ELECTRICS

SUBJECT: 30. DEBRIEF

TRAINING OBJECTIVE (a)	REFERENCE (b)	ALLOCATION OF PERIODS (c)	Syll Hrs (e)	No of CELLS (f)	INSTR HOURS (g)
30.0 Carry out a debrief on phase content and assessment.		Classroom	2.00	1	2.00
		Practical	0.00		0.00
		Total	2.00		2.00

EQUIPMENT (h)	PUBLICATIONS (i)

FILMS/VIDEOS		
Nº (j)	TITLE (k)	TIME (l)

Nº (a)	ENABLING OBJECTIVES (b)	CONDITIONS (c)	STANDARDS (d)	REFERENCE (e)
30.1	Participate in a debrief of P22 Propulsion Electrics. End of 30.0	In a classroom.		

TRADE TRAINING

SECTION: P23 AIRCRAFT CONTROLS

SUBJECT: 2. PURPOSE AND CONSTRUCTION

TRAINING OBJECTIVE (a)	REFERENCE (b)	ALLOCATION OF PERIODS (c)	Syll Hrs (e)	No of CELLS (f)	INSTR HOURS (g)
2.0 State the purpose and construction of aircraft remote control systems		Classroom	4.00	1	4.00
		Practical	0.00		0.00
		Total	4.00		4.00

EQUIPMENT (h)	PUBLICATIONS (i)
Remote control component benches.	Course manual.

FILMS/VIDEOS		
Nº (j)	TITLE (k)	TIME (l)

N^{o} (a)	ENABLING OBJECTIVES (b)	CONDITIONS (c)	STANDARDS (d)	REFERENCE (e)
2.1	State the need for remote control systems on aircraft.	In a classroom.	Correctly.	Course manual.
2.2	Define the term 'aircraft control system'.	In a classroom.	Correctly.	Course manual.
2.3	State the requirements of a remote control system:- a. Must be safe. b. Must be positive. c. Must be accurate. d. Must operate in the correct sense. e. Must be maintainable.	In a classroom.	Correctly.	Course manual.
2.4	State the meaning of 'correct sense' as applied to remote control systems.	In a classroom.	Correctly.	Course manual.
2.5	Explain the variations and combinations of the following remote control systems on aircraft:- a. Mechanical. b. Electrical. c. Electro-mechanical. d. Mechanical-hydraulic.	In a classroom.	Correctly.	Course manual.
2.6	State the advantages/disadvantages of the variations and combinations of the remote control systems listed in EO 2.5.	In a classroom.	Correctly.	Course manual.
2.7	State the safety precautions to be observed when working on aircraft control systems. End of 2.0	In a classroom.	Without error.	Course manual.

TRADE TRAINING

SECTION: P23 AIRCRAFT CONTROLS

SUBJECT: 10. CONTROL SYSTEMS MAINTENANCE

TRAINING OBJECTIVE (a)	REFERENCE (b)	ALLOCATION OF PERIODS (c)	Syll Hrs (e)	No of CELLS (f)	INSTR HOURS (g)
10.0 Carry out maintenance on the following control systems:-		Classroom	0.00		0.00
a. Teleflex.		Practical	16.00	4	16.00
b. Push rod and lever.					
c. Wire cable.		Total	16.00		16.00

EQUIPMENT (h)	PUBLICATIONS (i)
Remote control component benches. Jet provost aircraft. Jaguar aircraft.	Course manual. Aircraft Topic 1.

FILMS/VIDEOS		
N^{o} (j)	TITLE (k)	TIME (l)

N^{o} (a)	ENABLING OBJECTIVES (b)	CONDITIONS (c)	STANDARDS (d)	REFERENCE (e)
10.1	Identify a teleflex control system.	In a hangar/workshop, given teleflex controls and relevant publications.	Correctly.	
10.2	State the precautions to be observed when working on teleflex controls.	In a hangar/workshop, given teleflex controls and relevant publications.	Correctly.	
10.3	Identify the following teleflex components:- a. Wheel unit. b. Spent travel tube. c. Junction box. d. Quick break unit. e. Conduit connectors. f. Greasing adapters.	In a hangar/workshop, given teleflex controls and relevant publications.	Correctly.	
10.4	Remove and fit a teleflex control system.	In a hangar/workshop, given teleflex controls and relevant publications.	Correctly.	
10.5	Clean, examine and lubricate a teleflex control system.	In a hangar/workshop, given teleflex controls and relevant publications.	Correctly.	
10.6	Carry out a functional check for range of movement on a teleflex control system.	In a hangar/workshop, given teleflex controls and relevant publications.	Correctly.	
10.7	Identify a push rod and lever control system.	In a hangar/workshop, given push rod and lever controls and relevant publications.	Correctly.	

Nº (a)	ENABLING OBJECTIVES (b)	CONDITIONS (c)	STANDARDS (d)	REFERENCE (e)
10.8	Identify the following components in a push-rod and lever control system:- a. Torque tubes. b. Bell crank levers. c. Idler links. d. End fittings. e. Roller bearings. f. Lost motion boxes. g. Operating handles and levers. h. Control stops.	In a hangar/workshop, given push rod and lever controls and relevant publications.	Correctly.	
10.9	Remove, fit and adjust a push rod and lever control system.	In a hangar/workshop, given push rod and lever controls and relevant publications.	Correctly.	
10.10	Carry out a functional check on a push-rod and lever control system for:- a. Correct sense. b. Range of movement.	In a hangar/workshop, given push rod and lever controls and relevant publications.	Correctly.	
10.17	Identify a wire cable control system	In a hangar/workshop, given wire controls and relevant publications.	Correctly.	
10.18	Identify the following components of a wire cable control system:- a. Cables. b. Pulleys. c. Pulley guards. d. Turnbuckles. e. Fibre fairleads. f. Operating levers	In a hangar/workshop, given wire controls and relevant publications.	Correctly.	
10.19	Remove, clean, fit and adjust a wire cable control system.	In a hangar/workshop, given wire controls and relevant publications.	Correctly.	

Nº (a)	ENABLING OBJECTIVES (b)	CONDITIONS (c)	STANDARDS (d)	REFERENCE (e)
10.20	Examine the items listed in EO 10.18 for:- a. Visible damage. b. Kinking. c. Fraying. d. Corrosion. e. Correct tension. f. Security of attachment.	In a hangar/workshop, given wire controls and relevant publications.	Correctly.	
10.21	Carry out functional tests on a wire cable control system for:- a. Range of movement. b. Friction loading. c. Sense of operation.	In a hangar/workshop, given wire controls and relevant publications.	Correctly.	
10.22	State the precautions to be observed when handling cable.	In a hangar/workshop, given wire controls and relevant publications.	Correctly.	
10.23	Locate an engine throttle box and carry out the following:- a. Examine with panels removed. a. Friction test using a spring balance. End of 10.0	In a hangar/workshop, given a throttle box and relevant publications.	Correctly.	

PART III

TRADE TRAINING

SECTION: P25A GAS TURBINES

SUBJECT: 1. GAS TURBINE ENGINE INTRODUCTION

<table>
<tr><td rowspan="2">TRAINING OBJECTIVE
(a)</td><td rowspan="2">REFERENCE
(b)</td><td colspan="4">ALLOCATION OF PERIODS</td></tr>
<tr><td>(c)</td><td>Syll Hrs
(e)</td><td>No of CELLS
(f)</td><td>INSTR HOURS
(g)</td></tr>
<tr><td rowspan="4">1.0 Explain the reasons for the introduction of the gas turbine engine as a means of providing propulsive force for aircraft.</td><td rowspan="4">BTEC 14574F B2</td><td>Classroom</td><td>2.00</td><td>1</td><td>2.00</td></tr>
<tr><td>Practical</td><td>1.00</td><td>2</td><td>2.00</td></tr>
<tr><td></td><td></td><td></td><td></td></tr>
<tr><td>Total</td><td>3.00</td><td></td><td>4.00</td></tr>
<tr><td>EQUIPMENT
(h)</td><td colspan="5">PUBLICATIONS
(i)</td></tr>
<tr><td rowspan="3">Training engines</td><td colspan="5"></td></tr>
<tr><td colspan="5">FILMS/VIDEOS</td></tr>
<tr><td>Nº
(j)</td><td colspan="3">TITLE
(k)</td><td>TIME
(l)</td></tr>
<tr><td></td><td colspan="3"></td><td></td></tr>
</table>

Nº (a)	ENABLING OBJECTIVES (b)	CONDITIONS (c)	STANDARDS (d)	REFERENCE (e)
1.1	State the four forces acting on an aircraft.	In a classroom.	Correctly.	
1.2	State the need for thrust to overcome drag.	In a classroom.	Correctly.	
1.3	Explain the drag law.	In a classroom.	Correctly.	
1.4	Explain the main reasons for the introduction of the gas turbine engine as a means of providing propulsive force.	In a classroom.	Correctly.	
1.5	Identify the following: a. Engine inlets. b. Compressors. c. Combustion chambers. d. Turbine assemblies. e. Exhaust units. f. Propelling nozzles.	On training engines or given diagrams.	Correctly.	
1.6	State the need for each of the following engine types and recognise their basic configurations: a. Turbo-jet. b. By-pass (fan) engine. c. Turbo-prop. d. Turbo-shaft.	In a classroom, given examples.	Correctly.	
1.7	State the general effects of atmospheric conditions and how they vary with height.	In a classroom.	Correctly.	
1.8	State the meaning of the following terms: a. Thrust. b. Power. c. Drag. d. Thrust/weight ratio. e. Power/weight ratio. End of 1.0	In a classroom.	Correctly.	

TRADE TRAINING

SECTION: P25A GAS TURBINES

SUBJECT: 2. PRINCIPLES OF OPERATION

TRAINING OBJECTIVE (a)	REFERENCE (b)	ALLOCATION OF PERIODS (c)	Syll Hrs (e)	No of CELLS (f)	INSTR HOURS (g)
2.0 Explain the general principles of operation of a gas turbine engine.	JPS P.1 BTEC 14584/1	Classroom	8.00	1	8.00
		Practical	0.00		0.00
		Total	8.00		8.00

EQUIPMENT (h)	PUBLICATIONS (i)
Gas turbine engine	

FILMS/VIDEOS		
Nº (j)	TITLE (k)	TIME (l)

Nº (a)	ENABLING OBJECTIVES (b)	CONDITIONS (c)	STANDARDS (d)	REFERENCE (e)
2.1	Explain the principle of conservation of energy and relate it to the operation of gas turbines.	In a classroom.	Correctly.	
2.2	Relate the gas laws to the operation of gas turbine engines.	In a classroom.	Correctly.	
2.3	Explain the relationship between total pressure, static pressure and dynamic pressure.	In a classroom.	Correctly.	
2.4	Explain the principle of continuity of flow (mass flow of matter) and how it applies to the gas turbine engine.	In a classroom.	Correctly.	
2.5	Explain how the following factors will affect the mass flow rate: a. Changes in air/fluid density due to changes in ambient conditions and altitude. b. Changes in the cross sectional area of the duct.	In a classroom.	Correctly.	
2.6	Describe the changes of pressure, velocity and temperature of a fluid flowing sub-sonically through: a. A parallel duct. b. A convergent duct. c. A divergent duct.	In a classroom.	Correctly.	
2.7	State the effects of compressibility. End of 2.0	In a classroom.	Correctly.	

TRADE TRAINING

SECTION: P25A GAS TURBINES

SUBJECT: 3. AIRFLOW

TRAINING OBJECTIVE (a)	REFERENCE (b)	ALLOCATION OF PERIODS (c)	Syll Hrs (e)	No of CELLS (f)	INSTR HOURS (g)
3.0 Explain how airflow is affected by different types of intake.	JPS P.3 BTEC 14584/1	Classroom	2.00	1	2.00
		Practical	1.00	1	1.00
		Total	3.00		3.00

EQUIPMENT (h)	PUBLICATIONS (i)
	AP3456

FILMS/VIDEOS		
Nº (j)	TITLE (k)	TIME (l)

Nº (a)	ENABLING OBJECTIVES (b)	CONDITIONS (c)	STANDARDS (d)	REFERENCE (e)
3.1	State the need for aircraft air intakes.	In a classroom.	Correctly.	
3.2	State the purpose and requirements of aircraft air intakes.	In a classroom.	Correctly.	
3.3	State the duct configuration that is required to reduce velocity and increase static pressure of a subsonic airflow.	In a classroom.	Correctly.	
3.4	State the effect on conditions within an intake duct caused by a gas turbine engine during ground running at sea-level static (SLS).	In a classroom.	Correctly.	
3.5	Explain the effect on conditions within an intake duct created by an increase in aircraft speed.	In a classroom.	Correctly.	
3.6	Explain the meaning of the following terms: a. $P_{0.}$ b. $P_{1.}$ c. Pressure recovery. d. Ram recovery. e. Ram compression. f. Ram effect. g. Pressure recovery ratio. h. Intake efficiency. i. Thrust recovery. j. Ideal intake conditions.	In a classroom.	Correctly.	
3.7	Recognise the following types of intake configuration used for subsonic/transonic flight: a. Pitot. b. Side. c. Bifurcated. d. Wing root. e. Bellmouth.	In a classroom, shown examples.	Correctly.	
3.8	Explain the reason for 'rounded lips' on subsonic intakes.	In a classroom.	Correctly.	
3.9	Explain the meaning of the term 'boundary layer' air.	In a classroom.	Correctly.	AP3456 Vol 2 Part 1 Sect 3 Chap 2 Para 10.
3.10	Explain how airflow is affected by different designs of intake.	In a classroom.	Correctly.	
3.11	Explain how the following methods minimise the effects of ‘boundary layer’ air: a. Flow diverter. b. Fencing. c. Boundary layer bleed.	In a classroom.	Correctly.	

Nº (a)	ENABLING OBJECTIVES (b)	CONDITIONS (c)	STANDARDS (d)	REFERENCE (e)
3.12	State the three basic intake operating conditions and when they occur: a. Critical. b. Sub-critical. c. Super-critical.	In a classroom.	Correctly.	
3.13	State the need for auxiliary intake doors.	In a classroom.	Correctly.	
3.14	State the advantages and disadvantages of the intake configurations listed above in EO 3.7.	In a classroom.	Correctly.	
3.15	State the purpose of the following and where they are used: a. Inlet screens. b. Sand/ice separators.	In a classroom.	Correctly.	
3.16	State the conditions that will result in intake icing.	In a classroom.	Correctly.	
3.17	State the duct configuration that is required to reduce airflow velocity and increase static pressure of a supersonic airflow.	In a classroom.	Correctly.	
3.18	State the meaning of the following terms: a. Normal shock wave. b. Oblique shock wave.	In a classroom.	Correctly.	
3.19	Explain why shock waves form.	In a classroom.	Correctly.	
3.20	Explain the effects on airflow mach number immediately downstream of each type of shock wave.	In a classroom.	Correctly.	
3.21	Explain why intakes are designed to set up multiple shock waves for flight at high mach numbers.	In a classroom.	Correctly.	
3.22	State the duct configuration that is required to reduce airflow velocity and increase static pressure downstream of a normal shock wave.	In a classroom.	Correctly.	
3.23	State the types of intake configuration used for supersonic flight.	In a classroom.	Correctly.	
3.24	Explain the need for knife-edge intake lips.	In a classroom.	Correctly.	
3.25	Explain the operation of the intakes used for supersonic flight.	In a classroom.	Correctly.	
3.26	State the purpose of the following: a. Auxiliary doors. b. Dump/spill doors.	In a classroom.	Correctly.	
3.27	State possible causes of intake damage and the effects of it on engine performance.	In a classroom.	Correctly.	
3.28	State the safety precautions to be observed when working in intakes.	In a classroom.	Without error.	
3.29	State the hazards that exist around an engine installation prior to and during engine operation.	In a classroom.	Without error.	
3.30	State the purpose of engine external cooling airflows.	In a classroom.	Correctly.	

N° (a)	ENABLING OBJECTIVES (b)	CONDITIONS (c)	STANDARDS (d)	REFERENCE (e)
3.31	Explain how engine external cooling is achieved.	In a classroom.	Correctly.	
3.32	Explain why an engine installation bay/nacelle may be divided into zones.	In a classroom.	Correctly.	
3.33	State that external cooling flows can be induced using jet eductors.	In a classroom.	Correctly.	
3.34	State the advantages of using jet eductors. End of 3.0	In a classroom.	Correctly.	

TRADE TRAINING

SECTION: P25A GAS TURBINES

SUBJECT: 4. COMPRESSORS

TRAINING OBJECTIVE (a)	REFERENCE (b)	ALLOCATION OF PERIODS			
		(c)	Syll Hrs (e)	No of CELLS (f)	INSTR HOURS (g)
4.0 Explain the purpose, principles of operation and aerodynamic airflow in gas turbine engine compressors.	JPS P.1 BTEC 14584/1	Classroom	3.00	1	3.00
		Practical	0.00		0.00
		Total	3.00		3.00

EQUIPMENT (h)	PUBLICATIONS (i)
	AP3456

FILMS/VIDEOS		
Nº (j)	TITLE (k)	TIME (l)

Nº (a)	ENABLING OBJECTIVES (b)	CONDITIONS (c)	STANDARDS (d)	REFERENCE (e)
4.1	State the purpose and requirements of gas turbine engine compressors.	In a classroom.	Correctly.	
4.2	Define the term 'Specific Fuel Consumption' (SFC).	In a classroom.	Correctly.	
4.3	Explain the relationship between SFC and compressor performance.	In a classroom.	Correctly.	
4.4	Explain how the compressor is driven.	In a classroom.	Correctly.	
4.5	Identify the component features of centrifugal compressors.	In a classroom, shown examples.	Correctly.	
4.6	Describe the principles of operation of a centrifugal compressor.	In a classroom.	Correctly.	
4.7	Explain what the term 'compressor stage' means with respect to centrifugal compressors.	In a classroom.	Correctly.	
4.8	Explain the aerodynamic airflow through centrifugal compressors and how the pressure rise is achieved: a. In the impellor. b. In the diffuser.	In a classroom.	Correctly.	
4.9	Explain why the air passage between the impeller and the compressor casing converges.	In a classroom.	Correctly.	
4.10	Define the following terms: a. Pressure ratio. b. Compression ratio.	In a classroom.	Correctly.	
4.11	Explain the purpose of the 'vane-less space'.	In a classroom.	Correctly.	
4.12	Recognise and correctly annotate centrifugal compressor airflow vector diagrams.	In a classroom, given examples.	Correctly.	
4.13	State the degree of pressure rise (total) that is typically achieved using Centrifugal compressors.	In a classroom.	Correctly.	
4.14	Explain how the following can be achieved with a centrifugal compressor: a. Higher pressure ratios (including limitations on design). b. Greater mass flow.	In a classroom.	Correctly.	
4.15	State the advantages/disadvantages of centrifugal compressors.	In a classroom.	Correctly.	
4.16	Define axial flow and radial flow.	In a classroom.	Correctly.	
4.17	Identify axial flow compressors.	In a classroom or workshop, shown examples.	Correctly.	
4.18	Identify the following main components of an axial flow compressor: a. Rotors. b. Stators.	In a classroom or workshop, shown examples.	Correctly.	

Nº (a)	ENABLING OBJECTIVES (b)	CONDITIONS (c)	STANDARDS (d)	REFERENCE (e)
4.19	Explain what the term ‘compressor stage’ means with respect to axial flow compressors.	In a classroom.	Correctly.	
4.20	State the factors that determine the efficiency of compressor blades.	In a classroom.	Correctly.	
4.21	Define the terms: a. Blade root. b. Blade tip. c. Stagger angle.	In a classroom.	Correctly.	
4.22	Explain the reason why some blades have increased camber at the root/tips.	In a classroom.	Correctly.	
4.23	Explain how the pressure rise is achieved in the following elements of an axial flow compressor: a. In the rotors. b. In the stators.	In a classroom.	Correctly.	
4.24	Explain why the air is presented to the first stage at M0.3-M 0.4.	In a classroom.	Correctly.	
4.25	State the degree of pressure rise (total) that is typically achieved using axial flow compressors.	In a classroom.	Correctly.	
4.26	Explain the reason why the air passage (annulus) reduces from compressor inlet to outlet.	In a classroom.	Correctly.	
4.27	State the purpose of outlet guide vanes.	In a classroom.	Correctly.	
4.28	Explain what is meant by the term ‘Cascade effect’.	In a classroom.	Correctly.	
4.29	Recognise and correctly annotate axial flow compressor airflow vector diagrams.	In a classroom, given examples.	Correctly.	
4.30	Explain how the following can be achieved with an axial flow compressor: a. Higher pressure ratios. b. Greater mass flow.	In a classroom.	Correctly.	
4.31	State the effect of RPM on compression ratio.	In a classroom.	Correctly.	
4.32	Explain the effect of increasing compression on air temperature and degree of pressure rise achievable.	In a classroom.	Correctly.	
4.33	Explain the effect of temperature on Mach number.	In a classroom.	Correctly.	
4.34	Explain the term ‘compressor stall’ and its effects.	In a classroom.	Correctly.	
4.35	Explain the reasons for the following and when they occur: a. Compressor front end stall. b. Compressor rear-end stall.	In a classroom.	Correctly.	
4.36	Explain what is meant by the term ‘choked’ and state why it occurs in compressors.	In a classroom.	Correctly.	

N^{o} (a)	ENABLING OBJECTIVES (b)	CONDITIONS (c)	STANDARDS (d)	REFERENCE (e)
4.37	State the advantages/disadvantages of axial flow compressors.	In a classroom.	Correctly.	
4.38	State how the problems of single spool multiple stage compressors can be overcome.	In a classroom.	Correctly.	
4.39	Explain the aerodynamic principles and effects of the following: a. Variable inlet guide vanes. b. Variable stators. c. Compressor bleeds.	In a classroom.	Correctly.	
4.40	Explain the advantages of multi-spool compressors.	In a classroom.	Correctly.	
4.41	Describe the construction of a combination compressor.	In a classroom.	Correctly.	
4.42	Explain the advantages of combination compressors.	In a classroom.	Correctly.	
4.43	Describe the aerodynamic airflow through gas turbine compressors. End of 4.0	In a classroom.	Correctly.	

TRADE TRAINING

SECTION: P25A GAS TURBINES

SUBJECT: 5. COMBUSTION CHAMBERS

TRAINING OBJECTIVE (a)	REFERENCE (b)	ALLOCATION OF PERIODS (c)	Syll Hrs (e)	No of CELLS (f)	INSTR HOURS (g)
5.0 Explain the purpose, principles of operation and aerodynamic airflow in gas turbine engine combustion chambers.	JPS P.1 BTEC 14584/1	Classroom	2.00	1	2.00
		Practical	0.00		0.00
		Total	2.00		2.00

EQUIPMENT (h)	PUBLICATIONS (i)
	AP3456

FILMS/VIDEOS		
Nº (j)	TITLE (k)	TIME (l)

Nº (a)	ENABLING OBJECTIVES (b)	CONDITIONS (c)	STANDARDS (d)	REFERENCE (e)
5.1	State the purpose and requirements of gas turbine engine combustion systems.	In a classroom.	Correctly.	
5.2	Define each of the following and state their effects on combustion efficiency: a. High rate of heat release. b. High combustion efficiency. c. Flame stabilisation. d. Even distribution of turbine entry temperature. e. Minimum pressure loss. f. Minimum carbon formation. g. Reliability.	In a classroom.	Correctly.	
5.3	Explain the following terms: a. Air/fuel ratios. b. Stoichiometric mixture. c. Calorific value. d. Limit of flammability.	In a classroom.	Correctly.	
5.4	Recognise the basic configurations of the following combustion systems: a. Multiple can. b. Annular. c. Turbo-annular. d. Reverse flow.	In a classroom, shown examples.	Correctly.	
5.5	Explain how airflow velocity is reduced prior to the combustion chamber (diffuser).	In a classroom.	Correctly.	
5.6	Describe the aerodynamic airflow through a typical combustion chamber.	In a classroom.	Correctly.	
5.7	Describe the gas flow through the four types of combustion system.	In a classroom.	Correctly.	
5.8	State the purpose of primary, secondary and tertiary air.	In a classroom.	Correctly.	
5.9	State the advantages/disadvantages of each type of combustion system. End of 5.0	In a classroom.	Correctly.	

TRADE TRAINING

SECTION: P25A GAS TURBINES

SUBJECT: 6. TURBINES

TRAINING OBJECTIVE (a)	REFERENCE (b)	ALLOCATION OF PERIODS (c)	Syll Hrs (e)	No of CELLS (f)	INSTR HOURS (g)
6.0 Explain the purpose, principles of operation and aerodynamic airflow through turbine assemblies.	JPS P.1 BTEC 14584/1.	Classroom	3.00	1	3.00
		Practical	0.00		0.00
		Total	3.00		3.00

EQUIPMENT (h)	PUBLICATIONS (i)
	AP3456

FILMS/VIDEOS		
Nº (j)	TITLE (k)	TIME (l)

Nº (a)	ENABLING OBJECTIVES (b)	CONDITIONS (c)	STANDARDS (d)	REFERENCE (e)
6.1	Recognise turbine section nozzle guide vanes (NGVs) and rotors.	In a classroom or workshop, shown examples.	Correctly.	
6.2	Define the term 'turbine stage'.	In a classroom.	Correctly.	
6.3	State the purpose of the turbine section.	In a classroom.	Correctly.	
6.4	State the types of turbine blading that are used on gas turbines and their application.	In a classroom.	Correctly.	
6.5	Identify: a. NGVs. b. Pure impulse blades. c. Impulse/reaction blades.	In a classroom or workshop, shown examples.	Correctly.	
6.6	Define the term 'throat area'.	In a classroom.	Correctly.	
6.7	Explain how the energy conversion to drive the turbine is achieved in the following: a. In an impulse turbine stage. b. In a reaction turbine stage. c. Using impulse/reaction (vortex) blading.	In a classroom.	Correctly.	
6.8	Explain the aerodynamic airflow through the differing types of turbine assemblies.	In a classroom.	Correctly.	
6.9	Explain why impulse/reaction (vortex) blading is used.	In a classroom.	Correctly.	
6.10	Recognise and correctly annotate gas flow vector diagrams for an impulse/reaction turbine stage.	In a classroom, given examples.	Correctly.	
6.11	Explain the factors that determine how many turbine stages are required on an engine and why the size of subsequent turbine stages increases.	In a classroom.	Correctly.	
6.12	Explain the advantages of multi-stage turbines.	In a classroom.	Correctly.	
6.13	Describe the principles of operation of the turbine.	In a classroom.	Correctly.	
6.14	Describe the gas flow through a typical gas turbine aero engine turbine system and the associated changes in P, V and T. End of 6.0	In a classroom.	Correctly.	

TRADE TRAINING

SECTION: P25A GAS TURBINES

SUBJECT: 7. EXHAUST ASSEMBLIES

TRAINING OBJECTIVE (a)	REFERENCE (b)	ALLOCATION OF PERIODS (c)	Syll Hrs (e)	No of CELLS (f)	INSTR HOURS (g)
7.0 Explain the purpose, principles of operation and aerodynamic airflow through exhaust assemblies. a. Without afterburner. b. With afterburner. c. Convergent / divergent	JPS P.1 BTEC 14584/1 BTEC 14584/5	Classroom	2.00	1	2.00
		Practical	0.00		0.00
		Total	2.00		2.00

EQUIPMENT (h)	PUBLICATIONS (i)
	AP3456

	FILMS/VIDEOS		
	Nº (j)	TITLE (k)	TIME (l)

Nº (a)	ENABLING OBJECTIVES (b)	CONDITIONS (c)	STANDARDS (d)	REFERENCE (e)
7.1	Recognise the basic features of (simple turbo-jet) exhaust systems.	In a classroom.	Correctly.	
7.2	State the purpose of gas turbine engine exhaust units.	In a classroom.	Correctly.	
7.3	Explain aerodynamic airflow through gas turbine engine exhaust units: a. On a turbo-jet. b. On a by-pass engine including: (i) Hot stream ducting. (ii) Cold stream ducting. (iii) Hot/cold stream ducting. c. On engines with no appreciable jet pipe.	In a classroom.	Correctly.	
7.4	Explain the purpose of jet pipes.	In a classroom.	Correctly.	
7.5	Explain aerodynamic airflow through a typical jet pipe duct: a. Without reheat. b. With reheat.	In a classroom.	Correctly.	
7.6	State the purpose of a propelling nozzle.	In a classroom.	Correctly.	
7.7	Explain the aerodynamic airflow through a fixed area convergent propelling nozzle for the following conditions: a. Unchoked. b. Choked.	In a classroom.	Correctly.	
7.8	State under what conditions choking occurs.	In a classroom.	Correctly.	
7.9	State why engine propelling nozzles are designed to run choked.	In a classroom.	Correctly.	
7.10	State the advantages/disadvantages of the choked condition.	In a classroom.	Correctly.	
7.11	Explain the terms ‘under expansion’.	In a classroom.	Correctly.	
7.12	State the effects of ‘under expansion’.	In a classroom.	Correctly.	
7.13	Explain aerodynamic airflow through a variable area propelling nozzle.	In a classroom.	Correctly.	
7.14	State why a variable area propelling nozzle is used on turbo-jet engines.	In a classroom.	Correctly.	
7.15	Explain the terms: a. ‘Under restoration’. b. ‘Over restoration’.	In a classroom.	Correctly.	
7.16	State the effects of under/over restoration.	In a classroom.	Correctly.	
7.17	State the operating conditions that require a fixed con-di nozzle to be used.	In a classroom.	Correctly.	
7.18	Explain the aerodynamic airflow through a fixed con-di nozzle: a. For subsonic conditions. b. For supersonic conditions.	In a classroom.	Correctly.	

Nº (a)	ENABLING OBJECTIVES (b)	CONDITIONS (c)	STANDARDS (d)	REFERENCE (e)
7.19	State the meaning of : a. Nozzle area ratio. b. Design pressure ratio.	In a classroom.	Correctly.	
7.20	Explain the term ‘over expansion’.	In a classroom.	Correctly.	
7.21	Explain the effects of ‘over expansion’.	In a classroom.	Correctly.	
7.22	State the advantages/disadvantages of fixed convergent-divergent nozzles.	In a classroom.	Correctly.	
7.23	State the need for variable geometry convergent-divergent nozzles.	In a classroom.	Correctly.	
7.24	Describe the construction of a typical variable geometry convergent-divergent nozzle.			
7.25	Explain the aerodynamic airflow principles through a variable geometry convergent-divergent nozzle.	In a classroom.	Correctly.	
7.26	Identify primary and secondary nozzles.	In a classroom or workshop, shown examples.	Correctly.	
7.27	Explain how the gas/air flows can be used to vary the duct area.	In a classroom.	Correctly.	
7.28	State the need for secondary nozzle area variation for changes in flight mach number.	In a classroom.	Correctly.	
7.29	State the meaning of the term ‘thrust vectoring’.	In a classroom.	Correctly.	
7.30	State the purpose of thrust vectoring nozzles.	In a classroom.	Correctly.	
7.31	State the purpose of thrust reversers.	In a classroom.	Correctly.	
7.32	Explain the aerodynamic airflow through a typical thrust reverser.	In a classroom.	Correctly.	
7.33	Identify the noise hazards associated with gas turbine engines.	In a classroom.	Correctly.	
7.34	State the purpose of noise suppressors.	In a classroom.	Correctly.	
7.35	State the principles of operation of noise suppressors. End of 7.0	In a classroom.	Correctly.	

TRADE TRAINING

SECTION: P25A GAS TURBINES

SUBJECT: 8. GAS TURBINE AIRFLOW

TRAINING OBJECTIVE (a)	REFERENCE (b)	ALLOCATION OF PERIODS (c)	Syll Hrs (e)	No of CELLS (f)	INSTR HOURS (g)
8.0 Explain the operating characteristics and describe the aerodynamic airflow through a gas turbine.	JPS P.1 BTEC 14584/1	Classroom	4.00	1	4.00
		Practical	0.00		0.00
		Total	4.00		4.00

EQUIPMENT (h)	PUBLICATIONS (i)
	AP3456

FILMS/VIDEOS		
Nº (j)	TITLE (k)	TIME (l)

Nº (a)	ENABLING OBJECTIVES (b)	CONDITIONS (c)	STANDARDS (d)	REFERENCE (e)
8.1	Define the term ‘swallowing capacity’.	In a classroom.	Correctly.	
8.2	Explain the relationship between gas turbine engine mass flow rates and pressure ratios.	In a classroom.	Correctly.	
8.3	Explain the effects of nozzle area changes on engine operating parameters.	In a classroom.	Correctly.	
8.4	Explain what is meant by the terms: a. Duct characteristics. b. Compressor characteristics. c. Surge line. d. Working line (equilibrium running line). e. Design point.	In a classroom.	Correctly.	
8.5	State the need for aerodynamic matching of compressor, turbine and propelling nozzle.	In a classroom.	Correctly.	
8.6	Explain how propelling nozzle area changes are achieved in the following cases: a. Fixed nozzle. b. Variable nozzle.	In a classroom.	Correctly.	
8.7	Explain how air bleeds can be used to benefit ‘off design’ performance.	In a classroom.	Correctly.	
8.8	Explain the effect of air bleeds on engine working line.	In a classroom.	Correctly.	
8.9	Explain the term ‘engine surge’ and its effects.	In a classroom.	Correctly.	
8.10	Explain why engine surge is likely to occur under the following conditions: a. On engine start-up (single spool multi-stage axial flow). b. On engine acceleration. c. Dirty/damaged compressor. d. Air turbulence or intake distortion. e. On reheat selection.	In a classroom.	Correctly.	
8.11	State the need for engine control systems.	In a classroom.	Correctly.	
8.12	Describe the aerodynamic airflow through a gas turbine engine, explaining the changes in pressures, temperatures and velocity of the gas flow and why they occur.	In a classroom.	Correctly.	
8.13	State the effects on engine internal gas temperatures and pressures for changes in: a. Ambient pressure. b. Ambient temperature.	In a classroom.	Correctly.	
8.14	State where the highest static pressure occurs in a gas turbine engine.	In a classroom.	Correctly.	
8.15	State where the highest velocity occurs in a gas turbine engine.	In a classroom.	Correctly.	
8.16	State how stations through a gas turbine engine are typically identified.	In a classroom.	Correctly.	

N^{o} (a)	ENABLING OBJECTIVES (b)	CONDITIONS (c)	STANDARDS (d)	REFERENCE (e)
8.17	State the notation used to identify the following: a. Spool speeds. b. Turbine/exhaust temperatures.	In a classroom.	Correctly.	
8.18	State the meaning of the word 'buzz'. End of 8.0	In a classroom.	Correctly.	

TRADE TRAINING

SECTION: P25A GAS TURBINES

SUBJECT: 9. THRUST AND GAS TURBINE PERFORMANCE

TRAINING OBJECTIVE (a)	REFERENCE (b)	ALLOCATION OF PERIODS (c)	Syll Hrs (e)	No of CELLS (f)	INSTR HOURS (g)
9.0 Explain the factors affecting thrust and how gas turbine performance is measured.	BTEC 14584/1	Classroom	4.00	1	4.00
		Practical	2.00	1	2.00
		Total	6.00		6.00

EQUIPMENT (h)	PUBLICATIONS (i)
	AP3456

FILMS/VIDEOS		
Nº (j)	TITLE (k)	TIME (l)

Nº (a)	ENABLING OBJECTIVES (b)	CONDITIONS (c)	STANDARDS (d)	REFERENCE (e)
9.1	State how Newton's Laws apply to the operation of a gas turbine engine and the production of thrust.	In a classroom.	Correctly.	
9.2	Explain the production of thrust in pure jet and turbo jet engines.	In a classroom.	Correctly.	
9.3	Explain the production of thrust and the distribution of thrust forces within a typical single spool axial flow turbojet and identify: a. Where forward loads (thrust) occur. b. Where rearward loads (drag) occur.	In a classroom.	Correctly.	
9.4	State what is meant by the term 'rated thrust' of a turbo jet engine.	In a classroom.	Correctly.	
9.5	Explain the meaning of the following terms: a. Take-off dry thrust. b. Take-off wet thrust. c. Maximum continuous thrust. d. Ground idle speed. e. Flight idle speed.	In a classroom.	Correctly.	
9.6	Define the following: a. Momentum thrust (identifying momentum drag component). b. Pressure/nozzle thrust. c. Gross static thrust (with choked nozzle). d. Net thrust (with choked nozzle).	In a classroom.	Correctly.	
9.7	Explain the effects of the following on air density: a. Pressure. b. Temperature. c. Humidity. d. Altitude.	In a classroom.	Correctly.	
9.8	Explain the effects of ambient conditions on engine pressure ratios and operating temperatures.	In a classroom.	Correctly.	
9.9	Explain the effect on thrust and SFC of the following: a. Air temperature. b. Air pressure. c. Altitude.	In a classroom.	Correctly.	
9.10	Explain why air pressure has the greater effect on thrust and sketch a graph to show variation with altitude.	In a classroom.	Correctly.	
9.11	Explain the effect of engine rpm on thrust and SFC.	In a classroom.	Correctly.	
9.12	Sketch a graph to show how thrust varies with rpm.	In a classroom.	Correctly.	

Nº (a)	ENABLING OBJECTIVES (b)	CONDITIONS (c)	STANDARDS (d)	REFERENCE (e)
9.13	Explain the effect of forward speed on thrust and SFC.	In a classroom.	Correctly.	
9.14	Explain the terms: a. Ram compression. b. Ram recovery.	In a classroom.	Correctly.	
9.15	Sketch a graph to show thrust variation with forward speed.	In a classroom.	Correctly.	
9.16	Perform simple thrust calculations.	In a classroom.	Correctly.	
9.17	Explain the term ‘bypass’ engine.	In a classroom.	Correctly.	
9.18	Define the terms: a. Bypass ratio. b. Low bypass ratio. c. High bypass ratio.	In a classroom.	Correctly.	
9.19	Explain that bypass flows can be mixed with core gas flow or exhausted separately	In a classroom.	Correctly.	
9.20	Describe the airflow through a bypass turbo fan engine.	In a classroom.	Correctly.	
9.21	Explain the difference between turbo jet and turbo fan engines with respect to the following: a. Mass airflow. b. Exhaust gas velocity.	In a classroom.	Correctly.	
9.22	Use the momentum thrust equation to calculate the thrust of turbo-fan engines for: a. Mixed flows. b. Unmixed flows.	In a classroom, given example figures.	Correctly.	
9.23	State how the propulsive (thrust) power output of turbo jet and turbo fan engines can be determined.	In a classroom.	Correctly.	
9.24	State how turbo-prop engines are rated.	In a classroom.	Correctly.	
9.25	State the meaning of the term ‘shaft power’.	In a classroom.	Correctly.	
9.26	State the factors that will determine the shaft power produced.	In a classroom.	Correctly.	
9.27	Explain how the power output is controlled for varying flight conditions and propeller torque.	In a classroom.	Correctly.	
9.28	State the limitations of a propeller.	In a classroom.	Correctly.	
9.29	State the meaning of the term 'propulsive (thrust) power' with respect to turbo prop engines.	In a classroom.	Correctly.	
9.30	State how turbo-shaft engines are rated. End of 9.0	In a classroom.	Correctly.	

TRADE TRAINING

SECTION: P25A GAS TURBINES

SUBJECT: 10. GAS TURBINE EFFICIENCY

TRAINING OBJECTIVE (a)	REFERENCE (b)	ALLOCATION OF PERIODS (c)	Syll Hrs (e)	No of CELLS (f)	INSTR HOURS (g)
10.0 Explain gas turbine efficiency and how it has improved with engine development.	BTEC 14584/1	Classroom	3.00	1	3.00
		Practical	0.00		0.00
		Total	3.00		3.00

EQUIPMENT (h)	PUBLICATIONS (i)
	AP3456

FILMS/VIDEOS		
Nº (j)	TITLE (k)	TIME (l)

Nº (a)	ENABLING OBJECTIVES (b)	CONDITIONS (c)	STANDARDS (d)	REFERENCE (e)
10.1	Describe the basic energy conversions occurring in a gas turbine engine.	In a classroom.	Correctly.	
10.2	State the meaning of the term 'efficiency'.	In a classroom.	Correctly.	
10.3	State the meaning of the term 'thermal efficiency'.	In a classroom.	Correctly.	
10.4	State the effects of the following on engine thermal efficiency: a. Air inlet temperature. b. Compressor compression ratio. c. Maximum permissible turbine entry temperature. d. Component efficiency.	In a classroom.	Correctly.	
10.5	State the meaning of the term 'propulsive efficiency'.	In a classroom.	Correctly.	
10.6	Determine the propulsive efficiency of an installed turbo-jet engine when achieving its gross static thrust.	In a classroom, given examples.	Correctly.	
10.7	Explain the effect of increasing airspeed on propulsive efficiency.	In a classroom.	Correctly.	
10.8	Explain the gas turbine developments that have improved propulsive efficiency over a range of airspeeds.	In a classroom.	Correctly.	
10.9	Sketch a graph showing propulsive efficiency versus airspeed for the following engines: a. Turbo-prop. b. High bypass ratio turbo-fan. c. Low bypass ratio turbo-fan. d. Turbo-jet.	In a classroom.	Correctly.	
10.10	Define overall efficiency.	In a classroom.	Correctly.	
10.11	State the advantages of a bypass turbo fan engine.	In a classroom.	Correctly.	
10.12	State the effects of dirt and erosion on compressor/engine performance.	In a classroom.	Correctly.	
10.13	State the effects of maritime operations.	In a classroom.	Correctly.	
10.14	Explain the purpose of compressor/engine washing and the methods used. End of 10.0	In a classroom.	Correctly.	

TRADE TRAINING

SECTION: P25A GAS TURBINES

SUBJECT: 11.0 INTERNATIONAL STANDARD ATMOSPHERE

TRAINING OBJECTIVE (a)	REFERENCE (b)	ALLOCATION OF PERIODS (c)	Syll Hrs (e)	No of CELLS (f)	INSTR HOURS (g)
11.0 Define International Standard Atmosphere and carry out corrections to performance figures.	BTEC 14584/1	Classroom	2.00	1	2.00
		Practical	0.00		0.00
		Total	2.00		2.00

EQUIPMENT (h)	PUBLICATIONS (i)
	AP3456

FILMS/VIDEOS		
Nº (j)	TITLE (k)	TIME (l)

Nº (a)	ENABLING OBJECTIVES (b)	CONDITIONS (c)	STANDARDS (d)	REFERENCE (e)
11.1	State the need for an international standard.	In a classroom.	Correctly.	
11.2	State the International Standard day conditions for: a. ISA absolute pressure. b. ISA absolute temperature.	In a classroom.	Correctly.	
11.3	State the meaning of the term 'ISA SLS'.	In a classroom.	Correctly.	
11.4	Explain why ISA corrections are carried out.	In a classroom.	Correctly.	
11.5	Identify the notation used for ISA corrections.	Shown an example.	Correctly.	
11.6	Define and state the significance of the following terms: a. Pressure altitude. b. Density altitude.	In a classroom.	Correctly.	
11.7	Determine the effect of the following conditions on a given engine's performance: a. A hot day, 30°C, at a fixed throttle setting. b. A cold day, 0°C, at a fixed throttle setting. c. A high pressure day, 1.033bar. d. A low pressure day, 0.999bar.	In a classroom.	Correctly.	
11.8	State the need for T2 compensation.	In a classroom.	Correctly.	
11.9	State the need to control $N/\sqrt{\theta}$.	In a classroom.	Correctly.	
11.10	State the meaning of the term 'placard figures' and where they are specified for a given engine.	In a classroom.	Correctly.	
11.11	State how these corrections are undertaken in service: a. On aircraft. b. At an uninstalled test facility.	In a classroom.	Correctly.	
11.12	Recognise common correction formula used on engine performance correction graphs.	In a classroom, shown examples.	Correctly.	
11.13	Perform simple ISA corrections to pressure and temperature figures. End of 11.0	In a classroom, given examples.	Correctly.	

TRADE TRAINING

SECTION: P25A GAS TURBINES

SUBJECT: 12. NON-DIMENSIONAL ANALYSIS

TRAINING OBJECTIVE (a)	REFERENCE (b)	ALLOCATION OF PERIODS (c)	Syll Hrs (e)	No of CELLS (f)	INSTR HOURS (g)
12.0 State the reasons for non-dimensional analysis.	BTEC 14584/1	Classroom	1.00	1	1.00
		Practical	0.00		0.00
		Total	1.00		1.00

EQUIPMENT (h)	PUBLICATIONS (i)
	AP3456

FILMS/VIDEOS		
Nº (j)	TITLE (k)	TIME (l)

Nº (a)	ENABLING OBJECTIVES (b)	CONDITIONS (c)	STANDARDS (d)	REFERENCE (e)
12.1	State the reasons for non-dimensional analysis.	In a classroom.	Correctly.	
12.2	State the benefits of non-dimensional parameters.	In a classroom.	Correctly.	
12.3	Distinguish between truly non-dimensional and pseudo non-dimensional parameters. End of 12.0	In a classroom, given examples.	Correctly.	

TRADE TRAINING

SECTION: P25A GAS TURBINES

SUBJECT: 13. SECTIONS AND ASSEMBLIES

<table>
<tr><td rowspan="2">TRAINING OBJECTIVE
(a)</td><td rowspan="2">REFERENCE
(b)</td><td colspan="4">ALLOCATION OF PERIODS</td></tr>
<tr><td>(c)</td><td>Syll Hrs
(e)</td><td>No of CELLS
(f)</td><td>INSTR HOURS
(g)</td></tr>
<tr><td rowspan="5">13.0 Describe the construction of the main sections and assembly components of:
a. Turbo jet engines.
b. Turbo-prop engines.
c. Turbo-fan engines.
d. Turbo-shaft engines.</td><td rowspan="5"></td><td>Classroom</td><td>16.00</td><td>1</td><td>16.00</td></tr>
<tr><td>Practical</td><td>0.00</td><td></td><td>0.00</td></tr>
<tr><td></td><td></td><td></td><td></td></tr>
<tr><td>Total</td><td>16.00</td><td></td><td>16.00</td></tr>
<tr><td></td><td></td><td></td><td></td></tr>
<tr><td>EQUIPMENT
(h)</td><td colspan="5">PUBLICATIONS
(i)</td></tr>
<tr><td rowspan="3"></td><td colspan="5"></td></tr>
<tr><td colspan="5">FILMS/VIDEOS</td></tr>
<tr><td>N^o
(j)</td><td colspan="2">TITLE
(k)</td><td>TIME
(l)</td></tr>
<tr><td></td><td colspan="2"></td><td></td></tr>
</table>

Nº (a)	ENABLING OBJECTIVES (b)	CONDITIONS (c)	STANDARDS (d)	REFERENCE (e)
13.1	State the need for modular engines.	In a classroom.	Correctly.	
13.2	State the meaning of the following terms: a. Module. b. Modular engine. c. Non-modular parts.	In a classroom.	Correctly.	
13.3	State the advantages of modular engines.	In a classroom.	Correctly.	
13.4	Explain how modules are identified.	In a classroom.	Correctly.	
13.5	State the meaning of the term 'interface' when applied to modular engine construction.	In a classroom.	Correctly.	
13.6	State typical maintenance tasks that can be undertaken at first line.	In a classroom.	Correctly.	
13.7	Describe typical general assembly features used to ensure the correct alignment, matching and assembly of engine modules and accessories.	In a classroom.	Correctly.	
13.8	Identify the assembly and alignment features described in EO 13.7 above.	In a classroom or workshop, shown examples.	Correctly.	
13.9	Recognise and state the purpose of splined and serrated drives.	In a classroom or workshop, shown examples.	Correctly.	
13.10	State where assembly alignment features and torque load sequences is specified.	In a classroom.	Correctly.	
13.11	State the purpose of bearings.	In a classroom.	Correctly.	
13.12	Describe the types of primary internal loads that occur during the operation of a gas turbine engine.	In a classroom.	Correctly.	
13.13	State the purpose of the following types of bearings that are used on gas turbine engines and the type of loading each bearing is designed to carry: a. Plain bearings (inc. oilite bushes). b. Ball bearings. c. Roller bearings. d. Taper roller. e. Needle. f. Hydrodynamic (squeeze film).	In a classroom.	Correctly.	AP-119G-0006-1

N° (a)	ENABLING OBJECTIVES (b)	CONDITIONS (c)	STANDARDS (d)	REFERENCE (e)
13.14	Identify the types and the design features of bearings used on gas turbine engines, to include: a. Inner/outer races. b. Bearing cages. c. Load carrying properties. d. Materials. e. Methods of location.	In a classroom or workshop, shown examples.	Correctly.	
13.15	State the effects on bearings of: a. Misalignment. b. Excessive interference fit. c. Overloading. d. Vibration. e. Incorrect or reverse thrust. f. Ingress of foreign matter. g. Lack of or contaminated lubricant. h. Running or spinning without lubrication.	In a classroom.	Correctly.	
13.16	State the precautions that must be observed when handling, cleaning or maintaining bearings.	In a classroom.	Correctly.	
13.17	Identify a typical engine bearing arrangement.	In a classroom or workshop, shown examples.	Correctly.	
13.18	State the purpose of labyrinth air and oil seals.	In a classroom.	Correctly.	
13.19	Explain the principles of operation of a labyrinth air/oil seal.	In a classroom or workshop.	Correctly.	
13.20	State the purpose and describe the operation of the following labyrinth air and oil seals used on gas turbine engines: a. Continuous groove air seal. b. Continuous groove inter-stage air seal. c. Abraidable lined labyrinth seal. d. Fluid lined labyrinth seal. e. Thread type labyrinth oil seal.	In a classroom or workshop.	Correctly.	

N^{o} (a)	ENABLING OBJECTIVES (b)	CONDITIONS (c)	STANDARDS (d)	REFERENCE (e)
13.21	State the purpose and identify the following seals: a. Intershaft hydraulic seal. b. Ring type oil seal. c. Carbon seal. d. Brush seal.	In a classroom or workshop, shown examples.	Correctly.	
13.22	State the purpose of the air inlet casing.	In a classroom.	Correctly.	
13.23	Describe the construction features of an inlet casing for a typical modular turbo fan engine.	In a classroom.	Correctly.	
13.24	State the purpose of a piston ring type air sealing ring.	In a classroom.	Correctly.	
13.25	State the need for noise suppression.	In a classroom.	Correctly.	
13.26	Explain how fan noise suppression is achieved using acoustic liners on inlet casings.	In a classroom.	Correctly.	
13.27	Describe the construction features of LP and HP modular axial flow compressors.	In a classroom.	Correctly.	
13.28	State what is meant by the term ‘snubber’.	In a classroom.	Correctly.	
13.29	Identify the following features of compressor rotors: a. Root. b. Tip. c. Snubber. d. Platform.	In a classroom or workshop, shown examples.	Correctly.	
13.30	Name the current materials used for rotor blade construction.	In a classroom.	Correctly.	
13.31	State the advantages/disadvantages of titanium blades.	In a classroom.	Correctly.	
13.32	Describe the methods of attaching and securing rotor blades.	In a classroom.	Correctly.	
13.33	State what is meant by the term ‘wide chord’ blading.	In a classroom.	Correctly.	
13.34	State the benefits of ‘wide chord’ blading.	In a classroom.	Correctly.	
13.35	Explain the benefits of controlled diffusion blading.	In a classroom.	Correctly.	
13.36	Describe the following construction arrangements highlighting the differences: a. Compressor disc construction. b. Bladed disc (BLISK). c. Compressor drum construction.	In a classroom.	Correctly.	
13.37	Describe the methods used for the attachment and location of compressor stator vanes.	In a classroom.	Correctly.	
13.38	Explain the purpose and features of outlet guide vanes.	In a classroom.	Correctly.	
13.39	State the methods used to ensure correct compressor alignment and mating.	In a classroom.	Correctly.	
13.40	Explain the purpose of ‘curvic’ couplings.	In a classroom.	Correctly.	
13.41	Explain the need for air sealing between rotors and stators.	In a classroom.	Correctly.	
13.42	Explain the need for air bleeds/off-takes.	In a classroom.	Correctly.	

Nº (a)	ENABLING OBJECTIVES (b)	CONDITIONS (c)	STANDARDS (d)	REFERENCE (e)
13.43	Explain the need for inter-stage/inter-row coatings to protect against titanium fires.	In a classroom.	Correctly.	
13.44	State the services for which compressor air is tapped.	In a classroom.	Correctly.	
13.45	Explain the term ‘gyroscopic coupling’ and how its effects can be minimised.	In a classroom.	Correctly.	
13.46	State the types of damage sustained by compressors and how it is minimised.	In a classroom.	Correctly.	
13.47	State the purpose of the spinner.	In a classroom.	Correctly.	
13.48	Identify variable inlet guide vane assemblies and their operating linkage.	In a classroom or workshop, shown examples.	Correctly.	
13.49	Explain the need for axial split half casings where several stages of variable vanes are used.	In a classroom.	Correctly.	
13.50	State the purpose of the intermediate casing module.	In a classroom.	Correctly.	
13.51	Explain the term ‘thrust bearing/main location bearing.	In a classroom.	Correctly.	
13.52	Identify the following parts of a typical intermediate case module: a. Inner casing and internal gearbox. b. Outer casing.	In a classroom.	Correctly.	
13.53	Define the term ‘co-axial’.	In a classroom.	Correctly.	
13.54	State the purpose of the air flow divider (splitter).	In a classroom.	Correctly.	
13.55	Describe the construction of a typical combustion section as fitted to a modular gas turbine engine.	In a classroom.	Correctly.	
13.56	State the purpose of the outer air casing (CCOC).	In a classroom.	Correctly.	
13.57	State the need for burners.	In a classroom.	Correctly.	
13.58	State the purpose of the fuel drain valve.	In a classroom.	Correctly.	
13.59	State where igniter plugs are typically located.	In a classroom.	Correctly.	
13.60	State the purpose of an inner air casing (CCIC).	In a classroom.	Correctly.	
13.61	Describe the construction of a CCIC.	In a classroom.	Correctly.	
13.62	Describe the construction of a CCIC.	In a classroom.	Correctly.	
13.63	State the purpose of the flame tube.	In a classroom.	Correctly.	
13.64	Describe the construction features of typical front and rear combustion liners.	In a classroom.	Correctly.	
13.65	State the purpose of thermal barrier coatings (TBC).	In a classroom.	Correctly.	
13.66	Describe the methods used to achieve flame tube cooling.	In a classroom.	Correctly.	
13.67	Describe the type of damage likely to be seen in combustion systems.	In a classroom.	Correctly.	
13.68	State the purpose of nozzle guide vanes (NGVs).	In a classroom.	Correctly.	
13.69	Describe the construction of a typical modular NGV assembly.	In a classroom.	Correctly.	
13.70	State the materials used for NGVs.	In a classroom.	Correctly.	
13.71	State the need for vane cooling and how it is achieved.	In a classroom.	Correctly.	

Nº (a)	ENABLING OBJECTIVES (b)	CONDITIONS (c)	STANDARDS (d)	REFERENCE (e)
13.72	Explain the terms used to describe the methods used in vane cooling.	In a classroom.	Correctly.	
13.73	State the methods used to minimise vane erosion.	In a classroom.	Correctly.	
13.74	State the purpose of seals, lands, sealing strips and vane shrouds.	In a classroom.	Correctly.	
13.75	Describe the general types of damage witnessed on NGVs.	In a classroom.	Correctly.	
13.76	State the purpose of the turbine rotor.	In a classroom.	Correctly.	
13.77	Describe the construction of a typical modular turbine rotor assembly.	In a classroom.	Correctly.	
13.78	Describe the construction of turbine blades.	In a classroom.	Correctly.	
13.79	State the purpose and advantages of blade shrouds.	In a classroom.	Correctly.	
13.80	Explain the need for interlocking shrouds.	In a classroom.	Correctly.	
13.81	State the purpose of shroud knife-edge seal fins and fences.	In a classroom.	Correctly.	
13.82	State the materials used for turbine blades.	In a classroom.	Correctly.	
13.83	State how turbine blades are manufactured.	In a classroom.	Correctly.	
13.84	Explain the need for protective coatings.	In a classroom.	Correctly.	
13.85	State the need for blade cooling and how it is achieved.	In a classroom.	Correctly.	
13.86	Describe the method used to locate and secure turbine blades.	In a classroom.	Correctly.	
13.87	State the need for liner/sealing segments.	In a classroom.	Correctly.	
13.88	Describe the construction of a typical modular turbine rotor disc assembly.	In a classroom.	Correctly.	
13.89	Describe the construction of a typical modular turbine rotor shaft assembly.	In a classroom.	Correctly.	
13.90	Describe the methods of turbine assembly/location to compressor stub shafts.	In a classroom.	Correctly.	
13.91	State the need for blade containment and explain how it is achieved.	In a classroom.	Correctly.	
13.92	Describe the stresses imposed on the turbine assembly of a gas turbine engine.	In a classroom.	Correctly.	
13.93	State the consequences of engine ‘overtemp’.	In a classroom.	Correctly.	
13.94	Explain how damage due to ‘overtemp’ can be identified.	In a classroom.	Correctly.	
13.95	Explain the term ‘blade creep’.	In a classroom.	Correctly.	
13.96	Explain how damage to the turbine section can be identified.	In a classroom.	Correctly.	
13.97	Describe the construction of a typical exhaust unit.	In a classroom.	Correctly.	
13.98	State the materials used in the construction of the exhaust unit.	In a classroom.	Correctly.	
13.99	State how the exhaust unit is located.	In a classroom.	Correctly.	
13.100	State the purpose of the following: a. Exhaust unit vanes. b. Exhaust cone. c. Exhaust fairing/mixer unit.	In a classroom.	Correctly.	
13.101	State the types of damage that may be witnessed on the exhaust unit.	In a classroom.	Correctly.	
13.102	State the purpose of the bypass duct.	In a classroom.	Correctly.	
13.103	Describe the construction of a typical bypass duct.	In a classroom.	Correctly.	

Nº (a)	ENABLING OBJECTIVES (b)	CONDITIONS (c)	STANDARDS (d)	REFERENCE (e)
13.104	Name the materials used for bypass ducts and state the benefits of ISO-grid machining.	In a classroom.	Correctly.	
13.105	Describe the location/attachment of the bypass duct.	In a classroom.	Correctly.	
13.106	State how air leakage is prevented.	In a classroom.	Correctly.	
13.107	State the precautions to be taken during maintenance to prevent inadvertent damage to ducts and casings.	In a classroom.	Correctly.	
13.108	Describe the construction of a typical jet pipe (non-reheat).	In a classroom.	Correctly.	
13.109	State the types of materials used in jet pipe construction.	In a classroom.	Correctly.	
13.110	Explain the need for and construction of the jet pipe insulation and cooling features.	In a classroom.	Correctly.	
13.111	Describe the methods used to locate/attach a jet pipe to an engine.	In a classroom.	Correctly.	
13.112	Explain how jet pipe thermal expansion and thrust loadings are catered for.	In a classroom.	Correctly.	
13.113	State the purpose of the following and why they are used: a. Co-axial nozzles. b. Integrated nozzles.	In a classroom.	Correctly.	
13.114	Describe how thrust reversal is achieved.	In a classroom.	Correctly.	
13.115	Describe the construction of a typical thrust reverse system.	In a classroom.	Correctly.	
13.116	State how thrust reverse is selected and the safety features of the system.	In a classroom.	Correctly.	
13.117	State that thrust reverse can be actuated by the following methods: a. Hydraulically. b. Pneumatically.	In a classroom.	Correctly.	
13.118	Describe the damage typically seen on jet pipes.	In a classroom.	Correctly.	
13.119	State the requirements of the jet pipe and the propelling nozzle for engines with reheat.	In a classroom.	Correctly.	
13.120	Describe the construction of a typical jet pipe with reheat.	In a classroom.	Correctly.	
13.121	State the purpose of the nozzle actuators.	In a classroom.	Correctly.	
13.122	State the safety precautions necessary when working with high pressure fluid systems.	In a classroom.	Without error.	
13.123	State the purpose of a fire bulkhead.	In a classroom.	Correctly.	
13.124	State what is meant by the terms 'screech and howl'.	In a classroom.	Correctly.	
13.125	State the purpose of a screech damper.	In a classroom.	Correctly.	
13.126	State the purpose of a fuel/heat shield.	In a classroom.	Correctly.	
13.127	State the purpose of the reheat burner assembly.	In a classroom.	Correctly.	
13.128	Describe the construction of a typical reheat burner assembly.	In a classroom.	Correctly.	
13.129	Describe the damage typically seen on burner assemblies.	In a classroom.	Correctly.	
13.130	Describe the shaft arrangements that can be used to provide the driving torque for the propeller.	In a classroom.	Correctly.	
13.131	Identify turbo-prop reduction gearboxes.	In a workshop, shown examples.	Correctly.	

Nº (a)	ENABLING OBJECTIVES (b)	CONDITIONS (c)	STANDARDS (d)	REFERENCE (e)
13.132	Identify the construction features of a turbo-prop air inlet casing.	In a workshop, shown examples.	Correctly.	
13.133	Explain the term ‘free (power) turbine’.	In a classroom.	Correctly.	
13.134	Explain why more turbine stages are required on a turbo-prop engine.	In a classroom.	Correctly.	
13.135	State the purpose of the exhaust unit on a turbo-prop engine.	In a classroom.	Correctly.	
13.136	Explain how reverse thrust (reverse pitch) is achieved on a turbo-prop.	In a classroom.	Correctly.	
13.137	State the purpose of turbo-shaft engines.	In a classroom.	Correctly.	
13.138	State the purpose of the gas generator section of a turbo-shaft engine.	In a classroom.	Correctly.	
13.139	Describe the power turbine output drive shaft configurations for turbo-shaft engines.	In a classroom.	Correctly.	
13.140	State the need for a drive transmission unit.	In a classroom.	Correctly.	
13.141	State the purpose of the exhaust unit on turbo-shaft engines.	In a classroom.	Correctly.	
13.142	Explain why residual thrust is undesirable on turbo-shaft engines. End of 13.0	In a classroom.	Correctly.	

TRADE TRAINING

SECTION: P25A GAS TURBINES

SUBJECT: 14. COOLING, SEALING AND ANTI-ICING

TRAINING OBJECTIVE (a)	REFERENCE (b)	ALLOCATION OF PERIODS (c)	Syll Hrs (e)	No of CELLS (f)	INSTR HOURS (g)
14.0 Explain the purpose of the airflows that are used for cooling, sealing and anti-icing systems on gas turbine engines and the methods of controlling internal airflows.	JPS P.2, P.7 BTEC 14584/3	Classroom	4.00	1	4.00
		Practical	0.00		0.00
		Total	4.00		4.00

EQUIPMENT (h)	PUBLICATIONS (i)

FILMS/VIDEOS		
Nº (j)	TITLE (k)	TIME (l)

Nº (a)	ENABLING OBJECTIVES (b)	CONDITIONS (c)	STANDARDS (d)	REFERENCE (e)
14.1	State the need for cooling systems on gas turbine engines.	In a classroom.	Correctly.	
14.2	Explain the purpose of the airflows used for cooling.	In a classroom.	Correctly.	
14.3	State the need for sealing systems on gas turbine engines.	In a classroom.	Correctly.	
14.4	Explain the purpose of the airflows used for sealing.	In a classroom.	Correctly.	
14.5	Explain how airflows are ducted for the cooling and sealing of the following areas: a. Engine main shafts and bearings. b. Combustion chamber. c. Turbine assembly. d. Exhaust unit. e. Jet pipe.	In a classroom.	Correctly.	
14.6	Explain how 'thermal shock' stress to assemblies is prevented.	In a classroom.	Correctly.	
14.7	State the purpose of swirl slots.	In a classroom.	Correctly.	
14.8	State the meaning of the term 'active clearance control'.	In a classroom.	Correctly.	
14.9	Identify the areas where air sealing is used.	In a classroom.	Correctly.	
14.10	State how cooling and sealing airflows are typically controlled and vented.	In a classroom.	Correctly.	
14.11	State the need for anti-icing systems on gas turbine engines.	In a classroom.	Correctly.	
14.12	Explain the purpose of anti-icing.	In a classroom.	Correctly.	
14.13	Identify the areas of gas turbine engines prone to icing.	In a classroom.	Correctly.	
14.14	Identify the airflows that are used for cooling, sealing and anti-icing on a gas turbine engine.	In a classroom.	Correctly.	
14.15	Describe the principles of operation of a gas turbine engine: a. Cooling system. b. Air sealing system. c. Air anti-icing system.	In a classroom.	Correctly.	
14.16	State how seal locations are identified. End of 14.0	In a classroom.	Correctly.	

TRADE TRAINING

SECTION: P25A GAS TURBINES

SUBJECT: 15. GEARBOXES AND ACCESSORIES

TRAINING OBJECTIVE (a)	REFERENCE (b)	ALLOCATION OF PERIODS (c)	Syll Hrs (e)	No of CELLS (f)	INSTR HOURS (g)
15.0 State the purpose and describe the construction of internal and external gearboxes, accessory drives and the need for engine driven accessories.	JPS P.10 BTEC 14584/2	Classroom	4.00	1	4.00
		Practical	0.00		0.00
		Total	4.00		4.00

EQUIPMENT (h)	PUBLICATIONS (i)		
		FILMS/VIDEOS	
	Nº (j)	TITLE (k)	TIME (l)

Nº (a)	ENABLING OBJECTIVES (b)	CONDITIONS (c)	STANDARDS (d)	REFERENCE (e)
15.1	State the need for gearboxes and accessory drives.	In a classroom.	Correctly.	
15.2	State the purpose of gearboxes and accessory drives.	In a classroom.	Correctly.	
15.3	List the types of gearboxes in typical use.	In a classroom.	Correctly.	
15.4	Describe typical mechanical arrangements of internal gearboxes.	In a classroom.	Correctly.	
15.5	Explain how unwanted movement between a compressor shaft and the radial drive shaft bevel gears is minimised.	In a classroom.	Correctly.	
15.6	State the purpose of the radial drive shaft.	In a classroom.	Correctly.	
15.7	State the purpose of the external gearbox.	In a classroom.	Correctly.	
15.8	Name the material used for the external gearbox casings.	In a classroom.	Correctly.	
15.9	List typical components and accessories driven by the external gearbox for: a. Engine services and control systems. b. Aircraft services.	In a classroom.	Correctly.	
15.10	Identify the gears used in gearboxes and state why the particular gear types are used.	In a classroom or workshop, shown examples.	Correctly.	
15.11	State the need for and the purpose of the following reduction gears: a. Spur gear. b. Epicyclic gears. c. Fixed annulus. d. Rotating annulus.	In a classroom.	Correctly.	
15.12	Describe the principles of operation of an epicyclic reduction gear.	In a classroom.	Correctly.	
15.13	Explain the distribution of the gear trains within an external gearbox and state the reasons for this.	In a classroom or workshop, shown an example gearbox.	Correctly.	
15.14	State the purpose of drive shaft shear necks.	In a classroom.	Correctly.	
15.15	Explain the need for gearbox accessory drive sealing.	In a classroom.	Correctly.	
15.16	State the purpose of an accessory drive air blown gland seal.	In a classroom.	Correctly.	
15.17	Describe the construction features of an accessory drive air blown gland seal.	In a classroom.	Correctly.	
15.18	State how external gearbox driven accessories are located and secured.	In a classroom.	Correctly.	
15.19	State the purpose of quill drives.	In a classroom.	Correctly.	
15.20	State the purpose of an intermediate gearbox.	In a classroom.	Correctly.	
15.21	State the need for auxiliary gearboxes.	In a classroom.	Correctly.	
15.22	State the purpose of auxiliary gearboxes.	In a classroom.	Correctly.	
15.23	List the accessories typically mounted on an auxiliary gearbox.	In a classroom.	Correctly.	
15.24	State the need for an auxiliary gearbox drive shaft.	In a classroom.	Correctly.	

Nº (a)	ENABLING OBJECTIVES (b)	CONDITIONS (c)	STANDARDS (d)	REFERENCE (e)
15.25	State the purpose of auxiliary (accessory and transmission) drive shafts.	In a classroom.	Correctly.	
15.26	Describe the construction/arrangement of an auxiliary (accessory and transmission) drive shaft.	In a classroom.	Correctly.	
15.27	State the purpose of flexible couplings.	In a classroom.	Correctly.	
15.28	State the purpose of a clutch.	In a classroom.	Correctly.	
15.29	Identify the following: a. Drive shafts. b. Cross drive. c. PTO shaft. d. Drive shaft flexible couplings. e. Alignment and locating features. f. Adapter drives. g. Shear necks. h. Quill drives. i. Sprag clutch. j. Multiplate dry type clutch. k. Torque converter.	In a classroom or workshop, shown examples.	Correctly.	
15.30	Explain the basic principles of operation of the following: a. Sprag clutch. b. Pawl and ratchet clutch. c. Hydraulically operated multiplate dry clutch. d. Torque converter.	In a classroom.	Correctly.	
15.31	State the precautions to be observed during the maintenance and handling of the following: a. Drive shafts. b. Flexible couplings.	In a classroom.	Correctly.	
15.32	State the safety precautions to be observed when working on or near accessory drive equipment.	In a classroom.	Without error.	
15.33	State the advantages/disadvantages of magnesium alloy.	In a classroom.	Correctly.	
15.34	Explain the need to restore gearbox casing surface finishes and protective coatings.	In a classroom.	Correctly.	
15.35	State where the information relating to the restoration of surface finishes is specified.	In a classroom.	Correctly.	
15.36	State where the safety precautions, warnings and protective clothing requirements are specified for surface finish repairs. End of 15.0	In a classroom.	Correctly.	

TRADE TRAINING

SECTION: P25A GAS TURBINES

SUBJECT: 16. INSTRUMENTATION

TRAINING OBJECTIVE (a)	REFERENCE (b)	ALLOCATION OF PERIODS (c)	Syll Hrs (e)	No of CELLS (f)	INSTR HOURS (g)
16.0 Identify and state the purpose of engine instrumentation.	JPS P.7	Classroom	2.00	1	2.00
		Practical	0.00		0.00
		Total	2.00		2.00

EQUIPMENT (h)	PUBLICATIONS (i)

FILMS/VIDEOS		
Nº (j)	TITLE (k)	TIME (l)

Nº (a)	ENABLING OBJECTIVES (b)	CONDITIONS (c)	STANDARDS (d)	REFERENCE (e)
16.1	State the purpose of the electrical services harness.	In a classroom.	Correctly.	
16.2	Identify and state the purpose of the following engine instrumentation components: a. Engine performance indicators. b. Thrust meters. c. Engine condition indicators. d. Engine speed indicators and generators. e. Speed probes and phonic wheels. f. Torque meters. g. Oil pressure and temperature transmitters and indicators. h. Position transmitters and indicators. i. Vibration transducers and indicators. j. Radiation pyrometers. k. Thermocouples.	In a classroom or workshop, shown examples.	Correctly.	
16.3	Explain the purpose and operation of a thermocouple indicating system.	In a classroom.	Correctly.	
16.4	List the factors that will adversely affect the operation of a thermocouple system.	In a classroom.	Correctly.	
16.5	State the consequences of defects within the pyrometry system.	In a classroom.	Correctly.	
16.6	State the purpose and function of aircraft integrated data systems.	In a classroom.	Correctly.	
16.7	State the typical information indicated on a multi-function cockpit display.	In a classroom.	Correctly.	
16.8	Recognise typical output from an aircraft integrated data system's multi-function display.	In a classroom.	Correctly.	
16.9	State the purpose of engine ground test equipment.	In a classroom.	Correctly.	
16.10	Identify engine ground test equipment. End of 16.0	In a workshop, shown examples.	Correctly.	

TRADE TRAINING

SECTION: P25A GAS TURBINES

SUBJECT: 17. MODULES AND ASSEMBLIES

TRAINING OBJECTIVE (a)	REFERENCE (b)	ALLOCATION OF PERIODS (c)	Syll Hrs (e)	No of CELLS (f)	INSTR HOURS (g)
17.0 Identify, locate and examine the modules and assemblies of a gas turbine engine.	JPS P.1 BTEC 14584/2	Classroom	0.00		0.00
		Practical	4.00	2	8.00
		Total	4.00		8.00

EQUIPMENT (h)	PUBLICATIONS (i)		
		FILMS/VIDEOS		
	Nº (j)	TITLE (k)	TIME (l)

Nº (a)	ENABLING OBJECTIVES (b)	CONDITIONS (c)	STANDARDS (d)	REFERENCE (e)
17.1	Locate and identify the modules of modular engines.	In a classroom or workshop, shown examples of modular engines.	Correctly.	
17.2	Locate and identify on turbo-prop and turbo-shaft engines the following: a. Air intake assemblies. b. Compressor assemblies. c. Combustion section. d. Nozzle box and turbine assemblies. e. Exhaust systems.	In a classroom or workshop, shown examples of turbo-prop and turbo-shaft engines.	Correctly.	
17.3	Locate, identify and visually examine component parts of gas turbine engine main sections for signs of faults or damage.	In a workshop on a training engine.	Correctly.	
17.4	State the importance of investigation whenever cracks or flaws are suspected.	In a classroom.	Correctly.	
17.5	Examine internal parts for faults and damage using boroscope equipment.	In a workshop on a training engine, given boroscope equipment.	Correctly.	
17.6	State the actions to be taken, and where they are specified, should an engine be contaminated with fire extinguishant.	In a classroom.	Correctly.	
17.7	Examine gearboxes, joints, couplings, drives and arms to determine their condition.	In a workshop, given examples.	Correctly.	
17.8	Recognise, examine and determine the condition of: a. Accessory drive components. b. Ball and roller bearings. End of 17.0	In a workshop, given examples.	Correctly.	

TRADE TRAINING

SECTION: P25A GAS TURBINES

SUBJECT: 18. DOCUMENTATION

<table>
<tr><td rowspan="2">TRAINING OBJECTIVE
(a)</td><td rowspan="2">REFERENCE
(b)</td><td colspan="4">ALLOCATION OF PERIODS</td></tr>
<tr><td>(c)</td><td>Syll Hrs
(e)</td><td>No of CELLS
(f)</td><td>INSTR HOURS
(g)</td></tr>
<tr><td rowspan="4">18.0 Identify and state the purpose of documentation required to maintain engines.</td><td rowspan="4">JPS C.25, C.26</td><td>Classroom</td><td>2.00</td><td>1</td><td>2.00</td></tr>
<tr><td>Practical</td><td>0.00</td><td></td><td>0.00</td></tr>
<tr><td></td><td></td><td></td><td></td></tr>
<tr><td>Total</td><td>2.00</td><td></td><td>2.00</td></tr>
<tr><td>EQUIPMENT
(h)</td><td colspan="5">PUBLICATIONS
(i)</td></tr>
<tr><td rowspan="4"></td><td colspan="5">AP100B-01
AP100B-10
AP100C-02
AP100C-06
AP100E-01A/02</td></tr>
<tr><td colspan="5">FILMS/VIDEOS</td></tr>
<tr><td>N^{o}
(j)</td><td colspan="3">TITLE
(k)</td><td>TIME
(l)</td></tr>
<tr><td></td><td colspan="3"></td><td></td></tr>
</table>

Nº (a)	ENABLING OBJECTIVES (b)	CONDITIONS (c)	STANDARDS (d)	REFERENCE (e)
18.1	Identify and state the purpose of engine maintenance documentation.	In a classroom, shown examples.	Correctly.	
18.2	Explain the need for engine lifing, adjustment and maintenance history to be accurately recorded.	In a classroom.	Correctly.	
18.3	State where engine and module records are held and maintained.	In a classroom.	Correctly.	
18.4	State where engine, module and accessory lifing information is specified.	In a classroom.	Correctly.	
18.5	State the importance of ensuring module and accessory modification states are accurately recorded.	In a classroom.	Correctly.	
18.6	State how engine and module records are controlled using ADP.	In a classroom.	Correctly.	
18.7	State the meaning of the terms: a. Group A parts. b. Group B parts.	In a classroom.	Correctly.	
18.8	Explain the term ‘engine event’.	In a classroom.	Correctly.	
18.9	Explain the need for engine ‘event’ reporting.	In a classroom.	Correctly.	
18.10	State where information relating to engine 'event' reporting is specified.	In a classroom.	Correctly.	
18.11	State the importance of accurate work recording.	In a classroom.	Correctly.	
18.12	State how FOD damage is reported.	In a classroom.	Correctly.	
18.13	List the Air Publications associated with aero engine maintenance and work recording.	In a classroom.	Correctly.	
18.14	Explain the format and layout of: a. MOD Form 799 (N/O/A). b. MOD Form 799/1 (RAF). c. MOD Form 713 (RAF). d. MOD Form 707A (N/O/A). e. MOD Form 707B (ADP) MWO. f. MOD Form 799A (N/O/A). g. MOD Form 707J (AII). h. MOD Form 707BE (continuation). i. MOD Form 707BB (continuation). j. MOD Form 707MC. k. MOD Form 707MP. l. MOD Form 707P. m. MOD Form 707PA (continuation). n. MOD Form 731.	In a classroom, using; MOD Posters 300B, C & D. MOD Posters 301A & B. AP100C series.	Correctly.	AP100C-02 AP100C-06 AP100B-01

N^{o} (a)	ENABLING OBJECTIVES (b)	CONDITIONS (c)	STANDARDS (d)	REFERENCE (e)
18.14	Use and complete maintenance documentation throughout P25 practical exercises. End of 18.0	In a classroom or workshop, given relevant documentation.	Correctly.	

TRADE TRAINING

SECTION: P25A GAS TURBINES

SUBJECT: 19. PRINCIPLES AND CONSTRUCTION CONSOLIDATION

TRAINING OBJECTIVE (a)	REFERENCE (b)	ALLOCATION OF PERIODS (c)	Syll Hrs (e)	No of CELLS (f)	INSTR HOURS (g)
19.0 Consolidate the principles and construction of gas turbine engines with reasoning and practical exercises.	JPS P.1, P.17.	Classroom	0.00		0.00
		Practical	18.00	4	72.00
		Total	18.00		72.00

EQUIPMENT (h)	PUBLICATIONS (i)		
		FILMS/VIDEOS	
	Nº (j)	TITLE (k)	TIME (l)

Nº (a)	ENABLING OBJECTIVES (b)	CONDITIONS (c)	STANDARDS (d)	REFERENCE (e)
19.1	Consolidate the principles and construction of gas turbine engines with reasoning and practical exercises. End of 19.0	Using the PST/ADU.	Correctly.	

TRADE TRAINING

SECTION: P25A GAS TURBINES

SUBJECT: 20. ENGINE MOUNTINGS

TRAINING OBJECTIVE (a)	REFERENCE (b)	ALLOCATION OF PERIODS (c)	Syll Hrs (e)	No of CELLS (f)	INSTR HOURS (g)
20.0 Explain the transmission of loads through engine mountings to the airframe.	JPS P.15 BTEC 14584/3	Classroom	1.00	1	1.00
		Practical	0.00		0.00
		Total	1.00		1.00

EQUIPMENT (h)	PUBLICATIONS (i)

FILMS/VIDEOS		
Nº (j)	TITLE (k)	TIME (l)

Nº (a)	ENABLING OBJECTIVES (b)	CONDITIONS (c)	STANDARDS (d)	REFERENCE (e)
20.1	State the purpose of engine installation mountings.	In a classroom.	Correctly.	
20.2	State the factors that will determine the type and location of engine mountings.	In a classroom.	Correctly.	
20.3	State the meaning of the following: a. Engine change unit (ECU). b. Powerplant.	In a classroom.	Correctly.	
20.4	State the need to hand engines for some installations.	In a classroom.	Correctly.	
20.5	State the precautions to be taken when working near the following: a. Polyamide cabling. b. Microwave cabling.	In a classroom.	Without error.	
20.6	Identify the general hazards that are present in the operation and maintenance of gas turbine engines.	In a classroom.	Without error.	
20.7	State where the hazards and safety precautions that must be observed for a given aircraft/installation are specified.	In a classroom.	Correctly.	
20.8	State the need to be FOD aware at all times. End of 20.0	In a classroom.	Correctly.	

TRADE TRAINING

SECTION: P25A GAS TURBINES

SUBJECT: 21. FLUID CONTROL SYSTEMS

TRAINING OBJECTIVE (a)	REFERENCE (b)	ALLOCATION OF PERIODS (c)	Syll Hrs (e)	No of CELLS (f)	INSTR HOURS (g)
21.0 Explain the effects and influences of fluid control systems.	JPS P.7	Classroom	4.00	1	4.00
		Practical	0.00		0.00
		Total	4.00		4.00

EQUIPMENT (h)	PUBLICATIONS (i)

FILMS/VIDEOS		
Nº (j)	TITLE (k)	TIME (l)

Nº (a)	ENABLING OBJECTIVES (b)	CONDITIONS (c)	STANDARDS (d)	REFERENCE (e)
21.1	State the effects on fluid flow through an orifice for changes in orifice size.	In a classroom.	Correctly.	
21.2	State the effects on fluid flow of changing pressure.	In a classroom.	Correctly.	
21.3	State the meaning of the term 'throttle'.	In a classroom.	Correctly.	
21.4	State the purpose and effects of flow restrictors.	In a classroom.	Correctly.	
21.5	State the purpose and effects of flow attenuators.	In a classroom.	Correctly.	
21.6	Describe the effects of a venturi on fluid flow.	In a classroom.	Correctly.	
21.7	Explain what is meant by the term 'choked' flow within a fluid control system.	In a classroom.	Correctly.	
21.8	Explain why 'choked' flow conditions may be desirable within a fluid control system.	In a classroom.	Correctly.	
21.9	Explain the meaning and the causes of cavitation.	In a classroom.	Correctly.	
21.10	Explain the principles of operation of differential area pistons.	In a classroom.	Correctly.	
21.11	Explain what is meant by the term 'spool valve'.	In a classroom.	Correctly.	
21.12	Explain how directional control of a piston/valve is achieved.	In a classroom.	Correctly.	
21.13	Explain how rate of movement control of a piston/valve is achieved.	In a classroom.	Correctly.	
21.14	Explain the meaning of the term 'hysteresis'.	In a classroom.	Correctly.	
21.15	Explain the purpose and effect of profiled plugs.	In a classroom.	Correctly.	
21.16	State the meaning of the term 'servo'.	In a classroom.	Correctly.	
21.17	Explain the purpose of servo operated control systems.	In a classroom.	Correctly.	
21.18	Describe the construction and principles of operation of hydro-mechanically controlled variable orifices (servo systems): a. Half-ball spill valve operation. b. Kinetic knife spill valve.	In a classroom.	Correctly.	
21.19	Define the following terms as they apply to spill valve operation: a. Open. b. Closed. c. Sensitive.	In a classroom.	Correctly.	
21.20	Describe the operation of a simple servo regulated flow control circuit.	In a classroom.	Correctly.	
21.21	Describe the construction and principles of operation of an electro-hydraulical servo valve (torque motor).	In a classroom.	Correctly.	
21.22	Describe the construction and principles of operation of a fluidic switch.	In a classroom.	Correctly.	
21.23	Describe the following methods of spool valve/valve actuation: a. Mechanical. b. Pneumatic. c. Hydraulic. d. Electrical. End of 21.0	In a classroom.	Correctly.	

TRADE TRAINING

SECTION: P25A GAS TURBINES

SUBJECT: 22.0 STARTING SYSTEM PRINCIPLES

TRAINING OBJECTIVE (a)	REFERENCE (b)	ALLOCATION OF PERIODS (c)	Syll Hrs (e)	No of CELLS (f)	INSTR HOURS (g)
22.0 Explain the basic principles of a gas turbine engine starting system.	JPS P.8 BTEC 14584/3	Classroom	2.00	1	2.00
		Practical	0.00		0.00
		Total	2.00		2.00

EQUIPMENT (h)	PUBLICATIONS (i)

FILMS/VIDEOS		
Nº (j)	TITLE (k)	TIME (l)

Nº (a)	ENABLING OBJECTIVES (b)	CONDITIONS (c)	STANDARDS (d)	REFERENCE (e)
22.1	State the need for and purpose of starting systems for gas turbine engines.	In a classroom.	Correctly.	
22.2	State the three fundamental elements required to achieve combustion.	In a classroom.	Correctly.	
22.3	State the basic requirements of a starter system.	In a classroom.	Correctly.	
22.4	State the purpose of the start control unit.	In a classroom.	Correctly.	
22.5	State the purpose of the following basic starter system's cockpit controls: a. LP cock. b. HP cock. c. Start master switch. d. Ignition master switch. e. Start selector switch. f. Relight button.	In a classroom.	Correctly.	
22.6	Explain the operation of a basic starting system electrical circuit.	In a classroom.	Correctly.	
22.7	State the safety precautions to be taken before any engine ground run.	In a classroom.	Without error.	
22.8	State the need for ignition checks and when they are normally carried out.	In a classroom.	Correctly.	
22.9	State the typical control selections for a normal engine start.	In a classroom.	Correctly.	
22.10	Describe a typical basic engine start sequence.	In a classroom.	Correctly.	
22.11	Describe the cockpit indications during a typical basic start sequence.	In a classroom.	Correctly.	
22.12	Explain the meaning of the following terms: a. Motoring speed. b. Self-sustaining speed. c. Starter ‘cut-out’. d. Ground idle. e. ‘Hung’ start (hot start).	In a classroom.	Correctly.	
22.13	Describe the cockpit indications of a 'hung' start.	In a classroom.	Correctly.	
22.14	Explain the consequences of a 'hung' start.	In a classroom.	Correctly.	
22.15	State the correct procedures for aborting a start cycle and the post abort checks.	In a classroom.	Correctly.	
22.16	State the purpose of wet and dry runs and when they would be carried out.	In a classroom.	Correctly.	
22.17	State the position of control switches for the following: a. Wet run start. b. Dry run start.	In a classroom.	Correctly.	
22.18	Explain why the LP cock is opened in both cases stated in EO 22.17.	In a classroom.	Correctly.	
22.19	State the control switch positions for a typical engine airborne relight.	In a classroom.	Correctly.	
22.20	State the factors that will determine the type of starter system employed. End of 22.0	In a classroom.	Correctly.	

TRADE TRAINING

SECTION: P25A GAS TURBINES

SUBJECT: 23. STARTING SYSTEM OPERATION AND CONSTRUCTION

TRAINING OBJECTIVE (a)	REFERENCE (b)	ALLOCATION OF PERIODS (c)	Syll Hrs (e)	No of CELLS (f)	INSTR HOURS (g)
23.0 Describe the principles of operation and construction of starting system components and assemblies.	JPS P.4, P.5, P.8	Classroom	6.00	1	6.00
		Practical	0.00		0.00
		Total	6.00		6.00

EQUIPMENT (h)	PUBLICATIONS (i)		
		FILMS/VIDEOS	
	Nº (j)	TITLE (k)	TIME (l)

Nº (a)	ENABLING OBJECTIVES (b)	CONDITIONS (c)	STANDARDS (d)	REFERENCE (e)
23.1	Identify and categorise the main types of engine starting systems: a. Turbo starters. b. Electric starters. c. Hydraulic starters. d. Direct air impingement. e. Secondary power systems.	In a classroom or workshop, shown examples.	Correctly.	
23.2	State the meaning of the term ' turbo' starter.	In a classroom.	Correctly.	
23.3	State the means by which a turbo starter may be driven.	In a classroom.	Correctly.	
23.4	State the need for accurate recording of starter usage.	In a classroom.	Correctly.	
23.5	State the importance of accurately recording serial numbers and installed position details.	In a classroom.	Correctly.	
23.6	State where information relating to starter assembly life and maintenance history is recorded.	In a classroom.	Correctly.	
23.7	Describe the construction of a typical air driven starter motor.	In a classroom.	Correctly.	
23.8	Describe the principle of operation of a radial inflow turbine.	In a classroom.	Correctly.	
23.9	State the purpose of the reduction gear.	In a classroom.	Correctly.	
23.10	State the types and purpose of the starter clutch mechanism.	In a classroom.	Correctly.	
23.11	Explain how speed sensing is achieved.	In a classroom.	Correctly.	
23.12	Explain the principles of operation of a typical air driven starter motor.	In a classroom.	Correctly.	
23.13	State the advantages/disadvantages of an air driven starter.	In a classroom.	Correctly.	
23.14	State the need for starter lubrication and condition monitoring and how they are achieved.	In a classroom.	Correctly.	
23.15	Describe typical mounting, location and sealing features.	In a classroom.	Correctly.	
23.16	State the need for air supply/regulating valves.	In a classroom.	Correctly.	
23.17	Describe the construction and control of a typical air supply valve.	In a classroom.	Correctly.	
23.18	Explain the meaning of the term 'driver' gas turbine starter.	In a classroom.	Correctly.	
23.19	Describe the construction of a typical 'driver' gas turbine starter.	In a classroom.	Correctly.	
23.20	State the need for a separate starter fuel control system.	In a classroom.	Correctly.	
23.21	State the need for a separate starter lubrication system.	In a classroom.	Correctly.	
23.22	Explain the principles of operation of a typical 'driver' gas turbine starter.	In a classroom.	Correctly.	
23.23	State the advantages of a 'driver' gas turbine starter.	In a classroom.	Correctly.	
23.24	Explain the meaning of the term 'auxiliary power unit'.	In a classroom.	Correctly.	
23.25	State the purpose of a GTS/APU.	In a classroom.	Correctly.	
23.26	Describe the construction of a typical GTS/APU.	In a classroom.	Correctly.	
23.27	State the purpose of the GTS/APU accessory gearbox.	In a classroom.	Correctly.	

Nº (a)	ENABLING OBJECTIVES (b)	CONDITIONS (c)	STANDARDS (d)	REFERENCE (e)
23.28	State the purpose of the drive disconnect.	In a classroom.	Correctly.	
23.29	State the purpose of the disc brake unit.	In a classroom.	Correctly.	
23.30	Explain the principles and modes of operation of a typical 'driver' GTS/APU.	In a classroom.	Correctly.	
23.31	Explain what is meant by the term 'translation' start.	In a classroom.	Correctly.	
23.32	Describe typical mounting and location features.	In a classroom.	Correctly.	
23.33	Explain the difference between a gas turbine air producer system and a 'driver' gas turbine starter.	In a classroom.	Correctly.	
23.34	State the purpose of a typical gas turbine air producer system.	In a classroom.	Correctly.	
23.35	Describe the construction of a gas turbine air producer.	In a classroom.	Correctly.	
23.36	Describe the construction and state the purpose of the components of a typical air producer main engine starting system.	In a classroom.	Correctly.	
23.37	State the main functions of the start control unit.	In a classroom.	Correctly.	
23.38	Explain the principles of operation of an electric starter motor.	In a classroom.	Correctly.	
23.39	Describe the construction features of an electric starter motor.	In a classroom.	Correctly.	
23.40	State where electric starters are used.	In a classroom.	Correctly.	
23.41	State the disadvantages of an electric starter.	In a classroom.	Correctly.	
23.42	Explain the differences between an electric starter and electric starter generator.	In a classroom.	Correctly.	
23.43	Explain the principles of operation of a hydraulic starter motor.	In a classroom.	Correctly.	
23.44	Describe the construction features of a hydraulic starter motor.	In a classroom.	Correctly.	
23.45	State where hydraulic starter motors are used.	In a classroom.	Correctly.	
23.46	Explain the principle of operation of air impingement starting.	In a classroom.	Correctly.	
23.47	Explain the meaning of the term 'secondary power system'.	In a classroom.	Correctly.	
23.48	State the purpose of a secondary power system.	In a classroom.	Correctly.	
23.49	Describe the construction of a typical secondary power system.	In a classroom.	Correctly.	
23.50	List the accessories driven by a typical SPS.	In a classroom.	Correctly.	
23.51	Describe a typical SPS installation.	In a classroom.	Correctly.	
23.52	Describe the drive transmission path to the main engines.	In a classroom.	Correctly.	
23.53	Explain the basic principle of operation to the SPS.	In a classroom.	Correctly.	
23.54	State the advantages of an SPS.	In a classroom.	Correctly.	
23.55	Identify the components of a secondary power system.	In a classroom or workshop, shown examples.	Correctly.	
23.56	State the purpose of an ignition system.	In a classroom.	Correctly.	
23.57	State the requirements of an ignition system.	In a classroom.	Correctly.	
23.58	State the purpose of a HEIU.	In a classroom.	Correctly.	

Nº (a)	ENABLING OBJECTIVES (b)	CONDITIONS (c)	STANDARDS (d)	REFERENCE (e)
23.59	State typical energy output values for ignition units.	In a classroom.	Correctly.	
23.60	Explain why two energy output levels are typically available.	In a classroom.	Correctly.	
23.61	State how HEIU LT and HT connections are correctly identified.	In a classroom.	Correctly.	
23.62	State where LETHAL WARNINGS are published.	In a classroom.	Correctly.	
23.63	State the safety precautions to be taken when working on ignition systems.	In a classroom.	Without error.	
23.64	State the safety precautions to be taken prior to checking ignitor operation.	In a classroom.	Without error.	
23.65	Describe the construction of the following types of ignitors: a. Air gap. b. Surface discharge. c. Torch.	In a classroom.	Correctly.	
23.66	State the application of each ignitor type.	In a classroom.	Correctly.	
23.67	State the importance of achieving the correct ignitor immersion depth during installation.	In a classroom.	Correctly.	
23.68	Describe the construction of a HT ignition lead. End of 23.0	In a classroom.	Correctly.	

TRADE TRAINING

SECTION: P25A GAS TURBINES

SUBJECT: 24. TYPICAL ENGINE STARTING SYSTEM

TRAINING OBJECTIVE (a)	REFERENCE (b)	ALLOCATION OF PERIODS (c)	Syll Hrs (e)	No of CELLS (f)	INSTR HOURS (g)
24.0 Describe the composition and operation of a typical engine starting system. and signs of wear.	JPS P.4, P.5 BTEC 14584/3	Classroom	4.00	1	4.00
		Practical	0.00		0.00
		Total	4.00		4.00

EQUIPMENT (h)	PUBLICATIONS (i)

FILMS/VIDEOS		
Nº (j)	TITLE (k)	TIME (l)

Nº (a)	ENABLING OBJECTIVES (b)	CONDITIONS (c)	STANDARDS (d)	REFERENCE (e)
24.1	Describe the operation of a typical starting system cycle from rest up to and including main engine start.	In a classroom.	Correctly.	
24.2	State typical starting systems operating limitations.	In a classroom.	Correctly.	
24.3	State the safety precautions to be observed when working with engine starter systems.	In a classroom.	Without error.	
24.4	State the safety precautions to be observed when operating engine starter systems.	In a classroom.	Without error.	
24.5	State the types and purpose of engine starter system interlocks. End of 24.0	In a classroom.	Correctly.	

TRADE TRAINING

SECTION: P25A GAS TURBINES

SUBJECT: 25. AUXILIARY AIRBORNE POWER PLANTS

TRAINING OBJECTIVE (a)	REFERENCE (b)	ALLOCATION OF PERIODS (c)	Syll Hrs (e)	No of CELLS (f)	INSTR HOURS (g)
25.0 State the purpose of auxiliary airborne power plants.	JPS P.8 BTEC 14584/3	Classroom	2.00	1	2.00
		Practical	0.00		0.00
		Total	2.00		2.00

EQUIPMENT (h)	PUBLICATIONS (i)		
		FILMS/VIDEOS		
	Nº (j)	TITLE (k)	TIME (l)

Nº (a)	ENABLING OBJECTIVES (b)	CONDITIONS (c)	STANDARDS (d)	REFERENCE (e)
25.1	State the purpose of auxiliary airborne power plants.	In a classroom.	Correctly.	
25.2	Explain the operational differences between an APU and an airborne auxiliary power plant.	In a classroom.	Correctly.	
25.3	State the operating limitations when in emergency use in flight.	In a classroom.	Correctly.	
25.4	State the safety precautions to be observed prior to maintenance activities on an AAPP system or installation.	In a classroom.	Without error.	
25.5	Recognise a typical AAPP installation. End of 25.0	In a classroom.	Correctly.	

TRADE TRAINING

SECTION: P25A GAS TURBINES

SUBJECT: 26. STARTING SYSTEMS CONSOLIDATION

TRAINING OBJECTIVE (a)	REFERENCE (b)	ALLOCATION OF PERIODS (c)	Syll Hrs (e)	No of CELLS (f)	INSTR HOURS (g)
26.0 Consolidate the principles of gas turbine engine starting systems with reasoning and practical exercises.	JPS P.4, P.5, P.8, P.17	Classroom	1.00	1	1.00
		Practical	8.00	2	16.00
		Total	9.00		17.00

EQUIPMENT (h)	PUBLICATIONS (i)		
		FILMS/VIDEOS	
	Nº (j)	TITLE (k)	TIME (l)

Nº (a)	ENABLING OBJECTIVES (b)	CONDITIONS (c)	STANDARDS (d)	REFERENCE (e)
26.1	Identify the major components of a gas turbine starter/auxiliary power unit.	In a classroom or workshop, shown examples.	Correctly.	
26.2	Locate and identify the components of the air generator starter system and state their purpose.	In a classroom or workshop, shown examples.	Correctly.	
26.3	Carry out reasoning and practical exercises and complete all relevant documentation. End of 26.0	Using PST/ADU, given relevant documentation.	Correctly.	

TRADE TRAINING

SECTION: P25A GAS TURBINES

SUBJECT: 27. LUBRICATION

TRAINING OBJECTIVE (a)	REFERENCE (b)	ALLOCATION OF PERIODS (c)	Syll Hrs (e)	No of CELLS (f)	INSTR HOURS (g)
27.0 Explain the need for lubrication and identify the types of engine oil and their properties.	JPS P.6 BTEC 14584/3	Classroom	2.00	1	2.00
		Practical	0.00		0.00
		Total	2.00		2.00

EQUIPMENT (h)	PUBLICATIONS (i)		
		FILMS/VIDEOS		
	Nº (j)	TITLE (k)	TIME (l)

Nº (a)	ENABLING OBJECTIVES (b)	CONDITIONS (c)	STANDARDS (d)	REFERENCE (e)
27.1	State the need for lubrication and lubricants.	In a classroom.	Correctly.	
27.2	Define the term 'lubricant'.	In a classroom.	Correctly.	
27.3	State the classes of lubricants according to their origins.	In a classroom.	Correctly.	
27.4	State the meaning of the term 'synthetic' as it applies to gas turbine engine lubricants.	In a classroom.	Correctly.	
27.5	State the classes of lubricants used on gas turbine engines.	In a classroom.	Correctly.	
27.6	State the purpose of a lubricant.	In a classroom.	Correctly.	
27.7	State how a lubricant achieves its purpose.	In a classroom.	Correctly.	
27.8	State and explain the meaning of the terms used to describe the main properties of lubricating oil.	In a classroom.	Correctly.	
27.9	State the main factors that determine the properties of the lubricant to meet engine requirements.	In a classroom.	Correctly.	
27.10	Explain the effect of varying temperatures on oil viscosity.	In a classroom.	Correctly.	
27.11	State the meaning and purpose of a viscosity index.	In a classroom.	Correctly.	
27.12	State the characteristics of oils suitable for aero-engines.	In a classroom.	Correctly.	
27.13	State the factors that have influenced the development of oils for gas turbine engines.	In a classroom.	Correctly.	
27.14	Explain the meaning of the terms that describe the phases of lubrication: a. Boundary lubrication. b. Film lubrication.	In a classroom.	Correctly.	
27.15	Explain how the properties of an oil can be enhanced by the use of additives.	In a classroom.	Correctly.	
27.16	State the meaning of the term 'oxidation'.	In a classroom.	Correctly.	
27.17	State the purpose of oxidation inhibiters and their effect on synthetic oil colouration.	In a classroom.	Correctly.	
27.18	State the potential sources/causes of lubricating oil contamination.	In a classroom.	Correctly.	
27.19	State the effects and consequences of lubricating oil contamination.	In a classroom.	Correctly.	
27.20	State how the following contaminants can be identified: a. Water. b. Solids. c. Other lubricants. d. Fuel.	In a classroom.	Correctly.	

N^{o} (a)	ENABLING OBJECTIVES (b)	CONDITIONS (c)	STANDARDS (d)	REFERENCE (e)
27.21	State the hazards associated with synthetic lubricants.	In a classroom.	Correctly.	
27.22	State the safety precautions to be observed when handling, dispensing and storing lubricants and dispensing equipment.	In a classroom.	Without error.	
27.23	Recognise and correctly interpret hazard warning markings.	In a classroom or workshop, shown examples.	Correctly.	
27.24	State how oils for use in aero-engines are identified and the significance of oil code numbers.	In a classroom.	Correctly.	
27.25	State the need for the periodic testing of lubricating oils held in storage.	In a classroom.	Correctly.	
27.26	Explain how the correct oil for a particular engine is selected.	In a classroom.	Correctly.	
27.27	State where the correct oil for a particular engine is specified.	In a classroom.	Correctly.	
27.28	State where recommended alternative engine lubricating oils is specified. End of 27.0	In a classroom.	Correctly.	

TRADE TRAINING

SECTION: P25A GAS TURBINES

SUBJECT: 28.0 OIL SYSTEM COMPONENTS

TRAINING OBJECTIVE (a)	REFERENCE (b)	ALLOCATION OF PERIODS (c)	Syll Hrs (e)	No of CELLS (f)	INSTR HOURS (g)
28.0 Describe the principles of operation and construction of gas turbine engine oil system components.	JPS P.6 BTEC 14584/3	Classroom	8.00	1	8.00
		Practical	0.00		0.00
		Total	8.00		8.00

EQUIPMENT (h)	PUBLICATIONS (i)		
		FILMS/VIDEOS	
	Nº (j)	TITLE (k)	TIME (l)

Nº (a)	ENABLING OBJECTIVES (b)	CONDITIONS (c)	STANDARDS (d)	REFERENCE (e)
28.1	State the need for a lubrication system.	In a classroom.	Correctly.	
28.2	State the purpose of a lubrication system.	In a classroom.	Correctly.	
28.3	State the requirements of a lubrication system.	In a classroom.	Correctly.	
28.4	Identify the features and components necessary to complete a simple gas turbine closed lubrication system.	In a classroom or workshop, shown examples.	Correctly.	
28.5	State the meaning of the following terms and explain the differences between them: a. Wet sump. b. Dry sump.	In a classroom.	Correctly.	
28.6	State the need for an oil tank.	In a classroom.	Correctly.	
28.7	Identify and state the purpose of the following typical general construction features of a gas turbine engine oil tank: a. Oil replenishment points. b. Oil level/replenishment indicators. c. Drain valve/plug. d. Inverted flight valve.	In a classroom or workshop, shown examples.	Correctly.	
28.8	Explain the advantage of using a pressure replenishment point.	In a classroom.	Correctly.	
28.9	State the meaning of the term 'scupper' drain.	In a classroom.	Correctly.	
28.10	Explain the principle of operation of a de-aerator.	In a classroom.	Correctly.	
28.11	Explain the need for and operation of oil tank inverted flight components.	In a classroom.	Correctly.	
28.12	Explain the purpose of the air space above the oil in the oil tank.	In a classroom.	Correctly.	
28.13	State the purpose of the oil feed outlet strainer.	In a classroom.	Correctly.	
28.14	Explain how cavitation in oil systems can be prevented.	In a classroom.	Correctly.	
28.15	State the purpose of oil pumps.	In a classroom.	Correctly.	
28.16	State the types of oil pumps in general use.	In a classroom.	Correctly.	
28.17	Explain the meaning of the term 'positive displacement' when applied to pumps.	In a classroom.	Correctly.	
28.18	Explain why positive displacement pumps are used.	In a classroom.	Correctly.	
28.19	Describe the construction and principles of operation of a spur gear pump.	In a classroom.	Correctly.	
28.20	State the factors that determine the spur gear pump output capacity.	In a classroom.	Correctly.	
28.21	Explain how hydraulic (pressure) locking is prevented in oil pumps.	In a classroom.	Correctly.	
28.22	Explain why scavenge pump elements have a greater capacity.	In a classroom.	Correctly.	
28.23	Explain the purpose of a by-pass valve.	In a classroom.	Correctly.	
28.24	Explain the principle of operation of a typical by-pass valve.	In a classroom.	Correctly.	
28.25	Explain why there is not a shear neck on the oil pump drive shaft.	In a classroom.	Correctly.	
28.26	State the purpose of a metering pump.	In a classroom.	Correctly.	

Nº (a)	ENABLING OBJECTIVES (b)	CONDITIONS (c)	STANDARDS (d)	REFERENCE (e)
28.27	State the need for filters.	In a classroom.	Correctly.	
28.28	State the purpose of the following filters: a. Pressure. b. 'Last chance'. c. Scavenge.	In a classroom.	Correctly.	
28.29	Explain how the effectiveness of a filter is determined.	In a classroom.	Correctly.	
28.30	Define the term 'micron' and compare micron sizes against known examples.	In a classroom or workshop, given examples.	Correctly.	
28.31	Identify and describe the principle features of the following types of filters: a. Wire wound (purolator). b. Wire mesh (gauze). c. Paper (corrugated). d. Stacked screen. e. Thread type. f. Resin impregnated. g. Magnetic (mdps).	In a classroom or workshop, shown examples.	Correctly.	
28.32	State where each of the above filters would be used in an oil system.	In a classroom.	Correctly.	
28.33	Describe the flow of oil through a typical in-line bowl type filter assembly.	In a classroom.	Correctly.	
28.34	State the purpose of a filter by-pass valve.	In a classroom.	Correctly.	
28.35	State the purpose of an impending by-pass indicator.	In a classroom.	Correctly.	
28.36	Describe the construction and explain the principle of operation of an impending by-pass indicators.	In a classroom.	Correctly.	
28.37	State the purpose of a by-pass 'thermal lock'.	In a classroom.	Correctly.	
28.38	State the maintenance practices associated with each filter type including: a. Cleaning procedures. b. Inspection intervals. c. Replacement frequency.	In a classroom.	Correctly.	
28.39	State where the maintenance practices for each filter type is specified.	In a classroom.	Correctly.	
28.40	State the purpose of oil coolers.	In a classroom.	Correctly.	
28.41	State the methods of oil cooling in use.	In a classroom.	Correctly.	
28.42	Describe the construction and principles of operation of a typical fuel cooled oil cooler.	In a classroom.	Correctly.	
28.43	Explain the advantages of using fuel as the cooling medium.	In a classroom.	Correctly.	
28.44	State the purpose of the oil cooler by-pass valve.	In a classroom.	Correctly.	
28.45	State where the oil cooler can be situated in the oil system.	In a classroom.	Correctly.	

Nº (a)	ENABLING OBJECTIVES (b)	CONDITIONS (c)	STANDARDS (d)	REFERENCE (e)
28.46	State the advantages/disadvantages of siting the oil cooler in the following positions: a. In the pressure system. b. In the scavenge system.	In a classroom.	Correctly.	
28.47	Explain the effects of leaks within the oil cooler matrix.	In a classroom.	Correctly.	
28.48	State the purpose of an oil cooler pressurising valve.	In a classroom.	Correctly.	
28.49	Explain when an air cooled oil cooler would be used.	In a classroom.	Correctly.	
28.50	State the advantages and disadvantages of using air cooled oil coolers.	In a classroom.	Correctly.	
28.51	Explain the need for oil system indication and monitoring systems.	In a classroom.	Correctly.	
28.52	Describe the basic construction and principles of operation of a typical oil pressure switch.	In a classroom.	Correctly.	
28.53	Describe the construction of a typical simple bearing housing, including: a. Labyrinth oil/air seal arrangement. b. Oil feed. c. Oil scavenge. d. Cavity drain. e. Vent. f. Bearing and shaft location.	In a classroom.	Correctly.	
28.54	Describe and state the purpose of the following oil jet types: a. Fluid stream. b. Mist and vapour. c. Under-race.	In a classroom.	Correctly.	
28.55	State the purpose of: a. Oil catchers. b. Slinger/flinger rings.	In a classroom.	Correctly.	
28.56	Describe the methods of achieving bearing lubrication using the above methods.	In a classroom.	Correctly.	
28.57	State the purpose of the cavity drain.	In a classroom.	Correctly.	
28.58	State the purpose of the bearing housing vent.	In a classroom.	Correctly.	
28.59	Explain how the volume flow of oil to the bearing is controlled.	In a classroom.	Correctly.	
28.60	State the factors that determine the flow of oil to the bearings.	In a classroom.	Correctly.	
28.61	Describe the oil feed arrangement for squeeze film bearings.	In a classroom.	Correctly.	
28.62	Explain the meaning of the term 'splash' lubrication.	In a classroom.	Correctly.	
28.63	Describe how gears, drive shafts and engine main shaft couplings are lubricated.	In a classroom.	Correctly.	
28.64	State the need for gear case venting.	In a classroom.	Correctly.	
28.65	Identify shaft and gear housing sealing.	In a classroom or workshop, shown examples.	Correctly.	

Nº (a)	ENABLING OBJECTIVES (b)	CONDITIONS (c)	STANDARDS (d)	REFERENCE (e)
28.66	Explain the need for pressure flow control.	In a classroom.	Correctly.	
28.67	Describe the basic construction and principles of operation of: a. A simple pressure relief valve. b. A compound relief valve.	In a classroom.	Correctly.	
28.68	Explain the purpose of the following pressure relief valves used in lubrication systems: a. System relief valve. b. Over-pressure (emergency) relief valve. c. Compound relief valve.	In a classroom.	Correctly.	
28.69	State the purpose of magnetic chip detectors.	In a classroom.	Correctly.	
28.70	State where magnetic chip detectors are generally located in lubrication systems.	In a classroom.	Correctly.	
28.71	State the types of magnetic chip detectors in use.	In a classroom.	Correctly.	
28.72	Explain the principles of operation of indicating type chip detectors.	In a classroom.	Correctly.	
28.73	Explain the principles of operation of electric pulsed chip detectors.	In a classroom.	Correctly.	
28.74	State the purpose of a centrifugal breather.	In a classroom.	Correctly.	
28.75	Describe the construction of a typical centrifugal breather.	In a classroom.	Correctly.	
28.76	Explain the principles of operation of a centrifugal breather.	In a classroom.	Correctly.	
28.77	State where a centrifugal breather is usually mounted and how it is driven.	In a classroom.	Correctly.	
28.78	State the purpose of a trim valve in setting oil flow requirements. End of 28.0	In a classroom.	Correctly.	

TRADE TRAINING

SECTION: P25A GAS TURBINES

SUBJECT: 29. LUBRICATION SYSTEMS OPERATION

TRAINING OBJECTIVE (a)	REFERENCE (b)	ALLOCATION OF PERIODS (c)	Syll Hrs (e)	No of CELLS (f)	INSTR HOURS (g)
29.0 Describe the principles of operation and the construction of gas turbine lubrication systems with regard to:- a. Turbo-jet engines. b. Turbo-prop engines. c. Turbo-fan engines. d. Turbo-shaft engines.	JPS P.6	Classroom	10.00	1	10.00
		Practical	0.00		0.00
		Total	10.00		10.00

EQUIPMENT (h)	PUBLICATIONS (i)

FILMS/VIDEOS		
Nº (j)	TITLE (k)	TIME (l)

Nº (a)	ENABLING OBJECTIVES (b)	CONDITIONS (c)	STANDARDS (d)	REFERENCE (e)
29.1	State the meaning of the following terms used to identify oil systems: a. Expendable. b. Total loss. c. Partial loss. d. Recirculatory.	In a classroom.	Correctly.	
29.2	Classify gas turbine engine lubrication systems.	In a classroom or workshop, shown examples.	Correctly.	
29.3	State the factors that will determine the type of oil system used for a particular engine.	In a classroom.	Correctly.	
29.4	State the types of engines that would use expendable oil systems.	In a classroom.	Correctly.	
29.5	Explain the differences in component requirements for expendable and recirculatory oil systems.	In a classroom.	Correctly.	
29.6	State the consequences of oil contamination in the compressor.	In a classroom.	Correctly.	
29.7	Explain how oil loss is controlled on expendable oil systems.	In a classroom.	Correctly.	
29.8	Describe the features of a typical expendable oil system.	In a classroom.	Correctly.	
29.9	Explain how recirculatory systems are classified.	In a classroom.	Correctly.	
29.10	State the types of recirculatory systems.	In a classroom.	Correctly.	
29.11	State the meaning of the term 'partial loss'.	In a classroom.	Correctly.	
29.12	Describe the features of a typical 'partial loss' oil system.	In a classroom.	Correctly.	
29.13	Explain how a pressure relief valve system can be identified.	In a classroom.	Correctly.	
29.14	Describe the construction of a typical relief valve lubrication system.	In a classroom.	Correctly.	
29.15	Explain the principles of operation of a recirculatory relief valve lubrication system.	In a classroom.	Correctly.	
29.16	State where the system relief valve is positioned in relation to the other components in the system.	In a classroom.	Correctly.	
29.17	Explain the reason for the position of the system relief valve.	In a classroom.	Correctly.	
29.18	State the engine operating conditions for which the oil pressure and oil flow is optimised.	In a classroom.	Correctly.	
29.19	Explain the effects of varying engine rpm on pump output, bearing housing pressures, and the optimum flow of oil to the bearings.	In a classroom.	Correctly.	
29.20	State the meaning of the following terms: a. Under oiling. b. Over oiling.	In a classroom.	Correctly.	
29.21	Recognise and describe the flow of oil through a typical pressure relief valve lubrication system.	In a classroom or workshop, given examples.	Correctly.	

Nº (a)	ENABLING OBJECTIVES (b)	CONDITIONS (c)	STANDARDS (d)	REFERENCE (e)
29.22	State the disadvantages of a PRV system.	In a classroom.	Correctly.	
29.23	Explain how bearing housing pressure can be used to augment (modify) the value of the relief valve spring.	In a classroom.	Correctly.	
29.24	Explain how a scavenge backed pressure relief valve system can be identified.	In a classroom.	Correctly.	
29.25	Describe the construction of a typical scavenge backed pressure relief valve lubrication system.	In a classroom.	Correctly.	
29.26	Recognise and describe the flow of oil through a typical scavenge backed relief valve lubrication system.	In a classroom.	Correctly.	
29.27	Explain how a full flow system can be identified.	In a classroom.	Correctly.	
29.28	State the reason for the introduction of full flow systems.	In a classroom.	Correctly.	
29.29	Explain what is meant by the term 'full flow'.	In a classroom.	Correctly.	
29.30	Explain the principles of operation of a recirculatory 'full flow' lubrication system.	In a classroom.	Correctly.	
29.31	State the relationship between engine rpm, oil pressure and oil flow rate to the consumers.	In a classroom.	Correctly.	
29.32	Explain the purpose of a metered spill.	In a classroom.	Correctly.	
29.33	State the purpose of the relief valve in a full flow system.	In a classroom.	Correctly.	
29.34	Recognise and describe the flow of oil through a typical 'full flow' lubrication system.	In a classroom or workshop, shown examples.	Correctly.	
29.35	State the purpose of a vent system.	In a classroom.	Correctly.	
29.36	State the typical areas from which air is vented.	In a classroom.	Correctly.	
29.37	State the purpose of restrictors in vent lines.	In a classroom.	Correctly.	
29.38	Describe the operation of a typical vent sub-system.	In a classroom.	Correctly.	
29.39	Explain the effects of a blockage in the air vent system.	In a classroom.	Correctly.	
29.40	State where information relating to an oil system's capacity is specified.	In a classroom.	Correctly.	
29.41	Explain why only a proportion of the total system is usable.	In a classroom.	Correctly.	
29.42	State the need for monitoring engine oil consumption.	In a classroom.	Correctly.	
29.43	State where engine oil replenishments are recorded.	In a classroom.	Correctly.	
29.44	State how engine oil consumption can be monitored.	In a classroom.	Correctly.	
29.45	State where information relating to an engine's typical oil usage rate is specified.	In a classroom.	Correctly.	
29.46	State the factors that effect engine oil consumption rates.	In a classroom.	Correctly.	
29.47	State the occasions when engine oil level is checked.	In a classroom.	Correctly.	
29.48	State the occasions when oil system draining/flushing is required. End of 29.0	In a classroom.	Correctly.	

TRADE TRAINING

SECTION: P25A GAS TURBINES

SUBJECT: 30.0 OIL SYSTEMS CONSOLIDATION

TRAINING OBJECTIVE (a)	REFERENCE (b)	ALLOCATION OF PERIODS (c)	Syll Hrs (e)	No of CELLS (f)	INSTR HOURS (g)
30.0 Consolidate gas turbine engine oil systems with reasoning and practical exercises.	JPS P.6, P.17	Classroom	0.00		0.00
		Practical	16.00	4	64.00
		Total	16.00		64.00

EQUIPMENT (h)	PUBLICATIONS (i)		
		FILMS/VIDEOS	
	Nº (j)	TITLE (k)	TIME (l)

Nº (a)	ENABLING OBJECTIVES (b)	CONDITIONS (c)	STANDARDS (d)	REFERENCE (e)
30.1	State the occasions that will call for component removal/replacement.	In a classroom.	Correctly.	
30.2	State the need for 'standard practices'.	In a classroom.	Correctly.	
30.3	State the importance of maintaining a minimum clearance between pipes and assemblies.	In a classroom.	Correctly.	
30.4	State the correct methods to be used for the following: a. Pipe fitting. b. Seal fitting. c. Threaded coupling assembling.	In a classroom.	Correctly.	
30.5	State the purpose of seals.	In a classroom.	Correctly.	
30.6	State the types of seals commonly used for oil pipes.	In a classroom.	Correctly.	
30.7	State how seals are identified and coded and the reasons for different seal materials.	In a classroom.	Correctly.	
30.8	State the occasions when seals are to be replaced.	In a classroom.	Correctly.	
30.9	State where the standard practices for maintenance activities is defined.	In a classroom.	Correctly.	
30.10	Identify, locate and describe the function of the components of a lubrication system.	In a workshop on a training engine.	Correctly.	
30.11	Carry out the removal/refit of oil system components of a gas turbine engine and complete all relevant documentation.	In a workshop on a training engine.	Correctly.	
30.12	State the need for Personal Protective Equipment (PPE).	In a classroom.	Correctly.	
30.13	List the hazards associated with oil system maintenance tasks.	In a classroom.	Correctly.	
30.14	State the minimum level of PPE required and the safety precautions to be observed when carrying out oil system maintenance.	In a classroom.	Without error.	
30.15	State the actions to be taken in the event of an oil spillage.	In a classroom.	Correctly.	
30.16	State the correct procedure for oil disposal.	In a classroom.	Correctly.	
30.17	State the standard practices to be adopted when undertaking maintenance on oil systems and their components. End of 30.0	In a classroom.	Correctly.	

TRADE TRAINING

SECTION: P25A GAS TURBINES

SUBJECT: 31. ENGINE HEALTH MONITORING

TRAINING OBJECTIVE (a)	REFERENCE (b)	ALLOCATION OF PERIODS (c)	Syll Hrs (e)	No of CELLS (f)	INSTR HOURS (g)
31.0 State the reason for, the principles of and the methods of health monitoring on gas turbine engines.	BTEC 14574F E5 BTEC 14584/3	Classroom	2.00	1	2.00
		Practical	2.00	2	4.00
		Total	4.00		6.00

EQUIPMENT (h)	PUBLICATIONS (i)		
	FILMS/VIDEOS		
	Nº (j)	TITLE (k)	TIME (l)

Nº (a)	ENABLING OBJECTIVES (b)	CONDITIONS (c)	STANDARDS (d)	REFERENCE (e)
31.1	Explain the meaning of the terms: a. Condition-based maintenance. b. Condition monitoring.	In a classroom.	Correctly.	
31.2	State the purpose of health monitoring on gas turbine engines.	In a classroom.	Correctly.	
31.3	State the methods of health monitoring on gas turbine engines.	In a classroom.	Correctly.	
31.4	State the purpose and aims of Wear Debris Monitoring (WDM).	In a classroom.	Correctly.	
31.5	Explain the basic principles and procedures of the following WDM techniques: a. Wear Debris Analysis. b. Spectrometric Oil Analysis. c. X-ray Fluorescence (XRF). d. Scanning Electron Microscope (SEM).	In a classroom.	Correctly.	
31.6	State who carries out WDM.	In a classroom.	Correctly.	
31.7	State the correct procedure for the removal and replacement of MDPs.	In a classroom.	Correctly.	
31.8	State the correct procedure for taking oil samples (SOAP).	In a classroom.	Correctly.	
31.9	Identify the documentation associated with MDP/SOAP sampling.	In a classroom, shown examples.	Correctly.	
31.10	State the purpose of EHUMS and the typical parameters monitored by such systems.	In a classroom.	Correctly.	
31.11	State the meaning of the terms: a. Low cycle fatigue (LCF). b. LCF cycle.	In a classroom.	Correctly.	
31.12	State how information can be accessed and downloaded from a typical engine monitoring system.	In a classroom.	Correctly.	
31.13	State the purpose of vibration monitoring.	In a classroom.	Correctly.	
31.14	State typical causes/sources of vibration.	In a classroom.	Correctly.	
31.15	State the meaning of the terms: a. LP order vibration. b. HP order vibration. c. Broadband vibration.	In a classroom.	Correctly.	
31.16	State how vibration monitoring is achieved.	In a classroom.	Correctly.	
31.17	Identify typical vibration monitoring equipment.	In a classroom or workshop, shown examples.	Correctly.	
31.18	Locate and identify health-monitoring components and carry out practical exercises. End of 31.0	In a workshop, given components and exercises.		

TRADE TRAINING

SECTION: P25A GAS TURBINES

SUBJECT: 32. TYPES OF FUEL

TRAINING OBJECTIVE (a)	REFERENCE (b)	ALLOCATION OF PERIODS (c)	Syll Hrs (e)	No of CELLS (f)	INSTR HOURS (g)
32.0 State the requirements of and the types of fuel used in a gas turbine engine.	JPS P.11	Classroom	2.00	1	2.00
		Practical	0.00		0.00
		Total	2.00		2.00

EQUIPMENT (h)	PUBLICATIONS (i)
	AP3456 State and define the requirements of the fuels used in gas turbine engines.

FILMS/VIDEOS		
Nº (j)	TITLE (k)	TIME (l)

Nº (a)	ENABLING OBJECTIVES (b)	CONDITIONS (c)	STANDARDS (d)	REFERENCE (e)
32.1	State and define the requirements of the fuels used in gas turbine engines.	In a classroom.	Correctly.	
32.2	Explain the meaning of the term 'specific gravity' (SG).	In a classroom.	Correctly.	
32.3	State how the SG of fuel can be determined.	In a classroom.	Correctly.	
32.4	Explain the meaning of the term 'calorific value' (CV).	In a classroom.	Correctly.	
32.5	Explain that the CV of a fuel can be expressed as energy per unit volume (MJ/ltr) or energy per unit mass (MJ/kg).	In a classroom.	Correctly.	
32.6	State the effects of changes in fuel specific gravity.	In a classroom.	Correctly.	
32.7	Explain the need for and the purpose of the following additives used in gas turbine fuels: a. Lubricity additive (AL61). b. Fuel system icing inhibitor (FSII-AL41). c. AL48.	In a classroom.	Correctly.	
32.8	State the types of gas turbine fuels and how they are identified.	In a classroom.	Correctly.	
32.9	State where the correct fuel grade for an aircraft is specified.	In a classroom.	Correctly.	
32.10	Recognise alternative fuel designations likely to be met on detachments.	In a classroom, shown examples of alternative fuel designations.	Correctly.	
32.11	State the operational effects of a change of fuel grade.	In a classroom.	Correctly.	
32.12	State the potential sources/causes of fuel contamination.	In a classroom.	Correctly.	
32.13	State the effects and consequences of fuel contamination.	In a classroom.	Correctly.	
32.14	State how contaminants can be identified. End of 32.0	In a classroom.	Correctly.	

TRADE TRAINING

SECTION: P25A GAS TURBINES

SUBJECT: 33. ENGINE FUEL SYSTEM

TRAINING OBJECTIVE (a)	REFERENCE (b)	ALLOCATION OF PERIODS (c)	Syll Hrs (e)	No of CELLS (f)	INSTR HOURS (g)
33.0 State the purpose of and the requirements of a gas turbine engine fuel system.	JPS P.11 BTEC 14584/3	Classroom	4.00	1	4.00
		Practical	0.00		0.00
		Total	4.00		4.00

EQUIPMENT (h)	PUBLICATIONS (i)

FILMS/VIDEOS		
Nº (j)	TITLE (k)	TIME (l)

Nº (a)	ENABLING OBJECTIVES (b)	CONDITIONS (c)	STANDARDS (d)	REFERENCE (e)
33.1	State the need for engine fuel control systems.	In a classroom.	Correctly.	
33.2	State the purpose of the fuel system.	In a classroom.	Correctly.	
33.3	State the general requirements of an engine fuel system.	In a classroom.	Correctly.	
33.4	State the meaning of the following terms in relation to engine fuel systems: a. Open loop control system. b. Closed loop system.	In a classroom.	Correctly.	
33.5	Describe the basic configuration of an engine fuel system to block diagram level.	In a classroom.	Correctly.	
33.6	State the purpose of the low pressure system.	In a classroom.	Correctly.	
33.7	State the purpose of the high pressure system.	In a classroom.	Correctly.	
33.8	List the factors that determine the amount of fuel delivered to the engine.	In a classroom.	Correctly.	
33.9	Explain the need to respond to changes in: a. Forward speed. b. Altitude. c. Acceleration. d. Engine rpm. e. Gas temperature.	In a classroom.	Correctly.	
33.10	Explain the need for engine acceleration control.	In a classroom.	Correctly.	
33.11	State the purpose and requirements of acceleration control systems.	In a classroom.	Correctly.	
33.12	Explain the principles of acceleration control.	In a classroom.	Correctly.	
33.13	Explain the need to limit: a. Maximum engine rpm. b. Maximum engine gas stream temperature.	In a classroom.	Correctly.	
33.14	Name the following engine fuel system control methods: a. Mechanical. b. Hydro-mechanical. c. Electro-mechanical.	In a classroom.	Correctly.	
33.15	Explain that fuel system design and construction will depend on the aircraft types flight envelope. End of 33.0	In a classroom.	Correctly.	

TRADE TRAINING

SECTION: P25A GAS TURBINES

SUBJECT: 34. FUEL SYSTEM CONSTRUCTION

TRAINING OBJECTIVE (a)	REFERENCE (b)	ALLOCATION OF PERIODS (c)	Syll Hrs (e)	No of CELLS (f)	INSTR HOURS (g)
34.0 Describe the construction and basic principles of operation of the components and flow control features of a gas turbine engine fuel system.	JPS P.11 BTEC 14584/3	Classroom	8.00	1	8.00
		Practical	0.00		0.00
		Total	8.00		8.00

EQUIPMENT (h)	PUBLICATIONS (i)		
		FILMS/VIDEOS	
	Nº (j)	TITLE (k)	TIME (l)

Nº (a)	ENABLING OBJECTIVES (b)	CONDITIONS (c)	STANDARDS (d)	REFERENCE (e)
34.1	Explain the advantages of locating the fuel cooled oil cooler in: a. The LP system. b. The HP system.	In a classroom.	Correctly.	
34.2	State the need for and the purpose of an LP cock.	In a classroom.	Correctly.	
34.3	Describe the construction arrangement of a typical LP cock.	In a classroom.	Correctly.	
34.4	State how the LP cock is typically actuated.	In a classroom.	Correctly.	
34.5	Explain why the LP cock is never closed when the engine is running.	In a classroom.	Correctly.	
34.6	State the purpose of the LP pump.	In a classroom.	Correctly.	
34.7	Describe the construction of a typical impeller type pump.	In a classroom.	Correctly.	
34.8	Describe where the pump is mounted and how it is driven.	In a classroom.	Correctly.	
34.9	State the effects of increasing rpm on pump output.	In a classroom.	Correctly.	
34.10	State the methods that can be used to identify LP pump failure.	In a classroom.	Correctly.	
34.11	State where an LP fuel pressure switch would be located/positioned.	In a classroom.	Correctly.	
34.12	State the purpose of the LP fuel filter.	In a classroom.	Correctly.	
34.13	Describe the construction of typical LP fuel filters and filter housing.	In a classroom.	Correctly.	
34.14	State the effect of the filter on flow pressure.	In a classroom.	Correctly.	
34.15	State the methods that can be used to indicate a blocked filter.	In a classroom.	Correctly.	
34.16	State the purpose of a centrifugal fuel filter.	In a classroom.	Correctly.	
34.17	Describe the construction and principles of operation of a centrifugal fuel filter.	In a classroom.	Correctly.	
34.18	Explain why a secondary filter is required downstream of a centrifugal filter.	In a classroom.	Correctly.	
34.19	Explain what is meant by the term 'water sediment checks'.	In a classroom.	Correctly.	
34.20	State where information relating to filter cleaning is specified.	In a classroom.	Correctly.	
34.21	State where filter cleaning is recorded.	In a classroom.	Correctly.	
34.22	State the purpose of a differential pressure switch.	In a classroom.	Correctly.	
34.23	State where a typical differential pressure switch would be located.	In a classroom.	Correctly.	
34.24	Describe the construction and principles of operation of a differential pressure switch.	In a classroom.	Correctly.	
34.25	State the purpose of an LP fuel pressure switch.	In a classroom.	Correctly.	
34.26	Explain the principles of operation of an LP fuel pressure switch.	In a classroom.	Correctly.	
34.27	State the purpose of the High Pressure (HP) fuel pump.	In a classroom.	Correctly.	
34.28	State the types of High Pressure pump in common use.	In a classroom.	Correctly.	
34.29	Describe the construction of a simple variable stroke multi-plunger pump.	In a classroom.	Correctly.	
34.30	Explain the terms: a. Camplate. b. Swashplate.	In a classroom.	Correctly.	

Nº (a)	ENABLING OBJECTIVES (b)	CONDITIONS (c)	STANDARDS (d)	REFERENCE (e)
34.31	Explain the reason for the kidney shaped ports.	In a classroom.	Correctly.	
34.32	State the purpose of the slipper pads and explain how they are lubricated.	In a classroom.	Correctly.	
34.33	Explain the forces influencing the movement (position) of the servo piston and hence the position of the cam plate and pump output.	In a classroom.	Correctly.	
34.34	Explain the principles of operation of the variable stroke multi plunger pump.	In a classroom.	Correctly.	
34.35	State the maximum output (flow rate) of the variable stroke multi plunger pump.	In a classroom.	Correctly.	
34.36	Explain the need for and the purpose of a maximum rpm governor.	In a classroom.	Correctly.	
34.37	Describe the typical construction and principles of operation of a centrifugal governor.	In a classroom.	Correctly.	
34.38	Explain the difference between a tension and a compression spring and how they are illustrated.	In a classroom.	Correctly.	
34.39	Explain the effects of changes in fuel specific gravity on the operation of a centrifugal governor.	In a classroom.	Correctly.	
34.40	Describe the typical construction and principles of operation of a hydro-mechanical governor.	In a classroom.	Correctly.	
34.41	Explain why the hydro-mechanical governor does not need to be adjusted for changes in fuel density.	In a classroom.	Correctly.	
34.42	State the advantages of using a gear type HP fuel pump.	In a classroom.	Correctly.	
34.43	Describe the construction and principles of operation of the gear type pump.	In a classroom.	Correctly.	
34.44	Describe how the output of the gear type pump is regulated.	In a classroom.	Correctly.	
34.45	Explain how maximum engine rpm is controlled.	In a classroom.	Correctly.	
34.46	State the principle of operation of a simple flow control system.	In a classroom.	Correctly.	
34.47	State the purpose of the main fuel control unit in a hydro mechanical simple flow control system.	In a classroom.	Correctly.	
34.48	List four engine parameters that are automatically controlled to ensure engine operating limitations are not exceeded.	In a classroom.	Correctly.	
34.49	Identify the control elements incorporated within a typical hydro-mechanical fuel control unit.	In a classroom, given a fuel system diagram.	Correctly.	
34.50	Describe the general construction and principles of operation of the barometric section of a typical flow control unit.	In a classroom.	Correctly.	
34.51	Explain why two equal area capsules are used for the capsule assembly.	In a classroom.	Correctly.	
34.52	Explain the purpose of the evacuated capsule.	In a classroom.	Correctly.	
34.53	Describe the general construction and principles of operation of the pressure drop section of a typical flow control unit.	In a classroom.	Correctly.	
34.54	Explain the conditions for which the pressure drop will remain constant.	In a classroom.	Correctly.	
34.55	Explain how the value of the pressure drop constant changes with altitude.	In a classroom.	Correctly.	

Nº (a)	ENABLING OBJECTIVES (b)	CONDITIONS (c)	STANDARDS (d)	REFERENCE (e)
34.56	Explain which force is used to modify the pressure drop value.	In a classroom.	Correctly.	
34.57	Describe the purpose and operation of the power limiter.	In a classroom.	Correctly.	
34.58	State the meaning of the term 'dashpot throttle'.	In a classroom.	Correctly.	
34.59	Describe the general construction and principles of operation of a dashpot throttle.	In a classroom.	Correctly.	
34.60	Explain the need for start-up and idling fuel flows.	In a classroom.	Correctly.	
34.61	Explain the need to control engine acceleration during engine starting.	In a classroom.	Correctly.	
34.62	Explain the principles of acceleration control using a dashpot throttle.	In a classroom.	Correctly.	
34.63	Describe how the signal for top temperature control is typically generated.	In a classroom.	Correctly.	
34.64	Describe how the signal for LP shaft speed control is typically generated.	In a classroom.	Correctly.	
34.65	Describe the general construction and principles of operation of a top temperature and speed control section of a typical flow control unit.	In a classroom.	Correctly.	
34.66	State the purpose of a pressure raising valve.	In a classroom.	Correctly.	
34.67	State the need for and the purpose of a HP cock.	In a classroom.	Correctly.	
34.68	State how a HP cock can be operated.	In a classroom.	Correctly.	
34.69	Explain how the pilot's throttle control movement is transmitted to the main engine fuel control unit.	In a classroom.	Correctly.	
34.70	Identify the features of a typical throttle quadrant.	In a classroom or workshop, shown an example.	Correctly.	
34.71	State the purpose of the main fuel control unit in an electronically controlled fuel system.	In a classroom.	Correctly.	
34.72	State the units incorporated within a typical electronically controlled fuel control unit.	In a classroom.	Correctly.	
34.73	State the meaning of the term variable metering orifice (VMO).	In a classroom.	Correctly.	
34.74	Describe the general construction and principles of operation of a typical VMO.	In a classroom.	Correctly.	
34.75	State the purpose of the pressure drop unit (PDU).	In a classroom.	Correctly.	
34.76	Explain the construction and principles of operation of the PDU.	In a classroom.	Correctly.	
34.77	Explain the principles of acceleration control using compressor pressure ratios.	In a classroom.	Correctly.	
34.78	State the purpose of the main fuel control unit (MFCU) pressure raising valve.	In a classroom.	Correctly.	
34.79	State the purpose of the MFCU purge valve.	In a classroom.	Correctly.	
34.80	State the need to condition fuel for efficient combustion.	In a classroom.	Correctly.	
34.81	State the difference between atomising and vapourising.	In a classroom.	Correctly.	
34.82	State the purpose of fuel nozzles (burners).	In a classroom.	Correctly.	
34.83	Describe the construction and principles of operation of a Simplex fuel nozzle.	In a classroom.	Correctly.	
34.84	State the disadvantages of the Simplex burner.	In a classroom.	Correctly.	
34.85	Describe the construction and principles of operation of a Duplex burner.	In a classroom.	Correctly.	

Nº (a)	ENABLING OBJECTIVES (b)	CONDITIONS (c)	STANDARDS (d)	REFERENCE (e)
34.86	State the need for and the purpose of a pressurising valve.	In a classroom.	Correctly.	
34.87	Describe the construction and principles of operation of a fuel/air spray nozzle.	In a classroom.	Correctly.	
34.88	State the causes and describe the effects of poor burner spray patterns.	In a classroom.	Correctly.	
34.89	Describe the construction and principles of operation of a vapouriser.	In a classroom.	Correctly.	
34.90	Explain the need for starter atomising jets with vapouriser systems.	In a classroom.	Correctly.	
34.91	State the purpose of dump/drain valves.	In a classroom.	Correctly.	
34.92	Describe the construction and operation of a typical drain valve.	In a classroom.	Correctly.	
34.93	State the purpose of a drain collector tank. End of 34.0	In a classroom.	Correctly.	

TRADE TRAINING

SECTION: P25A GAS TURBINES

SUBJECT: 35. BASIC ENGINE FUEL FLOW CONTROL SYSTEM

TRAINING OBJECTIVE (a)	REFERENCE (b)	ALLOCATION OF PERIODS (c)	Syll Hrs (e)	No of CELLS (f)	INSTR HOURS (g)
35.0 State the purpose, construction and principles of operation of a basic engine fuel flow control system.	JPS P.7, P.11 BTEC 14584/3	Classroom	12.00	1	12.00
		Practical	0.00		0.00
		Total	12.00		12.00

EQUIPMENT (h)	PUBLICATIONS (i)		
		FILMS/VIDEOS	
	Nº (j)	TITLE (k)	TIME (l)

Nº (a)	ENABLING OBJECTIVES (b)	CONDITIONS (c)	STANDARDS (d)	REFERENCE (e)
35.1	State the purpose and principles of operation of a typical fuel flow control system.	In a classroom.	Correctly.	
35.2	Explain the principles of flow control.	In a classroom.	Correctly.	
35.3	State the requirements that a fuel flow control fuel system is designed to satisfy.	In a classroom.	Correctly.	
35.4	State the disadvantages of a fuel flow control system.	In a classroom.	Correctly.	
35.5	Identify the main components and control input signals on a given fuel flow control fuel system.	In a classroom or workshop, shown an example fuel flow control fuel system.	Correctly.	
35.6	Explain the need for: a. Starting acceleration control. b. Engine acceleration control.	In a classroom.	Correctly.	
35.7	Describe the operation of a basic flow control fuel system for the following conditions: a. Prior to start. b. Engine start and acceleration to ground idle. c. Acceleration to maximum power. d. Climb to altitude at constant throttle and aircraft speed. e. Increase in forward speed. f. High forward speed at low level and constant throttle. g. Maximum TGT limiting. h. NL and NH limiting. i. Pressure (power) limiting. j. Engine shutdown.	In a classroom.	Correctly.	
35.8	State the relationship between LP and HP spool speeds for changes in ambient conditions.	In a classroom.	Correctly.	
35.9	Explain the effects of the engine automatic controls that ensure engine operating limitations are not exceeded for given ambient conditions.	In a classroom.	Correctly.	
35.10	Identify the adjustments that can be carried out on a given fuel system.	In a classroom or workshop, on a fuel system diagram or on a training engine.	Correctly.	
35.11	State the occasions when adjustments will be required.	In a classroom.	Correctly.	
35.12	Explain why adjustments for installed engine ground performance settings are corrected for ambient conditions.	In a classroom.	Correctly.	
35.13	Explain the term 'pressure altitude'.	In a classroom.	Correctly.	
35.14	State the effects those adjustments have on a given engine performance.	In a classroom.	Correctly.	

Nº (a)	ENABLING OBJECTIVES (b)	CONDITIONS (c)	STANDARDS (d)	REFERENCE (e)
35.15	Interpret engine performance adjustment procedures and graphical information.	In a classroom, given procedures and graphical information.	Correctly.	
35.16	Explain the purpose of wet drains and dry drains.	In a classroom.	Correctly.	
35.17	State the fuel system components typically connected to wet and dry drains.	In a classroom.	Correctly.	
35.18	State the reason for gland seal drains. End of 35.0	In a classroom.	Correctly.	

TRADE TRAINING

SECTION: P25A GAS TURBINES

SUBJECT: 36. ELECTRONIC FUEL CONTROL SYSTEMS

TRAINING OBJECTIVE (a)	REFERENCE (b)	ALLOCATION OF PERIODS (c)	Syll Hrs (e)	No of CELLS (f)	INSTR HOURS (g)
36.0 State the purpose and basic principles of operation of electronic fuel control systems.	JPS P.7, P.11 BTEC 14584/3	Classroom	2.00	1	2.00
		Practical	0.00		0.00
		Total	2.00		2.00

EQUIPMENT (h)	PUBLICATIONS (i)		
		FILMS/VIDEOS	
	Nº (j)	TITLE (k)	TIME (l)

Nº (a)	ENABLING OBJECTIVES (b)	CONDITIONS (c)	STANDARDS (d)	REFERENCE (e)
36.1	State the purpose of an electronic fuel control and management system.	In a classroom.	Correctly.	
36.2	State the advantages of electronic engine control and management systems.	In a classroom.	Correctly.	
36.3	Explain the meaning of the following terms: a. FADEC. b. MECU. c. DECU.	In a classroom.	Correctly.	
36.4	Explain the meaning of the following terms: a. Analogue. b. Digital. c. Transducer. d. Signal conditioner. e. Error unit. f. Function generator. g. f - DC converter. h. Datum.	In a classroom.	Correctly.	
36.6	State the three main elements of a control system.	In a classroom.	Correctly.	
36.7	List the input parameters and conditions that are monitored to effect engine performance control.	In a classroom.	Correctly.	
36.8	State the meaning of the term 'lane' as it applies to electronic fuel control.	In a classroom.	Correctly.	
36.9	State the need for system redundancy.	In a classroom.	Correctly.	
36.10	Explain the principle of lane control.	In a classroom.	Correctly.	
36.11	State the meaning of the term 'reversionary' lane.	In a classroom.	Correctly.	
36.12	Explain the meaning of the following control principles: a. Lowest fuel wins. b. Highest fuel wins.	In a classroom.	Correctly.	
36.13	State the principles of operation of an electronic fuel flow control system.	In a classroom.	Correctly.	
36.14	Annotate a simple block diagram of an electronically controlled fuel system to show the following: a. Electronic control unit. b. MFCU acceleration control section. c. MFCU variable metering orifice (VMO). End of 36.0	In a classroom, given a block diagram of an electronically controlled fuel system..	Correctly.	

TRADE TRAINING

SECTION: P25A GAS TURBINES

SUBJECT: 37. FUEL SYSTEMS CONSOLIDATION

TRAINING OBJECTIVE (a)	REFERENCE (b)	ALLOCATION OF PERIODS (c)	Syll Hrs (e)	No of CELLS (f)	INSTR HOURS (g)
37.0 Consolidate gas turbine engine fuel system training with reasoning and practical tasks.	JPS P.7, P.11, P.17	Classroom	0.00		0.00
		Practical	16.00	4	64.00
		Total	16.00		64.00

EQUIPMENT (h)	PUBLICATIONS (i)		
		FILMS/VIDEOS	
	Nº (j)	TITLE (k)	TIME (l)

Nº (a)	ENABLING OBJECTIVES (b)	CONDITIONS (c)	STANDARDS (d)	REFERENCE (e)
37.1	Undertake fuel system maintenance.	In a workshop, on a training engine.	Correctly.	
37.2	Identify and locate fuel system components on a gas turbine engine.	In a workshop, on a training engine.	Correctly.	
37.3	Carry out the removal/refit of fuel system components, observing all relevant safety precautions.	In a workshop, on a training engine.	Correctly.	
37.4	Complete all relevant documentation.	In a workshop, given relevant documentation.	Correctly.	
37.5	Identify and trace fuel system flow paths.	In a workshop, on a training engine.	Correctly.	
37.6	Consolidate gas turbine engine fuel system training with reasoning and practical exercises.	In a workshop, on a training engine.	Correctly.	

TRADE TRAINING

SECTION: P25A GAS TURBINES

SUBJECT: 38. AIRFLOW CONTROL SYSTEM COMPONENTS

TRAINING OBJECTIVE (a)	REFERENCE (b)	ALLOCATION OF PERIODS (c)	Syll Hrs (e)	No of CELLS (f)	INSTR HOURS (g)
38.0 Describe the construction and principles of operation of the main components of a gas turbine airflow control system.	JPS P.3, P.7 BTEC 14584/3	Classroom	4.00	1	4.00
		Practical	0.00		0.00
		Total	4.00		4.00

EQUIPMENT (h)	PUBLICATIONS (i)		
		FILMS/VIDEOS	
	Nº (j)	TITLE (k)	TIME (l)

Nº (a)	ENABLING OBJECTIVES (b)	CONDITIONS (c)	STANDARDS (d)	REFERENCE (e)
38.1	State the need for and the purpose of airflow control.	In a classroom.	Correctly.	
38.2	State the typical gas turbine engine 'off design' operating conditions for which airflow control is required.	In a classroom.	Correctly.	
38.3	State the methods used to improve the 'off design' performance of gas turbine engines.	In a classroom.	Correctly.	
38.4	Describe the conditions that exist at the following locations within a typical high compression ratio axial flow compressor at low rpm: a. The first stages. b. The final stages.	In a classroom.	Correctly.	
38.5	State the effect of compressor air inlet temperature on the following: a. Mach number. b. Air density and air compressibility. c. The relationship between engine rpm and airflow velocity.	In a classroom.	Correctly.	
38.6	State the parameters that are used to determine the operating limits of an airflow control system.	In a classroom.	Correctly.	
38.7	State the effect of airflow control systems on the engine working line and surge margin.	In a classroom.	Correctly.	
38.8	State the methods used to operate airflow control systems.	In a classroom.	Correctly.	
38.9	State the purpose of inlet guide vanes.	In a classroom.	Correctly.	
38.10	Describe the components of a typical variable inlet guide vane (VIGV) airflow control system.	In a classroom.	Correctly.	
38.11	State the purpose of the following components within a typical VIGV control system: a. Temperature sensor. b. VIGV actuator. c. VIGV operating linkage (and actuating ring).	In a classroom.	Correctly.	
38.12	Describe the construction of the components within a typical VIGV control system.	In a classroom.	Correctly.	
38.13	Explain the principles of operation of the components within a typical VIGV control system.	In a classroom.	Correctly.	
38.14	State what position the VIGVs will be at prior to engine start and explain the reason for this.	In a classroom.	Correctly.	
38.15	Explain what is meant by the following terms: a. Maximum swirl. b. Minimum swirl.	In a classroom.	Correctly.	
38.16	State the typical methods used to achieve air bleeds.	In a classroom.	Correctly.	
38.17	Describe the components of a typical bleed valve airflow control system.	In a classroom.	Correctly.	
38.18	State the purpose of the components within a typical bleed valve system.	In a classroom.	Correctly.	

Nº (a)	ENABLING OBJECTIVES (b)	CONDITIONS (c)	STANDARDS (d)	REFERENCE (e)
38.19	Describe the construction of the components within the system.	In a classroom.	Correctly.	
38.20	Explain the principles of operation of the components within the system.	In a classroom.	Correctly.	
38.21	State the position the bleed valve will be at prior to engine start and explain the reason for this. End of 38.0	In a classroom.	Correctly.	

TRADE TRAINING

SECTION: P25A GAS TURBINES

SUBJECT: 39. METHODS OF AIRFLOW CONTROL

TRAINING OBJECTIVE (a)	REFERENCE (b)	ALLOCATION OF PERIODS (c)	Syll Hrs (e)	No of CELLS (f)	INSTR HOURS (g)
39.0 Explain the principles of operation and the methods used to operate the following airflow control systems:-	JPS P.3 BTEC 14584/3	Classroom	6.00	1	6.00
		Practical	0.00		0.00
a. Variable inlet guide vanes.		Total	6.00		6.00
b. Bleed valves.					
c. Nozzle controlled bleed					

EQUIPMENT (h)	PUBLICATIONS (i)		
	FILMS/VIDEOS		
	Nº (j)	TITLE (k)	TIME (l)

Nº (a)	ENABLING OBJECTIVES (b)	CONDITIONS (c)	STANDARDS (d)	REFERENCE (e)
39.1	Explain the operation of a typical gas turbine engine VIGV airflow control system.	In a classroom.	Correctly.	
39.2	Determine the operating points of a typical VIGV system.	In a classroom.	Correctly.	
39.3	Explain the operation of a typical gas turbine engine bleed valve airflow control system.	In a classroom.	Correctly.	
39.4	Explain the effect of bleed valve operation on TGT and NH. End of 39.0	In a classroom.	Correctly.	

TRADE TRAINING

SECTION: P25A GAS TURBINES

SUBJECT: 40. AIRFLOW CONTROL SYSTEMS CONSOLIDATION

TRAINING OBJECTIVE (a)	REFERENCE (b)	ALLOCATION OF PERIODS (c)	Syll Hrs (e)	No of CELLS (f)	INSTR HOURS (g)
40.0 Consolidate gas turbine engine airflow control systems training with reasoning and practical exercises.	JPS P.3, P.17	Classroom	0.00		0.00
		Practical	4.00	2	8.00
		Total	4.00		8.00

EQUIPMENT (h)	PUBLICATIONS (i)

FILMS/VIDEOS		
Nº (j)	TITLE (k)	TIME (l)

Nº (a)	ENABLING OBJECTIVES (b)	CONDITIONS (c)	STANDARDS (d)	REFERENCE (e)
40.1	Locate and identify airflow control system components on gas turbine engines.	In a workshop, on training engines.	Correctly.	
40.2	Consolidate gas turbine engine airflow control systems training with reasoning and practical exercises. End of 40.0	Using the PST.	Correctly.	

TRADE TRAINING

SECTION: P25A GAS TURBINES

SUBJECT: 41. REHEAT BASIC PRINCIPLES

TRAINING OBJECTIVE (a)	REFERENCE (b)	ALLOCATION OF PERIODS (c)	Syll Hrs (e)	No of CELLS (f)	INSTR HOURS (g)
41.0 Explain the basic principles and requirements of a reheat system.	JPS P.12 BTEC 14584/5	Classroom	4.00	1	4.00
		Practical	0.00		0.00
		Total	4.00		4.00

EQUIPMENT (h)	PUBLICATIONS (i)		
		FILMS/VIDEOS	
	Nº (j)	TITLE (k)	TIME (l)

Nº (a)	ENABLING OBJECTIVES (b)	CONDITIONS (c)	STANDARDS (d)	REFERENCE (e)
41.1	Using the principles of momentum thrust ($m(V_o-V_1)$), explain how thrust augmentation can be achieved.	In a classroom.	Correctly.	
41.2	State the need for and the purpose of a reheat system.	In a classroom.	Correctly.	
41.3	Explain the principle of reheat.	In a classroom.	Correctly.	
41.4	Explain the underlying principle of how an increase in nozzle gas velocity is achieved using reheat.	In a classroom.	Correctly.	
41.5	State the effects of reheat combustion on jet pipe P, V and T.	In a classroom.	Correctly.	
41.6	Explain the effects of an uncontrolled rise in jet pipe total pressure due to reheat combustion.	In a classroom.	Correctly.	
41.7	State the following requirements of a reheat system: a. Selection is by extension of the pilot's normal throttle range. b. Reheat operation must not affect the core engine. c. The system must fail safe. d. The supply fuel must be in a readily combustible form. e. Automatic sequencing on pilot selection.	In a classroom.	Correctly.	
41.8	State how reheat is selected and modulated.	In a classroom.	Correctly.	
41.9	Explain why the turbine pressure ratio is used as a control parameter.	In a classroom.	Correctly.	
41.10	Explain why a fully variable area propelling nozzle is employed on engines fitted with reheat.	In a classroom.	Correctly.	
41.11	State the effect controlled reheat operation will have on engine mass flow.	In a classroom.	Correctly.	
41.12	State the disadvantages of a reheat system.	In a classroom.	Correctly.	
41.13	State the effects of reheat on engine Specific Fuel Consumption (SFC).	In a classroom.	Correctly.	
41.14	Explain why a significant increase in SFC occurs.	In a classroom.	Correctly.	
41.15	State the effects of reheat operation on engine thrust.	In a classroom.	Correctly.	
41.16	Explain why a bypass engine is particularly suitable for afterburning.	In a classroom.	Correctly.	
41.17	Explain how the percentage thrust increase can be determined.	In a classroom.	Correctly.	
41.18	Explain why the percentage thrust increase improves with altitude.	In a classroom.	Correctly.	
41.19	Explain why reheat is used in preference to using an engine of higher thrust rating. End of 41.0	In a classroom.	Correctly.	

TRADE TRAINING

SECTION: P25A GAS TURBINES

SUBJECT: 42. REHEAT SYSTEM CONSTRUCTION

TRAINING OBJECTIVE (a)	REFERENCE (b)	ALLOCATION OF PERIODS (c)	Syll Hrs (e)	No of CELLS (f)	INSTR HOURS (g)
42.0 State the purpose and describe the construction of the components of a basic reheat system.	JPS P.12 BTEC 14584/5	Classroom	2.00	1	2.00
		Practical	2.00	2	4.00
		Total	4.00		6.00

EQUIPMENT (h)	PUBLICATIONS (i)		
		FILMS/VIDEOS	
	Nº (j)	TITLE (k)	TIME (l)

Nº (a)	ENABLING OBJECTIVES (b)	CONDITIONS (c)	STANDARDS (d)	REFERENCE (e)
42.1	State the basic methods of reheat control: a. Pilot's control of fuel flow. b. Pilot's control of nozzle area. c. Electronic control.	In a classroom.	Correctly.	
42.2	Explain the basic control principles for the three methods of reheat control.	In a classroom.	Correctly.	
42.3	State the advantages/disadvantages of the three methods of reheat control.	In a classroom.	Correctly.	
42.4	Describe the basic configuration of a typical hydro-mechanical reheat fuel and nozzle control system to block diagram level.	In a classroom.	Correctly.	
42.5	Explain the term 'water hammer shock'.	In a classroom.	Correctly.	
42.6	Identify and state the purpose of a typical 'water hammer shock' attenuator.	In a classroom or workshop, shown an example.	Correctly.	
42.7	Explain the need for and the purpose of an afterburner fuel pump.	In a classroom.	Correctly.	
42.8	Describe the construction of a typical vapour core pump (VCP).	In a classroom.	Correctly.	
42.9	Explain the principles of operation of a VCP.	In a classroom.	Correctly.	
42.10	Explain how the pump is driven.	In a classroom.	Correctly.	
42.11	Explain the need for pump cooling when the reheat system is not in use.	In a classroom.	Correctly.	
42.12	Explain the need to lubricate drive shaft bearings and seals, and how this is achieved.	In a classroom.	Correctly.	
42.13	Explain the need for and the purpose of fuel metering.	In a classroom.	Correctly.	
42.14	Identify the main and vapour gutter fuel manifolds of a typical burner assembly.	In a workshop, on a training engine.	Correctly.	
42.15	State the purpose of the main and vapour gutter manifolds.	In a classroom.	Correctly.	
42.16	Describe how fuel is conditioned for burning in each case.	In a classroom.	Correctly.	
42.17	State the purpose of the main fuel flow control assemblies.	In a classroom.	Correctly.	
42.18	Identify and state the purpose of the construction features of a typical main fuel (inlet) flow control assembly.	In a workshop, on a training engine.	Correctly.	
42.19	Describe the principles of operation of the main fuel flow control assemblies.	In a classroom.	Correctly.	
42.20	State the purpose and effect of the inlet flow profiled plug.	In a classroom.	Correctly.	
42.21	Describe the flow control assembly's influence on VCP flows and hence main manifold fuel feed.	In a classroom.	Correctly.	
42.22	State the purpose of the vapour gutter fuel flow control assembly.	In a classroom.	Correctly.	
42.23	Identify the construction features of a typical vapour gutter fuel flow control assembly.	In a workshop, on a training engine.	Correctly.	
42.24	State the purpose of a nozzle pressure ratio control unit (NPRCU).	In a classroom.	Correctly.	
42.25	Describe the construction of a typical NPRCU.	In a classroom.	Correctly.	

Nº (a)	ENABLING OBJECTIVES (b)	CONDITIONS (c)	STANDARDS (d)	REFERENCE (e)
42.26	Describe the construction of a typical nozzle ram.	In a classroom.	Correctly.	
42.27	Explain the term 'pre-open' (light up).	In a classroom.	Correctly.	
42.28	Explain the purpose of the 'pre-open' bleed.	In a classroom.	Correctly.	
42.29	Explain how the ‘pre-open’ bleed valve is actuated.	In a classroom.	Correctly.	
42.30	State the purpose and functions of the teleflex feedback control linkage.	In a classroom.	Correctly.	
42.31	Identify and state the purpose of the construction features of the main and primary metering valves assembly on a given system.	In a workshop, on a training engine.	Correctly.	
42.32	State the inputs that influence the degree of fuel flow through the main and primary metering valves.	In a classroom.	Correctly.	
42.33	State the principle of operation of the main and primary metering valves.	In a classroom.	Correctly.	
42.34	Identify the following flow paths of a reheat burner assembly: a. Primary. b. Colander (bypass). c. Gutter.	In a classroom on a reheat fuel flow diagram or in a workshop on a training engine.	Correctly.	
42.35	Explain the basic principles of operation of an electronic reheat nozzle control system.	In a classroom.	Correctly.	
42.36	State the purpose of the nozzle pressure ratio transducer on an electronic reheat nozzle control system. End of 42.0	In a classroom.	Correctly.	

TRADE TRAINING

SECTION: P25A GAS TURBINES

SUBJECT: 43. REHEAT IGNITION

TRAINING OBJECTIVE (a)	REFERENCE (b)	ALLOCATION OF PERIODS (c)	Syll Hrs (e)	No of CELLS (f)	INSTR HOURS (g)
43.0 Explain the methods of reheat ignition.	JPS P.12 BTEC 14584/5	Classroom	2.00	1	2.00
		Practical	0.00		0.00
		Total	2.00		2.00

EQUIPMENT (h)	PUBLICATIONS (i)		
		FILMS/VIDEOS		
	Nº (j)	TITLE (k)	TIME (l)

Nº (a)	ENABLING OBJECTIVES (b)	CONDITIONS (c)	STANDARDS (d)	REFERENCE (e)
43.1	State the need for a separate ignition source for a reheat system.	In a classroom.	Correctly.	
43.2	State the methods typically used to achieve reheat ignition.	In a classroom.	Correctly.	
43.3	Describe the construction of a catalyst igniter.	In a classroom.	Correctly.	
43.4	Explain the principle of operation of catalyst ignition.	In a classroom.	Correctly.	
43.5	Explain the principle of operation of hot shot ignition.	In a classroom.	Correctly.	
43.6	Describe the construction of a typical hot shot ignition accumulator and injection sub-system.	In a classroom.	Correctly.	
43.7	Explain the effect of hot shot fuel injection on the turbine entry temperature.	In a classroom.	Correctly.	
43.8	State the factors influencing the number of fuel injection points typically used.	In a classroom.	Correctly.	
43.9	Identify the three ignition methods. End of 43.0	In a workshop, on training engines.	Correctly.	

TRADE TRAINING

SECTION: P25A GAS TURBINES

SUBJECT: 44. REHEAT SYSTEM OPERATION

TRAINING OBJECTIVE (a)	REFERENCE (b)	ALLOCATION OF PERIODS (c)	Syll Hrs (e)	No of CELLS (f)	INSTR HOURS (g)
44.0 Describe the operation of the components of a reheat system and how the requirements of the system are met.	JPS P.12 BTEC 14584/5	Classroom	4.00	1	4.00
		Practical	0.00		0.00
		Total	4.00		4.00

EQUIPMENT (h)	PUBLICATIONS (i)		
		FILMS/VIDEOS	
	Nº (j)	TITLE (k)	TIME (l)

Nº (a)	ENABLING OBJECTIVES (b)	CONDITIONS (c)	STANDARDS (d)	REFERENCE (e)
44.1	Describe the interaction of typical hydro-mechanical reheat fuel flow control assemblies for the following conditions: a. Reheat selection. b. Reheat modulation. c. Reheat cancellation.	In a classroom.	Correctly.	
44.2	Describe the operation of a given NPRCU for the following conditions: a. Reheat light up. b. Reheat modulation (min to max reheat). c. Reheat modulation (max to min reheat). d. Reheat cancellation.	In a classroom.	Correctly.	
44.3	State how the NPRCU reference pressure (P2/P3) can be adjusted.	In a classroom.	Correctly.	
44.4	Explain the effect of the following adjustments to the P2/P3 bleed: a. Anti-clockwise. b. Clockwise.	In a classroom.	Correctly.	
44.5	State the reheat control method used in the given system. End of 44.0	In the classroom.	Correctly.	

TRADE TRAINING

SECTION: P25A GAS TURBINES

SUBJECT: 45. REHEAT CONSOLIDATION

TRAINING OBJECTIVE (a)	REFERENCE (b)	ALLOCATION OF PERIODS (c)	Syll Hrs (e)	No of CELLS (f)	INSTR HOURS (g)
45.0 Consolidate gas turbine thrust augmentation (Reheat) training with reasoning and practical exercises.	JPS P.12, P.17 BTEC 14584/5	Classroom	0.00		0.00
		Practical	8.00	4	32.00
		Total	8.00		32.00

EQUIPMENT (h)	PUBLICATIONS (i)		
		FILMS/VIDEOS	
	Nº (j)	TITLE (k)	TIME (l)

Nº (a)	ENABLING OBJECTIVES (b)	CONDITIONS (c)	STANDARDS (d)	REFERENCE (e)
45.1	Consolidate gas turbine thrust augmentation (reheat) training with reasoning and practical exercises.	Using the PST.	Correctly.	
45.2	From graphs, interpret the effects of pressure ratio adjustment on the following: a. LP shaft speed (NL). b. HP shaft speed (NH). c. Turbine gas temperature (TGT). End of 45.0	In a classroom, given the relevant graphs.	Correctly.	

TRADE TRAINING

SECTION: P25A GAS TURBINES

SUBJECT: 46. WATER INJECTION

TRAINING OBJECTIVE (a)	REFERENCE (b)	ALLOCATION OF PERIODS (c)	Syll Hrs (e)	No of CELLS (f)	INSTR HOURS (g)
46.0 Explain the principles of operation of water injection thrust augmentation systems.	JPS P.12 BTEC 14584/3	Classroom	2.00	1	2.00
		Practical	0.00		0.00
		Total	2.00		2.00

EQUIPMENT (h)	PUBLICATIONS (i)		
		FILMS/VIDEOS	
	Nº (j)	TITLE (k)	TIME (l)

Nº (a)	ENABLING OBJECTIVES (b)	CONDITIONS (c)	STANDARDS (d)	REFERENCE (e)
46.1	State the need for water injection thrust augmentation systems.	In a classroom.	Correctly.	
46.2	State how the thrust increase is achieved using water injection.	In a classroom.	Correctly.	
46.3	Explain the principles of combustion chamber injection.	In a classroom.	Correctly.	
46.4	Explain why only de-mineralised water should be used in water injection systems. End of 46.0	In a classroom.	Correctly.	

TRADE TRAINING

SECTION: P25A GAS TURBINES

SUBJECT: 47. REASONING AND PRACTICAL EXERCISES

TRAINING OBJECTIVE (a)	REFERENCE (b)	ALLOCATION OF PERIODS (c)	Syll Hrs (e)	No of CELLS (f)	INSTR HOURS (g)
47.0 Enhance gas turbine engine training with reasoning and practical exercises.	JPS P.1, P.17	Classroom	0.00		0.00
		Practical	8.00	4	32.00
		Total	8.00		32.00

EQUIPMENT (h)	PUBLICATIONS (i)		
		FILMS/VIDEOS		
	Nº (j)	TITLE (k)	TIME (l)

Nº (a)	ENABLING OBJECTIVES (b)	CONDITIONS (c)	STANDARDS (d)	REFERENCE (e)
47.1	Consolidate gas turbine engine training with reasoning and practical exercises. End of 47.0	Using the PST.	Correctly.	

TRADE TRAINING

SECTION: P25A GAS TURBINES

SUBJECT: 48. EXAMINATION

TRAINING OBJECTIVE (a)	REFERENCE (b)	ALLOCATION OF PERIODS (c)	Syll Hrs (e)	No of CELLS (f)	INSTR HOURS (g)
48.0 Obtain a pass in an examination.		Classroom	4.00	1	4.00
		Practical	0.00		0.00
		Total	4.00		4.00

EQUIPMENT (h)	PUBLICATIONS (i)		
		FILMS/VIDEOS		
	Nº (j)	TITLE (k)	TIME (l)

Nº (a)	ENABLING OBJECTIVES (b)	CONDITIONS (c)	STANDARDS (d)	REFERENCE (e)
48.1	Complete an examination of P25A gas turbine engines. End of 48.0	In a classroom, under examination conditions.	Attain the examination pass mark.	

TRADE TRAINING

SECTION: P25B GAS TURBINES GENERIC AIRCRAFT MODEL SYSTEMS

SUBJECT: 49. GENERIC AIRCRAFT MODEL (GAM) INTRODUCTION

TRAINING OBJECTIVE (a)	REFERENCE (b)	ALLOCATION OF PERIODS (c)	Syll Hrs (e)	No of CELLS (f)	INSTR HOURS (g)
49.0 Recognise and operate the training equipment of the GAM.		Classroom	4.00	2	8.00
		Practical	4.00	4	16.00
		Total	8.00		24.00

EQUIPMENT (h)	PUBLICATIONS (i)
GAM.	

FILMS/VIDEOS		
Nº (j)	TITLE (k)	TIME (l)

N^{o} (a)	ENABLING OBJECTIVES (b)	CONDITIONS (c)	STANDARDS (d)	REFERENCE (e)
49.1	Locate and identify the cockpit instrument panels and switches of the GAM.	Using the GAM.	Correctly.	
49.2	Locate and identify equipment bays of the GAM.	Using the GAM.	Correctly.	
49.3	Locate, identify and operate ground test equipment.	Using the GAM.	Correctly.	
49.4	Carry out GAM/CBT familiarisation exercises.	Using the GAM.	Correctly.	
49.5	State the need for a logical and systematic approach to fault identification and rectification.	In a classroom.	Correctly.	
49.6	Prepare a P25B assignment. End of 49.0	In the student's own time.	In accordance with BTEC guidelines.	

TRADE TRAINING

SECTION: P25B GAS TURBINES GENERIC AIRCRAFT MODEL SYSTEMS

SUBJECT: 50. ENGINE MONITORING SYSTEMS

TRAINING OBJECTIVE (a)	REFERENCE (b)	ALLOCATION OF PERIODS (c)	Syll Hrs (e)	No of CELLS (f)	INSTR HOURS (g)
50.0 State the purpose of engine monitoring systems and the type of data used.		Classroom	2.00	1	2.00
		Practical	0.00		0.00
		Total	2.00		2.00

EQUIPMENT (h)	PUBLICATIONS (i)
GAM.	

FILMS/VIDEOS		
Nº (j)	TITLE (k)	TIME (l)

Nº (a)	ENABLING OBJECTIVES (b)	CONDITIONS (c)	STANDARDS (d)	REFERENCE (e)
50.1	Identify and state the purpose of engine monitoring systems.	Using the GAM.	Correctly.	
50.2	Identify the types of data used by the GAM engine monitoring systems. End of 50.0	Using the GAM.	Correctly.	

TRADE TRAINING

SECTION: P25B GAS TURBINES GENERIC AIRCRAFT MODEL SYSTEMS

SUBJECT: 51. SECONDARY POWER SYSTEMS

TRAINING OBJECTIVE (a)	REFERENCE (b)	ALLOCATION OF PERIODS (c)	Syll Hrs (e)	No of CELLS (f)	INSTR HOURS (g)
51.0 State the purpose and explain the operation of a secondary power system.	JPS P.8	Classroom	4.00	1	4.00
		Practical	0.00		0.00
		Total	4.00		4.00

EQUIPMENT (h)	PUBLICATIONS (i)
GAM.	

FILMS/VIDEOS		
Nº (j)	TITLE (k)	TIME (l)

Nº (a)	ENABLING OBJECTIVES (b)	CONDITIONS (c)	STANDARDS (d)	REFERENCE (e)
51.1	Identify the major components of a given secondary power system (SPS).	Using the GAM.	Correctly.	
51.2	Describe the operation of the secondary power system for the following conditions: a. On start up. b. During running for ground maintenance. c. Normal engine start cycle. d. Rapid take-off. e. One engine shut down. f. APU protection/overspeed. g. Shut down.	Using the GAM.	Correctly.	
51.3	Describe the operation the secondary power system control unit.	Using the GAM.	Correctly.	
51.4	State the limitations on SPS.	In a classroom.	Correctly.	
51.5	State the safety precautions to be observed when operating secondary power systems. End of 51.0	In a classroom.	Without error.	

TRADE TRAINING

SECTION: P25B GAS TURBINES GENERIC AIRCRAFT MODEL SYSTEMS

SUBJECT: 52. SPS FAULT DIAGNOSIS

TRAINING OBJECTIVE (a)	REFERENCE (b)	ALLOCATION OF PERIODS (c)	Syll Hrs (e)	No of CELLS (f)	INSTR HOURS (g)
52.0 Carry out fault diagnosis on secondary power systems.	JPS P.8, P.13	Classroom	0.00		0.00
		Practical	8.00	4	32.00
		Total	8.00		32.00

EQUIPMENT (h)	PUBLICATIONS (i)
GAM.	

FILMS/VIDEOS		
Nº (j)	TITLE (k)	TIME (l)

Nº (a)	ENABLING OBJECTIVES (b)	CONDITIONS (c)	STANDARDS (d)	REFERENCE (e)
52.1	Recognise indications of faults/defects related to the operation of the GAM SPS.	Using the GAM.	Correctly.	
52.2	Identify the effects/symptoms of faults in the GAM SPS.	Using the GAM.	Correctly.	
52.3	Carry out fault investigations to LRU level.	Using the GAM.	Correctly.	
52.4	Identify the causes of faults encountered in the operation of the GAM SPS.	Using the GAM.	Correctly.	
52.5	Participate in reasoning and practical exercises.	Using the GAM.	Correctly.	
52.6	Complete all the mandatory 'First Line' maintenance documentation associated with the tasks. End of 52.0	In a classroom, given the relevant documentation.	Correctly.	

TRADE TRAINING

SECTION: P25B GAS TURBINES GENERIC AIRCRAFT MODEL SYSTEMS

SUBJECT: 53. LUBRICATION SYSTEM FAULT DIAGNOSIS

TRAINING OBJECTIVE (a)	REFERENCE (b)	ALLOCATION OF PERIODS (c)	Syll Hrs (e)	No of CELLS (f)	INSTR HOURS (g)
53.0 Carry out fault diagnosis on the GAM engine lubrication system and complete all relevant documentation.	JPS P.6, P.13	Classroom	0.00		0.00
		Practical	4.00	4	16.00
		Total	4.00		16.00

EQUIPMENT (h)	PUBLICATIONS (i)
GAM.	

FILMS/VIDEOS		
Nº (j)	TITLE (k)	TIME (l)

N^{o} (a)	ENABLING OBJECTIVES (b)	CONDITIONS (c)	STANDARDS (d)	REFERENCE (e)
53.1	Recognise and explain lubrication system fault indications related to: a. High/low oil pressure. b. High oil temperature. c. Vibration. d. High oil consumption. e. Increase in oil contents.	Using the GAM.	Correctly.	
53.2	Identify the effects/symptoms of faults in the above EO.	Using the GAM.	Correctly.	
53.3	Carry out fault investigations to LRU level.	Using the GAM.	Correctly.	
53.4	Identify the causes of faults encountered in the operation of the GAM lubrication system.	Using the GAM.	Correctly.	
53.5	Participate in reasoning and practical exercises.	Using the GAM.	Correctly.	
53.6	Complete all the mandatory 'First Line' maintenance documentation associated with the tasks. End of 53.0	In a classroom, given the relevant documentation.	Correctly.	

TRADE TRAINING

SECTION: P25B GAS TURBINES GENERIC AIRCRAFT MODEL SYSTEMS

SUBJECT: 54. GAM ENGINE FUEL SYSTEM

TRAINING OBJECTIVE (a)	REFERENCE (b)	ALLOCATION OF PERIODS (c)	Syll Hrs (e)	No of CELLS (f)	INSTR HOURS (g)
54.0 Explain the operation of the GAM electronically controlled main engine fuel system.	JPS P.7, P.11 .	Classroom	6.00	1	6.00
		Practical	0.00		0.00
		Total	6.00		6.00

EQUIPMENT (h)	PUBLICATIONS (i)		
		FILMS/VIDEOS	
	Nº (j)	TITLE (k)	TIME (l)

N^{o} (a)	ENABLING OBJECTIVES (b)	CONDITIONS (c)	STANDARDS (d)	REFERENCE (e)
54.1	Name the inputs and circuits and describe the electrical operation of an electronically controlled main engine fuel system.	In a classroom.	Correctly.	
54.2	Name the components and describe the mechanical operation of an electronically controlled main engine fuel system. End of 54.0	In a classroom.	Correctly.	

TRADE TRAINING

SECTION: P25B GAS TURBINES GENERIC AIRCRAFT MODEL SYSTEMS

SUBJECT: 55. DIGITALLY CONTROLLED ENGINE FUEL SYSTEM

TRAINING OBJECTIVE (a)	REFERENCE (b)	ALLOCATION OF PERIODS (c)	Syll Hrs (e)	No of CELLS (f)	INSTR HOURS (g)
55.0 Carry out fault diagnosis on a digitally controlled main engine fuel system and complete all relevant documentation	JPS P.7, P.11, P.13	Classroom	0.00		0.00
		Practical	8.00	4	32.00
		Total	8.00		32.00

EQUIPMENT (h)	PUBLICATIONS (i)
GAM.	

FILMS/VIDEOS		
Nº (j)	TITLE (k)	TIME (l)

Nº (a)	ENABLING OBJECTIVES (b)	CONDITIONS (c)	STANDARDS (d)	REFERENCE (e)
55.1	Recognise indications of faults/defects related to the operation of the main engine fuel system.	Using the GAM.	Correctly.	
55.2	Identify the effects/symptoms of faults on an electronically controlled main engine fuel system.	Using the GAM.	Correctly.	
55.3	Carry out fault investigations to LRU level.	Using the GAM.	Correctly.	
55.4	Identify the causes of faults encountered in the operation of the GAM main engine fuel system.	Using the GAM.	Correctly.	
55.5	Participate in reasoning and practical exercises.	Using the GAM.	Correctly.	
55.6	Complete the rectification of faults on an electronically controlled main engine fuel system.	Using the GAM.	Correctly.	
55.7	Complete all the mandatory 'First Line' maintenance documentation associated with the tasks. End of 55.0	In a classroom, given the relevant documentation.	Correctly.	

TRADE TRAINING

SECTION: P25B GAS TURBINES GENERIC AIRCRAFT MODEL SYSTEMS

SUBJECT: 56. GAM REHEAT SYSTEM

TRAINING OBJECTIVE (a)	REFERENCE (b)	ALLOCATION OF PERIODS (c)	Syll Hrs (e)	No of CELLS (f)	INSTR HOURS (g)
56.0 Explain the operation and control of the GAM reheat system.	JPS P.12	Classroom	6.00	1	6.00
		Practical	0.00		0.00
		Total	6.00		6.00

EQUIPMENT (h)	PUBLICATIONS (i)		
		FILMS/VIDEOS		
	Nº (j)	TITLE (k)	TIME (l)

N^{o} (a)	ENABLING OBJECTIVES (b)	CONDITIONS (c)	STANDARDS (d)	REFERENCE (e)
56.1	State the purpose and principles of operation and control of the GAM reheat system fuel scheduling system.	In a classroom.	Correctly.	
56.2	Name the inputs and circuits and describe the electrical operation of the GAM reheat system.	In a classroom.	Correctly.	
56.3	State the need for system priming and purging.	In a classroom.	Correctly.	
56.4	Describe the interaction of the hydro-mechanical and electronic elements during modulation of the reheat. End of 56.0	In a classroom.	Correctly.	

TRADE TRAINING

SECTION: P25B GAS TURBINES GENERIC AIRCRAFT MODEL SYSTEMS

SUBJECT: 57. REHEAT FAULT DIAGNOSIS

TRAINING OBJECTIVE (a)	REFERENCE (b)	ALLOCATION OF PERIODS (c)	Syll Hrs (e)	No of CELLS (f)	INSTR HOURS (g)
57.0 Carry out fault diagnosis on a digitally controlled reheat system and complete all relevant documentation.	JPS P.12, P.13	Classroom	0.00		0.00
		Practical	8.00	4	32.00
		Total	8.00		32.00

EQUIPMENT (h)	PUBLICATIONS (i)
GAM.	

FILMS/VIDEOS		
Nº (j)	TITLE (k)	TIME (l)

Nº (a)	ENABLING OBJECTIVES (b)	CONDITIONS (c)	STANDARDS (d)	REFERENCE (e)
57.1	Recognise the indications of faults/defects related to the operation of the main engine fuel system.	Using the GAM.	Correctly.	
57.2	Identify the effects/symptoms of faults on an electronically controlled main engine fuel system.	Using the GAM.	Correctly.	
57.3	Carry out fault investigations to LRU level.	Using the GAM.	Correctly.	
57.4	Identify the causes of faults encountered in the operation of the GAM main engine fuel system.	Using the GAM.	Correctly.	
57.5	Participate in reasoning and practical exercises.	Using the GAM.	Correctly.	
57.6	Complete the rectification of faults on an electronically controlled main engine fuel system.	Using the GAM.	Correctly.	
57.7	Complete all the mandatory 'First Line' maintenance documentation associated with the tasks. End of 57.0	In a classroom, given the relevant documentation.	Correctly.	

TRADE TRAINING

SECTION: P25B GAS TURBINES GENERIC AIRCRAFT MODEL SYSTEMS

SUBJECT: 58. CONSOLIDATION

TRAINING OBJECTIVE (a)	REFERENCE (b)	ALLOCATION OF PERIODS (c)	Syll Hrs (e)	No of CELLS (f)	INSTR HOURS (g)
58.0 Carry out a consolidation exercise.	JPS P.13	Classroom	0.00		0.00
		Practical	8.00	4	32.00
		Total	8.00		32.00

EQUIPMENT (h)	PUBLICATIONS (i)
GAM.	

FILMS/VIDEOS		
Nº (j)	TITLE (k)	TIME (l)

Nº (a)	ENABLING OBJECTIVES (b)	CONDITIONS (c)	STANDARDS (d)	REFERENCE (e)
58.1	Identify the effects/symptoms of given system faults.	Using the GAM.	Correctly.	
58.2	Carry out fault investigations to LRU level using a logical and systematic approach.	Using the GAM.	Correctly.	
58.3	Identify the causes of faults encountered.	Using the GAM.	Correctly.	
58.4	Complete the rectification of faults.	Using the GAM.	Correctly.	
58.5	Complete all the mandatory 'First Line' maintenance documentation associated with the tasks.	In a classroom, given the relevant documentation.	Correctly.	
58.6	Complete a P25B assignment. End of 58.0			

TRADE TRAINING

SECTION: P25B GAS TURBINES GENERIC AIRCRAFT MODEL SYSTEMS

SUBJECT: 59. EXAMINATION

TRAINING OBJECTIVE (a)	REFERENCE (b)	ALLOCATION OF PERIODS (c)	Syll Hrs (e)	No of CELLS (f)	INSTR HOURS (g)
59.0 Obtain a pass in an examination.		Classroom	2.00	1	2.00
		Practical	0.00		0.00
		Total	2.00		2.00

EQUIPMENT (h)	PUBLICATIONS (i)

FILMS/VIDEOS		
Nº (j)	TITLE (k)	TIME (l)

N^{o} (a)	ENABLING OBJECTIVES (b)	CONDITIONS (c)	STANDARDS (d)	REFERENCE (e)
59.1	Complete an examination of P25B gas turbine engines. End of 59.0	In a classroom, under examination conditions.	Attain the examination pass mark.	

TRADE TRAINING

SECTION: P25B GAS TURBINES GENERIC AIRCRAFT MODEL SYSTEMS

SUBJECT: 60. DEBRIEF

TRAINING OBJECTIVE (a)	REFERENCE (b)	ALLOCATION OF PERIODS (c)	Syll Hrs (e)	No of CELLS (f)	INSTR HOURS (g)
60.0 Participate in a debrief of P25A and P25B.		Classroom	2.00	1	2.00
		Practical	0.00		0.00
		Total	2.00		2.00

EQUIPMENT (h)	PUBLICATIONS (i)

FILMS/VIDEOS		
Nº (j)	TITLE (k)	TIME (l)

Nº (a)	ENABLING OBJECTIVES (b)	CONDITIONS (c)	STANDARDS (d)	REFERENCE (e)
60.1	Participate in a debrief of P25A and P25B gas turbine engines. End of 60.0	In a classroom.		

TRADE TRAINING

SECTION: P26 MODULAR ENGINE BAY MAINTENANCE

SUBJECT: 1. DOCUMENTATION

TRAINING OBJECTIVE (a)	REFERENCE (b)	ALLOCATION OF PERIODS (c)	Syll Hrs (d)	No of CELLS (e)	INSTR HOURS (f)
1.0 Complete all relevant documentation related to modular engine maintenance.		Classroom	8.00	1	8.00
		Practical	0.00		0.00
		Total	8.00		8.00

EQUIPMENT (g)	PUBLICATIONS (h)
Selection of relevant paperwork.	AP 100B-01 AP 100C-02 AP 100C-06 AP 100E-01A

FILMS/VIDEOS		
Nº (i)	TITLE (j)	TIME (k)

N^{o} (a)	ENABLING OBJECTIVES (b)	CONDITIONS (c)	STANDARDS (d)	REFERENCE (e)
1.1	State the need for engine life and maintenance to be accurately recorded.	In a classroom.	Correctly.	AP100C-02/06 AP100E-01A
1.2	State the purpose of Engineering Record Cards (ERCs).	In a classroom.	Correctly.	AP100C-06 Lflt 600
1.3	State the need for accurate module life records to be maintained.	In a classroom.	Correctly.	AP100E-01A AP100C-06
1.4	State the need for Engineering Record Cards to be transferred with the appropriate modules during their entire life history.	In a classroom.	Correctly.	AP100C-06 AP100E-01A Lflt 04
1.5	Identify and state the purpose of F740 (Assembly Record) and F750 (Modular Engine Change unit Record Card).	In a classroom, given the relevant forms.	Correctly.	AP100C-06 Lflt 600
1.6	Identify and state the purpose of MOD F735 (Component Log Card), 735A, (Component Record Card) and F753 (Inspection, Test and Modification Certificate).	In a classroom, given the relevant forms.	Correctly.	AP100C-06 Lflt 630, 631 & 609
1.7	Identify and state the purpose of F707MP (F2988B obs) and F707MC (F2988C obs).	In a classroom, given the relevant forms.	Correctly.	AP100C-06 Lflt 300 AP100C-02
1.8	Complete all the documentation required during a modular engine strip and build.	In a workshop, given all relevant documents.	Correctly.	AP100B-01
1.9	Check all engine and modular documentation for accuracy and correct compilation. End of 1.0	In a classroom or workshop.	Correctly.	Engine log cards and AP's listed in EO.s 1.5 to 1.6

TRADE TRAINING

SECTION: P26 MODULAR ENGINE BAY MAINTENANCE

SUBJECT: 2. DANGER AREAS AND HAZARDOUS OPERATIONS

TRAINING OBJECTIVE (a)	REFERENCE (b)	ALLOCATION OF PERIODS (c)	Syll Hrs (d)	No of CELLS (e)	INSTR HOURS (f)
2.0 Identify the danger areas and hazardous operations in an engine maintenance bay.		Classroom	1.00	1	1.00
		Practical	1.00	1	1.00
		Total	2.00		2.00

EQUIPMENT (g)	PUBLICATIONS (h)
	AP100B-10 AP400A-0004 JSP 375 JSP 395

FILMS/VIDEOS		
Nº (i)	TITLE (j)	TIME (k)

N^{o} (a)	ENABLING OBJECTIVES (b)	CONDITIONS (c)	STANDARDS (d)	REFERENCE (e)
2.1	State the safety precautions to be observed to safeguard personnel in a workshop and hangar environment.	In a classroom, workshop or hangar.	Without error.	AP100B-10 AP400A-0004 JSP 375
2.2	State the safety precautions necessary to safeguard personnel and equipment in the workshop.	In a classroom, workshop or hangar.	Without error.	AP400A-0004 JSP 375
2.3	State the extra safety precautions to be observed with regard to: a. Spilt oil and fuel. b. Movement of controls and moving parts of the engines. c. Cleaning, de-greasing and inhibiting materials. d. Moving of engine modules or components, and the security of nuts, bolts, washers and all fastening items. e. Items of Ground Support Equipment End of 2.0	In a classroom, workshop or hangar.	Without error.	AP400A-0004 JSP 375

TRADE TRAINING

SECTION: P26 MODULAR ENGINE BAY MAINTENANCE

SUBJECT: 3. CRANES AND LIFTING TACKLE

TRAINING OBJECTIVE (a)	REFERENCE (b)	ALLOCATION OF PERIODS (c)	Syll Hrs (d)	No of CELLS (e)	INSTR HOURS (f)
3.0 Operate remote controlled overhead and mobile cranes using standard and specialised lifting tackle.		Classroom	1.00	1	1.00
		Practical	2.00	4	8.00
		Total	3.00		9.00

EQUIPMENT (g)	PUBLICATIONS (h)
Didsbury/overhead crane. Various lifting tackle. Hard hats.	AP100E-10 AP119K Series AP119F-001-5F

FILMS/VIDEOS		
Nº (i)	TITLE (j)	TIME (k)

N^{o} (a)	ENABLING OBJECTIVES (b)	CONDITIONS (c)	STANDARDS (d)	REFERENCE (e)
3.1	State the Safety precautions to be observed when using lifting equipment.	In a classroom or workshop.	Without error.	AP119K Series
3.2	State the factors to be considered when selecting lifting equipment.	In a classroom or workshop.	Correctly.	
3.3	State where information regarding the Safe Working Load (SWL) can be found.	In a classroom or workshop.	Correctly.	
3.4	State the reason for the presence of a Supervisor prior to raising or lowering a load.	In a classroom or workshop.	Correctly.	
3.5	State the definition of a competent person (Operation).	In a classroom or workshop.	Correctly.	
3.6	Describe the lifting methods and techniques.	In a classroom or workshop.	Correctly.	
3.7	Adjust and attach the lifting equipment to the load and the lifting machine correctly.	In a workshop, given a load and the relevant lifting equipment.	Correctly.	
3.8	Secure and release a load.	In a workshop, given a load and the relevant lifting equipment.	Correctly.	
3.9	Carryout pre-use examination and when supervised use lifting equipment to raise and lower a load.	In a workshop, given a load and the relevant lifting equipment.	Correctly.	
3.10	Explain the meaning of the phrase ‘Safe Working Load’ (SWL).	In a workshop.	Correctly.	
3.11	Explain the units of Imperial weights and the relationships between the units (lb, cwt, tons).	In a classroom or workshop.	Correctly.	
3.12	Explain the units of Metric weights and the relationships between the units (grams, kilos).	In a classroom or workshop.	Correctly.	
3.13	State the need for a crane/hoist to lift/lower modules during strip/build.	In a classroom or workshop.	Correctly.	
3.14	State the need for specialised slings to lift, lower and transport engines and engine modules.	In a classroom or workshop.	Correctly.	
3.15	Identify and locate the cranes/hoists and specialised slings for engine strip and build.	In a classroom workshop.	Correctly.	
3.16	State the procedure for lifting, lowering and moving a load suspended on a crane/hoist.	In a classroom or workshop.	Correctly.	

Nº (a)	ENABLING OBJECTIVES (b)	CONDITIONS (c)	STANDARDS (d)	REFERENCE (e)
3.17	State the safety precautions to be observed when lifting loads using cranes/hoists.	In a classroom or workshop.	Without error.	AP119K Series
3.18	Operate the crane hoist to lift, lower and move a suspended load. End of 3.0	In a workshop, given a load and the relevant lifting equipment.	Correctly.	

TRADE TRAINING

SECTION: P26 MODULAR ENGINE BAY MAINTENANCE

SUBJECT: 4. PRESERVATION AND PACKING

TRAINING OBJECTIVE (a)	REFERENCE (b)	ALLOCATION OF PERIODS (c)	Syll Hrs (d)	No of CELLS (e)	INSTR HOURS (f)
4.0 Explain the principles of preservation and packing.		Classroom	2.00	1	2.00
		Practical	1.00	1	1.00
		Total	3.00		3.00

EQUIPMENT (g)	PUBLICATIONS (h)
Examples of packing material. Samples of bungs and blanks.	AP102C-17104-3 AP102C-17104-7

FILMS/VIDEOS		
Nº (i)	TITLE (j)	TIME (k)

N^{o} (a)	ENABLING OBJECTIVES (b)	CONDITIONS (c)	STANDARDS (d)	REFERENCE (e)
4.1	Recall the causes of corrosion.	In a classroom.	Correctly.	
4.2	State the effects of dust, dirt, water and other pollutants on uninstalled engines.	In a classroom.	Correctly.	
4.3	Describe the use of bungs, blanks and covers.	In a classroom.	Correctly.	
4.4	State the effects of condensation forming inside un-installed engines.	In a classroom.	Correctly.	
4.5	Describe how condensation is prevented.	In a classroom.	Correctly.	AP102C-17104-7 Chap.3
4.6	State the effects of de-composed and contaminated fuels and oils on engine components.	In a classroom.	Correctly.	
4.7	State the principle of preservation.	In a classroom.	Correctly.	
4.8	State the need to protect rotating assemblies and their bearings with preservatives, oils and greases/	In a classroom.	Correctly.	
4.9	State the need to prevent external corrosion or contamination by sealing the engine in a WVR bag.	In a classroom.	Correctly.	
4.10	Identify examples of: a. Blanks and blanking materials. b. Preservatives, oils and greases. c. De-hydrating materials (New and saturated). d. WVR bags.	In a classroom or workshop, given examples of relevant equipment.	Correctly.	
4.11	State the safety precautions to be observed when handling the preservation and packing materials.	In a classroom.	Correctly.	
4.12	Explain why the extent of the preservation will depend on the time the engine will be uninstalled or not in work.	In a classroom.	Correctly.	AP102C-17104-7 Chap.1
4.13	Explain the general requirements related to short-term storage of: a. Operational aircraft. b. Aircraft removed from flying and stored in a hangar. c. Engines removed from aircraft awaiting work or spares. d. Serviceable engines awaiting allocation to aircraft.	In a classroom.	Correctly.	
4.15	State where the procedures for short term storage of engines, installed or uninstalled, are published. End of 4.0	In a classroom.	Correctly.	

TRADE TRAINING

SECTION: P26 MODULAR ENGINE BAY MAINTENANCE

SUBJECT: 5. UNPACK AND PRE-STRIP EXAMINATION

TRAINING OBJECTIVE (a)	REFERENCE (b)	ALLOCATION OF PERIODS (c)	Syll Hrs (d)	No of CELLS (e)	INSTR HOURS (f)
5.0 Unpack a modular engine, install it in a lay-by stand and carry out a pre-strip examination.		Classroom	0.00		0.00
		Practical	10.00	4	40.00
		Total	10.00		40.00

EQUIPMENT (g)	PUBLICATIONS (h)
Modular engine. Transport and lay-by stand. Crane and associated lifting equipment. Hard hats.	AP102C-17104-7 AP4476A

FILMS/VIDEOS		
Nº (i)	TITLE (j)	TIME (k)

N^{o} (a)	ENABLING OBJECTIVES (b)	CONDITIONS (c)	STANDARDS (d)	REFERENCE (e)
5.1	Identify, locate and state the need for storage containers for aero-engines.	In a workshop, given the relevant equipment.	Correctly.	
5.2	Check the identification and prepare a stored engine to be moved from a WVR bag to a transit/installation stand.	In a workshop, given the relevant equipment.	Correctly.	
5.3	Check the humidity indicators on a WVR bag containing a stored engine.	In a workshop, given the relevant equipment.	Correctly.	
5.4	Remove the engine from a WVR bag and install in a transit/installation stand.	In a workshop, given the relevant equipment.	Correctly.	
5.6	Remove all packing/inhibiting materials and appropriate transit/storage blanks from the engine and re-assemble empty storage container.	In a workshop, given the relevant equipment.	Correctly.	
5.7	Examine the engine for completeness, damage and corrosion.	In a workshop, given the relevant equipment.	Correctly.	
5.8	Complete the appropriate documentation for any missing items or any faults found during examination. End of 5.0	In a workshop, given the relevant documentation.	Correctly.	

TRADE TRAINING

SECTION: P26 MODULAR ENGINE BAY MAINTENANCE

SUBJECT: 6. WVR BAG

TRAINING OBJECTIVE (a)	REFERENCE (b)	ALLOCATION OF PERIODS (c)	Syll Hrs (d)	No of CELLS (e)	INSTR HOURS (f)
6.0 Clean and examine a WVR bag.		Classroom	2.00	1	2.00
		Practical	4.00	4	16.00
		Total	6.00		18.00

EQUIPMENT (g)	PUBLICATIONS (h)
WVR bag. Repair materials. Detergent. Cloth. Kimwipe. Ruler.	AP102C-17104-7

FILMS/VIDEOS		
Nº (i)	TITLE (j)	TIME (k)

N^{o} (a)	ENABLING OBJECTIVES (b)	CONDITIONS (c)	STANDARDS (d)	REFERENCE (e)
6.1	Examine a WVR bag for abrasions, chafing, tearing, splits and closures.	In a workshop, given a WVR bag.	Correctly.	AP102C-17104-7
6.2	Explain the procedure for categorising damage to a WVR bag.	In a workshop.	Correctly.	
6.3	State where faults on a WVR bag are recorded.	In a workshop, given the relevant documentation.	Correctly.	
6.4	Describe the procedure for repairing a WVR bag by the following methods: a. Emergency repair. b. Patch repair. c. Weld repair.	In a workshop, given a WVR bag.	Correctly.	
6.5	State the hazards associated with and describe the use of typical adhesives.	In a workshop, given typical adhesives.	Correctly.	
6.6	Carry out a patch repair on a WVR bag.	In a workshop, given a WVR bag.	Correctly.	
6.7	Fold, pack and store a serviceable WVR bag and complete documentation.	In a workshop, given a WVR bag.	Correctly.	
6.8	Explain the procedure for disposing of WVR bags beyond repair. End of 6.0	In a workshop.	Correctly.	

TRADE TRAINING

SECTION: P26 MODULAR ENGINE BAY MAINTENANCE

SUBJECT: 7. REMOVE/FIT MODULES

TRAINING OBJECTIVE (a)	REFERENCE (b)	ALLOCATION OF PERIODS (c)	Syll Hrs (d)	No of CELLS (e)	INSTR HOURS (f)
7.0 Remove and fit modules of a modular engine.		Classroom	0.00		0.00
		Practical	88.00	4	352.00
		Total	88.00		352.00

EQUIPMENT (g)	PUBLICATIONS (h)
Modular engine. Relevant strip and build slings. Complete tool kits. Relevant servicing staging. Storage racks. Relevant engine specialist tool kits. Specialist precision measuring equipment. Didsbury crane. Hard hats. Relevant paperwork.	AP102C-17104-1A AP102C-17104-1B AP102C-17104-1D AP102C-17104-2 AP102C-17104-3 AP100E-01A/01B

FILMS/VIDEOS		
Nº (i)	TITLE (j)	TIME (k)

N^{o} (a)	ENABLING OBJECTIVES (b)	CONDITIONS (c)	STANDARDS (d)	REFERENCE (e)
7.1	Identify the appropriate F2988/707MP work cards (and the correct sections of the Engine Air Publications), for the removal and fitting of modules.	In a classroom or workshop, given the relevant documentation.	Correctly.	AP102C-17104-1B
7.2	Remove and fit selected modules of a modular engine to include the maintenance of shafts and couplings iaw F2988/707MP work cards and Engine Air Publications.	In a workshop, given the relevant equipment and documentation.	Correctly.	AP102C-17104-1B AP102C-17104-3
7.3	Attach test equipment to a jet pipe thermocouple installation and measure:- a. Resistance. b. Insulation.	In a workshop, given the relevant equipment and documentation.	Correctly.	AP102C-17104-1B
7.4	State the purpose of SNCO's stage checks during the build of an engine.	In a workshop.	Correctly.	
7.5	Carry out regular tool checks as detailed by the section prime instructor.	In a workshop, given a tool kit.	Without error.	
7.6	Complete all the relevant documentation to record removal and fitting of modules. End of 7.0	In a workshop, given the relevant documentation.	Correctly.	

TRADE TRAINING

SECTION: P26 MODULAR ENGINE BAY MAINTENANCE

SUBJECT: 8. CLEAN, INSPECT, PRESERVE AND PACK MODULES

TRAINING OBJECTIVE (a)	REFERENCE (b)	ALLOCATION OF PERIODS (c)	Syll Hrs (d)	No of CELLS (e)	INSTR HOURS (f)
8.0 Clean, inspect, preserve and pack engine modules and components.		Classroom	3.00	1	3.00
		Practical	3.00	4	12.00
		Total	6.00		15.00

EQUIPMENT (g)	PUBLICATIONS (h)
Engine modules. Packing materials. Relevant paperwork. Heat sealer. Inhibiting equipment.	AP102C-17104-7 AP100B-01

FILMS/VIDEOS		
Nº (i)	TITLE (j)	TIME (k)

N^{o} (a)	ENABLING OBJECTIVES (b)	CONDITIONS (c)	STANDARDS (d)	REFERENCE (e)
8.1	State the need to preserve and pack engine modules and/or components.	In a classroom.	Correctly.	AP102C-17104-7 Chap.3
8.2	Explain the following general requirements for preserving and packing modules/components: a. Cleaning and Examination. b. Internal/External preservation treatments. c. Packing.	In a classroom.	Correctly.	
8.3	State where the specific procedures for the preservation and packing of engine modules/components are published.	In a classroom.	Correctly.	
8.4	State the safety precautions to be observed when working with preservation materials and equipment.	In a classroom.	Without error.	
8.5	Identify the types and grades of oils used to inhibit fuel and oil system components before packing.	In a classroom or workshop, given examples.	Correctly.	
8.6	Explain the general procedure for inhibiting fuel and oil system components.	In a classroom or workshop.	Correctly.	
8.7	State where the specific procedures for inhibiting components is published.	In a classroom or workshop.	Correctly.	
8.8	Explain the advantages of sealing components in polythene bags prior to packing.	In a classroom or workshop.	Correctly.	
8.9	Identify a heat-sealing machine, and use to seal polythene bags.	In a workshop, given a heat sealing machine and polythene bags.	Correctly.	
8.10	State the safety precautions to be observed when using heat-sealing machines.	In a workshop.	Without error.	
8.11	State the need for special-to-type (STT) boxes or containers for some engine components, to prevent damage in transit.	In a classroom or workshop.	Correctly.	
8.12	Identify selected STT boxes or containers for certain engine components.	In a workshop, given a selection of STT boxes or containers.	Correctly.	
8.13	State the need to label the components and the packing containers prior to despatch.	In a classroom or workshop.	Correctly.	
8.14	Identify the F731 component labels and state the need for them to be accurately completed.	In a classroom or workshop, given a F731 component label.	Correctly.	AP100B-01 order 0811

Nº (a)	ENABLING OBJECTIVES (b)	CONDITIONS (c)	STANDARDS (d)	REFERENCE (e)
8.15	State the need for the appropriate conditioning stamp on the F731 disposal blocks.	In a classroom or workshop.	Correctly.	AP100B-01 order 0811
8.16	Complete a F731 for an engine component.	In a classroom or workshop, given a F731 component label.	Correctly.	
8.17	Clean, inspect, preserve and pack an engine module or component. End of 8.0	In a workshop, given the relevant equipment and documentation.	Correctly.	AP102C-17104-7

TRADE TRAINING

SECTION: P26 MODULAR ENGINE BAY MAINTENANCE

SUBJECT: 9. BLADE BLENDING

TRAINING OBJECTIVE (a)	REFERENCE (b)	ALLOCATION OF PERIODS (c)	Syll Hrs (d)	No of CELLS (e)	INSTR HOURS (f)
9.0 Examine, blend and dress a damaged LP compressor blade.		Classroom	1.00	1	1.00
		Practical	7.00	4	28.00
		Total	8.00		29.00

EQUIPMENT (g)	PUBLICATIONS (h)
Blade repair tool kit. Various grades of Micromesh. Metal polish. Non permanent markers. Magnifying glass. Relevant paperwork.	AP100C-02 AP102C-17104-1B AP102C-17104-1D

FILMS/VIDEOS		
Nº (i)	TITLE (j)	TIME (k)

N^{o} (a)	ENABLING OBJECTIVES (b)	CONDITIONS (c)	STANDARDS (d)	REFERENCE (e)
9.1	Visually examine component parts of gas turbine engine main section for damage.	In a workshop, given component parts of gas turbine engines.	Correctly.	
9.2	State the need to blend damaged areas to a smooth contour to avoid fatigue failure.	In a classroom or workshop.	Correctly.	
9.3	State the need to limit the depth of blending and the number of blends on each blade of a compressor.	In a classroom or workshop.	Correctly.	AP102C-17104-1B Sect 3B, Chap. 2.2
9.4	State the need to limit the amount of blending on a compressor.	In a classroom or workshop.	Correctly.	
9.5	State the need for blades to be crack tested before and after blending.	In a classroom or workshop.	Correctly.	
9.6	State the need to re-protect an engine compressor blade after blending operations.	In a classroom or workshop.	Correctly.	
9.7	State where blade weight reduction is recorded.	In a classroom or workshop.	Correctly.	
9.8	Describe how to prevent metal filings entering the engine when blending blades in-situ.	In a classroom or workshop.	Correctly.	
9.9	Identify and locate where the blade blending procedures and limits are published.	In a workshop, given the relevant documentation.	Correctly.	AP102C-17104-1D Chap 2.2
9.10	Raise F707BH for LP compressor blade blending.	In a workshop, given the relevant documentation.	Correctly.	
9.11	Identify and locate all special tools and equipment to complete a repair.	In a workshop, given the relevant equipment.	Correctly.	
9.12	Weigh blades before and after use.	In a workshop, given the relevant equipment.	Correctly.	
9.13	Carry out a blade repair in accordance with the relevant engine publication.	In a workshop, given the relevant equipment and documentation.	Correctly.	
9.14	Complete all necessary documentation to record the blending and re-protection of an LP compressor blade. End of 9.0	In a workshop, given the relevant documentation.	Correctly.	AP 100C-02

TRADE TRAINING

SECTION: P26 MODULAR ENGINE BAY MAINTENANCE

SUBJECT: 10. ENGINE CONTROLS

TRAINING OBJECTIVE (a)	REFERENCE (b)	ALLOCATION OF PERIODS (c)	Syll Hrs (d)	No of CELLS (e)	INSTR HOURS (f)
10.0 Set-up and adjust engine controls.		Classroom	1.00	1	1.00
		Practical	12.00	4	48.00
		Total	13.00		49.00

EQUIPMENT (g)	PUBLICATIONS (h)
Relevant engine modules in stands. Relevant engine rigging kit. Relevant engine paperwork. Tool kits.	AP102C-17104-1B Engine log cards and records AP100C-06

FILMS/VIDEOS		
Nº (i)	TITLE (j)	TIME (k)

N^{o} (a)	ENABLING OBJECTIVES (b)	CONDITIONS (c)	STANDARDS (d)	REFERENCE (e)
10.1	State the need for engine and nozzle controls to be accurately set up and adjusted.	In a classroom or workshop.	Correctly.	
10.2	Identify and locate the section/s of the engine Air Publications which detail the procedures for setting up and adjusting engine and nozzle controls.	In a classroom or workshop, given the relevant documentation.	Correctly.	AP102C-17104-1B Sect 4 Chap 8
10.3	Identify and locate F2988/707MP work cards for setting up and adjusting engine and nozzle controls.	In a classroom or workshop, given the relevant documentation.	Correctly.	
10.4	Identify and locate the special tools and equipment required to set up and adjust engine and nozzle controls.	In a workshop, given the relevant equipment.	Correctly.	
10.5	State the safety precautions to be observed when moving engine control levers.	In a workshop.	Without error.	
10.6	Identify and locate the Engine Log Book and determine the correct gaps and clearances for the nozzle controls, engine throttle, HP cock controls and the nozzle-closed area.	In a classroom or workshop, given the relevant documentation.	Correctly.	Engine log book/records.
10.7	Set up and adjust the engine nozzle controls, nozzle indication controls, engine throttle, HP cock controls and nozzle-closed area.	In a workshop, given the relevant equipment.	Correctly.	
10.8	Explain why only component stops must restrict control movement.	In a classroom or workshop.	Correctly.	
10.9	Complete the appropriate documentation to record the nozzle and engine control setting and adjustment.	In a classroom or workshop, given the relevant documentation.	Correctly.	
10.10	Explain the purpose of documentation used during control system maintenance, the purpose of independent control inspections and the method of recording the inspections.	In a classroom or workshop, given the relevant documentation.	Correctly.	
10.11	Complete the appropriate documentation for the independent control checks of the engine throttle and HP cock controls, the nozzle and indication controls.	In a classroom or workshop, given the relevant documentation.	Correctly.	AP100C-06
10.12	Carry out regular tool checks as detailed by the section prime instructor. End of 10.0	In a workshop, given a tool kit.	Without error.	

TRADE TRAINING

SECTION: P26 MODULAR ENGINE BAY MAINTENANCE

SUBJECT: 11. INHIBITING

TRAINING OBJECTIVE (a)	REFERENCE (b)	ALLOCATION OF PERIODS (c)	Syll Hrs (d)	No of CELLS (e)	INSTR HOURS (f)
11.0 Inhibit a modular engine and pack into a WVR bag.		Classroom	0.00		0.00
		Practical	4.00	4	16.00
		Total	4.00		16.00

EQUIPMENT (g)	PUBLICATIONS (h)
Relevant engines. Transport stand with WVR bag. Lay-by stands. Inhibiting rig with adequate OM11. Relevant safety equipment. Overhead crane with relevant lifting equipment. Relevant engine special tools. Hard hats.	AP102C-17104-7 AP4471-A AP102A-0001-1 AP119F-0204-16A AP100C-06

FILMS/VIDEOS		
Nº (i)	TITLE (j)	TIME (k)

N^{o} (a)	ENABLING OBJECTIVES (b)	CONDITIONS (c)	STANDARDS (d)	REFERENCE (e)
11.1	State the need to inhibit an engine, and to carry out preservation and packing.	In a classroom.	Correctly.	
11.2	Identify and locate the sections of the engine Air Publication which deal with inhibiting, preservation and packing.	In a classroom, given the relevant documentation.	Correctly.	AP102C-17104-7
11.3	Identify and locate the MOD Form F707M/F2988 work cards which detail the procedure for inhibiting, preservation and packing of the engine.	In a classroom, given the relevant documentation.	Correctly.	
11.4	Remove the engine from the transit stand and install into a lay-by stand.	In a workshop, given the relevant equipment.	Correctly.	AP102C-17104-7 AP102C-17104-1B
11.5	Identify and locate the special tools and equipment required to inhibit, preserve and pack an engine.	In a workshop, given the relevant equipment.	Correctly.	AP102C-17104-7 AP102C-17104-1B
11.6	Identify and locate the engine stand, complete with WVR bag in which the engine will be stored.	In a workshop, given the relevant equipment.	Correctly.	AP102C-17104-7
11.7	State the safety precautions to be observed during the inhibiting, preservation and packing of an engine.	In a classroom or workshop.	Without error.	
11.8	Inhibit and preserve an engine prior to fitting into a WVR bag.	In a workshop, given the relevant equipment.	Correctly.	AP102C-17104-7 AP119F-02040-16A
11.9	Inspect the WVR bag and check for serviceability.	In a workshop, given the relevant equipment.	Correctly.	AP102C-17104-7
11.10	Fit the engine into a WVR bag in an engine stand.	In a workshop, given the relevant equipment.	Correctly.	AP102C-17104-7 AP102A-0001-1
11.11	Complete all relevant documentation to record the inhibiting, preservation and pack.	In a workshop, given the relevant documentation.	Correctly.	AP100C-06
11.12	Carry out regular tool checks during the inhibiting, preservation and packing task, as detailed by the section prime instructor. End of 11.0	In a workshop, given a tool kit.	Correctly.	

TRADE TRAINING

SECTION: P26 MODULAR ENGINE BAY MAINTENANCE

SUBJECT: 12. EXAMINATION

TRAINING OBJECTIVE (a)	REFERENCE (b)	ALLOCATION OF PERIODS (c)	Syll Hrs (d)	No of CELLS (e)	INSTR HOURS (f)
12.0 Obtain a pass mark in an examination.		Classroom	2.00	1	2.00
		Practical	0.00		0.00
		Total	2.00		2.00

EQUIPMENT (g)	PUBLICATIONS (h)

FILMS/VIDEOS		
Nº (i)	TITLE (j)	TIME (k)

N° (a)	ENABLING OBJECTIVES (b)	CONDITIONS (c)	STANDARDS (d)	REFERENCE (e)
12.1	Undertake and pass an examination on subjects taught during the P26 phases. End of 12.0	In a classroom, under examination conditions.	Attaining the examination pass mark.	

TRADE TRAINING

SECTION: P26 MODULAR ENGINE BAY MAINTENANCE

SUBJECT: 13. DEBRIEF

TRAINING OBJECTIVE (a)	REFERENCE (b)	ALLOCATION OF PERIODS (c)	Syll Hrs (d)	No of CELLS (e)	INSTR HOURS (f)
13.0 Participate in a debrief of P26.		Classroom	2.00	1	2.00
		Practical	0.00		0.00
		Total	2.00		2.00

EQUIPMENT (g)	PUBLICATIONS (h)

FILMS/VIDEOS		
Nº (i)	TITLE (j)	TIME (k)

N^{o} (a)	ENABLING OBJECTIVES (b)	CONDITIONS (c)	STANDARDS (d)	REFERENCE (e)
13.1	Participate in an end of phase debrief of the subjects taught in the P26 phases as laid down in RAF Cosford Training Instructions and Training Squadron ORP. End of 13.0			

TRADE TRAINING

SECTION: P27 AIRCRAFT SYSTEMS

SUBJECT: 1. PURPOSE OF FUEL SYSTEM

TRAINING OBJECTIVE (a)	REFERENCE (b)	ALLOCATION OF PERIODS			
		(c)	Syll Hrs (d)	No of CELLS (e)	INSTR HOURS (f)
1.0 State the purpose of an aircraft fuel system and describe the methods of fuel storage.		Classroom	6.00	1	6.00
		Practical	0.00		0.00
		Total	6.00		6.00

EQUIPMENT (g)	PUBLICATIONS (h)
Examples of fuel tanks.	Course manual.

FILMS/VIDEOS		
Nº (i)	TITLE (j)	TIME (k)

N° (a)	ENABLING OBJECTIVES (b)	CONDITIONS (c)	STANDARDS (d)	REFERENCE (e)
1.1	State the purpose of and the basic requirements for an aircraft fuel system.	In a classroom.	Correctly.	Course manual.
1.2	State the need for the following aircraft fuel system sub-systems:- a. Storage. b. Supply. c. Transfer. d. Refuel/defuel. e. Pressure/vent. f. Contents. g. Management. h. Jettison.	In a classroom.	Correctly.	Course manual.
1.3	Explain the purpose of fuel tanks.	In a classroom.	Correctly.	Course manual.
1.4	State the types of fuel tanks in use and describe their construction.	In a classroom.	Correctly.	Course manual.
1.5	Explain tank numbering.	In a classroom.	Correctly.	Course manual.
1.6	State the safety precautions regarding the handling of fuels.	In a classroom.	Without error.	Course manual.
1.7	State the safety precautions to be observed when working on aircraft fuel systems.	In a classroom.	Without error.	Course manual.
1.8	Consolidate fuel/storage systems with reasoning exercises. End of 1.0	In a classroom.	Correctly.	Course manual.

TRADE TRAINING

SECTION: P27 AIRCRAFT SYSTEMS

SUBJECT: 2. AIRCRAFT FUEL SUPPLY AND TRANSFER

TRAINING OBJECTIVE (a)	REFERENCE (b)	ALLOCATION OF PERIODS (c)	Syll Hrs (d)	No of CELLS (e)	INSTR HOURS (f)
2.0 Describe the operation and construction of an aircraft fuel supply and transfer system.		Classroom	4.00	1	4.00
		Practical	0.00		0.00
		Total	4.00		4.00

EQUIPMENT (g)	PUBLICATIONS (h)
Aircraft fuel system component benches.	Course manual.

FILMS/VIDEOS		
Nº (i)	TITLE (j)	TIME (k)

N^{o} (a)	ENABLING OBJECTIVES (b)	CONDITIONS (c)	STANDARDS (d)	REFERENCE (e)
2.1	State the need for an aircraft fuel supply system.	In a classroom.	Correctly.	Course manual.
2.2	Explain the purpose, operation and describe the construction of the following fuel supply system components:- a. Low pressure fuel pumps (booster pumps). b. Fuel pressure switches. c. Non-return valves. d. Low pressure filters. e. Fuel cocks.	In a classroom.	Correctly.	Course manual.
2.3	Explain the purpose of the following:- a. Fuel system isolation cocks. b. Tank isolation cocks. c. Cross feed cocks.	In a classroom.	Correctly.	Course manual.
2.4	Explain the purpose of negative g traps and double-ended fuel pumps.	In a classroom.	Correctly.	Course manual.
2.5	State the need for a fuel transfer system.	In a classroom.	Correctly.	Course manual.
2.6	State the methods used to transfer fuel.	In a classroom.	Correctly.	Course manual.
2.7	State the importance of C.of G. balancing during fuel transfer.	In a classroom.	Correctly.	Course manual.
2.8	Explain the purpose, operation and describe the construction of the following fuel transfer system components:- a. Transfer pumps b. Fuel ejectors. c. Float switches. d. Reed switches e. Thermisters. f. Float valves. g. Fuel flow proportioners. h. Fuel/no air valves. i. Multi-way fuel cocks. j. Transfer valves.	In a classroom.	Correctly.	Course manual.
2.9	Consolidate fuel supply and transfer systems with reasoning exercises. End of 2.0	In a classroom.	Correctly.	Course manual.

TRADE TRAINING

SECTION: P27 AIRCRAFT SYSTEMS

SUBJECT: 3. REFUEL/DEFUEL SYSTEM

TRAINING OBJECTIVE (a)	REFERENCE (b)	ALLOCATION OF PERIODS (c)	Syll Hrs (d)	No of CELLS (e)	INSTR HOURS (f)
3.0 Describe the operation and construction of an aircraft refuel/defuel system.		Classroom	6.00	1	6.00
		Practical	0.00		0.00
		Total	6.00		6.00

EQUIPMENT (g)	PUBLICATIONS (h)
Aircraft fuel system component benches. Examples of relevant documentation.	Course manual. Aircraft MOD F700 100B-01

FILMS/VIDEOS		
Nº (i)	TITLE (j)	TIME (k)
AF 6514 VT AF 5872 VT	Aviation Fuel Handling Pt1 Pressure Refuelling	20 mins 15 mins

N^{o} (a)	ENABLING OBJECTIVES (b)	CONDITIONS (c)	STANDARDS (d)	REFERENCE (e)
3.1	State the need for aircraft refuel and defuel systems.	In a classroom.	Correctly.	Course manual.
3.2	Explain the two methods of ground refuelling aircraft.	In a classroom.	Correctly.	Course manual.
3.3	Explain the advantages and disadvantages of open-line and pressure refuelling methods.	In a classroom.	Correctly.	Course manual.
3.4	Explain the purpose, operation and describe the construction of the following components fitted in open-line, pressure and mixed refuelling systems. a. Open line filler cap. b. Nato refuel connector. c. Refuel valve. d. Solenoid controlled refuelling valves. e. Water sediment drain / Water drain valves. f. Defuel valve.	In a classroom/workshop given examples from aircraft fuel system component benches.	Correctly.	Course manual.
3.5	Explain the need to ensure that the correct type and grade of fuel is used when refuelling aircraft.	In a classroom.	Correctly.	Course manual.
3.6	Explain the meaning of the phrase ‘fuel load’.	In a classroom.	Correctly.	Course manual.
3.7	Explain the documentation used to record a fuelling operation.	In a classroom, given examples of the relevant aircraft documentation.	Correctly.	Course manual. Aircraft F700 documentation.
3.8	Explain the purpose of an aircraft refuelling control panel.	In a classroom.	Correctly.	Course manual.
3.9	Describe the procedures for fuelling a typical aircraft fuel system.	In a classroom.	Correctly.	Course manual.
3.10	State the safety precautions to be observed when refuelling/defuelling is to be carried out.	In a classroom.	Without error.	Course manual. AP100B-01.
3.11	State the procedures to prevent cavitation of flexible fuel tanks during defuelling.	In a classroom.	Correctly.	Course manual.
3.12	Consolidate refuel/defuel systems with reasoning exercises. End of 3.0	In a classroom.	Correctly.	Course manual.

TRADE TRAINING

SECTION: P27 AIRCRAFT SYSTEMS

SUBJECT: 4. PRESSURISATION AND VENTING SYSTEMS

TRAINING OBJECTIVE (a)	REFERENCE (b)	ALLOCATION OF PERIODS (c)	Syll Hrs (d)	No of CELLS (e)	INSTR HOURS (f)
4.0 Describe the operation and construction of an aircraft fuel pressurisation and venting system.		Classroom	4.00	1	4.00
		Practical	0.00		0.00
		Total	4.00		4.00

EQUIPMENT (g)	PUBLICATIONS (h)
Aircraft fuel system component benches.	Course manual.

FILMS/VIDEOS		
Nº (i)	TITLE (j)	TIME (k)

N^{o} (a)	ENABLING OBJECTIVES (b)	CONDITIONS (c)	STANDARDS (d)	REFERENCE (e)
4.1	State the need for fuel system pressurisation and venting systems.	In a classroom.	Correctly.	Course manual.
4.2	State the advantages and disadvantages of fuel system pressurisation.	In a classroom.	Correctly.	Course manual.
4.3	State the relationship between pressurisation and venting in a pressurised fuel system.	In a classroom.	Correctly.	Course manual.
4.4	Explain the purpose, operation and describe the construction of the following pressurisation and vent components :- a. Inward / outward vent valves. b. Pressure reducing valves. c. Air / no fuel valves. d. Non return valves. e. Vapour release valve. f. Drop tank air and fuel valves. g. Pressure relief valves.	In a classroom/workshop given examples from aircraft fuel system component benches.	Correctly.	Course manual.
4.5	Consolidate pressurisation and venting systems with reasoning exercises. End of 4.0	In a classroom.	Correctly.	Course manual.

TRADE TRAINING

SECTION: P27 AIRCRAFT SYSTEMS

SUBJECT: 5. FUEL CONTENTS GAUGING SYSTEM

TRAINING OBJECTIVE (a)	REFERENCE (b)	ALLOCATION OF PERIODS (c)	Syll Hrs (d)	No of CELLS (e)	INSTR HOURS (f)
5.0 Describe the operation and construction of an aircraft fuel contents gauging system.		Classroom	2.00	1	2.00
		Practical	0.00		0.00
		Total	2.00		2.00

EQUIPMENT (g)	PUBLICATIONS (h)
Aircraft fuel system component benches.	Course manual.

FILMS/VIDEOS		
Nº (i)	TITLE (j)	TIME (k)

N^{o} (a)	ENABLING OBJECTIVES (b)	CONDITIONS (c)	STANDARDS (d)	REFERENCE (e)
5.1	State the need for an aircraft fuel gauging system.	In a classroom.	Correctly.	Course manual.
5.2	Explain the purpose, operation and describe the construction of the following fuel gauging system components:- a. Fuel contents gauging unit. b. Fuel contents indicator. c. Dip stick. d. Drop stick. e. Drip stick.	In a classroom/workshop given examples from aircraft fuel system component benches.	Correctly.	Course manual.
5.3	Explain the need for fuel contents and zero checks.	In a classroom.	Correctly.	Course manual.
5.4	State the need for an aircraft fuel flow metering system.	In a classroom.	Correctly.	Course manual.
5.5	Explain the purpose, operation and describe the construction of Fuel flow metering devices.	In a classroom/workshop given examples from aircraft fuel system component benches.	Correctly.	Course manual.
5.6	Consolidate fuel contents gauging systems and fuel flow metering systems with reasoning exercises. End of 5.0	In a classroom.	Correctly.	Course manual.

TRADE TRAINING

SECTION: P27 AIRCRAFT SYSTEMS

SUBJECT: 6. FUEL MANAGEMENT SYSTEM

TRAINING OBJECTIVE (a)	REFERENCE (b)	ALLOCATION OF PERIODS (c)	Syll Hrs (d)	No of CELLS (e)	INSTR HOURS (f)
6.0 Describe the methods and indications used in an aircraft fuel management system.		Classroom	2.00	1	2.00
		Practical	0.00		0.00
		Total	2.00		2.00

EQUIPMENT (g)	PUBLICATIONS (h)
Aircraft fuel system component benches.	Course manual.

FILMS/VIDEOS		
Nº (i)	TITLE (j)	TIME (k)

N° (a)	ENABLING OBJECTIVES (b)	CONDITIONS (c)	STANDARDS (d)	REFERENCE (e)
6.1	Describe the methods of fuel management used in an aircraft fuel system	In a classroom.	Correctly.	Course manual.
6.2	Describe the different types of indications and warnings used in an aircraft fuel system.	In a classroom/workshop given examples from aircraft fuel system component benches.	Correctly.	Course manual.
6.3	Explain the purpose and operation of fuel jettison valves.	In a classroom.	Correctly.	Course manual.
6.4	Explain the purpose and operation of fuel low level warning system.	In a classroom.	Correctly.	Course manual.
6.5	Consolidate, with reasoning exercises, fuel management systems. End of 6.0	In a classroom.	Correctly.	Course manual.

TRADE TRAINING

SECTION: P27 AIRCRAFT SYSTEMS

SUBJECT: 7. FLIGHT REFUELLING

TRAINING OBJECTIVE (a)	REFERENCE (b)	ALLOCATION OF PERIODS (c)	Syll Hrs (d)	No of CELLS (e)	INSTR HOURS (f)
7.0 State the purpose of flight refuelling and identify the associated equipment and components.		Classroom	2.00	1	2.00
		Practical	0.00		0.00
		Total	2.00		2.00

EQUIPMENT (g)	PUBLICATIONS (h)
Aircraft fuel system component benches.	Course manual. JSP 392.

FILMS/VIDEOS		
Nº (i)	TITLE (j)	TIME (k)
AF 9332 VT	Air to Air Refuelling Pt1	20 mins

N^{o} (a)	ENABLING OBJECTIVES (b)	CONDITIONS (c)	STANDARDS (d)	REFERENCE (e)
7.1	State the purpose of aircraft in-flight refuelling.	In a classroom.	Correctly.	Course manual.
7.2	State the purpose of flight refuelling probes.	In a classroom.	Correctly.	Course manual.
7.3	Describe the construction of a flight refuelling probe and nozzle.	In a classroom/workshop given examples from aircraft fuel system component benches.	Correctly.	Course manual.
7.4	State the purpose of a flight refuelling drogue.	In a classroom.	Correctly.	Course manual.
7.5	Describe the construction of a flight refuelling drogue.	In a classroom/workshop given examples from aircraft fuel system component benches.	Correctly.	Course manual.
7.6	State the safety precautions to be observed when handling Beta lights.	In a classroom.	Without error.	Course manual. JSP 392
7.7	Explain the purpose of a hose drum unit and a flight refuelling pod. End of 7.0	In a classroom.	Correctly.	Course manual.

TRADE TRAINING

SECTION: P27 AIRCRAFT SYSTEMS

SUBJECT: 8. AIRCRAFT PYLON ASSEMBLIES

TRAINING OBJECTIVE (a)	REFERENCE (b)	ALLOCATION OF PERIODS			
		(c)	Syll Hrs (d)	No of CELLS (e)	INSTR HOURS (f)
8.0 Describe the fitting and removal of aircraft pylon assemblies.		Classroom	2.00	1	2.00
		Practical	0.00		0.00
		Total	2.00		2.00

EQUIPMENT (g)	PUBLICATIONS (h)
Aircraft pylon.	Course manual. Aircraft Topic 1.

FILMS/VIDEOS		
Nº (i)	TITLE (j)	TIME (k)

N^{o} (a)	ENABLING OBJECTIVES (b)	CONDITIONS (c)	STANDARDS (d)	REFERENCE (e)
8.1	Describe the purpose of pylon assemblies.	In a classroom.	Correctly.	Course manual.
8.2	Describe the typical systems that can be housed within a pylon assembly.	In a classroom/workshop given an aircraft pylon.	Correctly.	Course manual.
8.3	State where the procedures for removal and fitting of pylons and their relevant access panels, doors, fairings and blanks can be found.	In a classroom.	Correctly.	Course manual. Aircraft Topic 1.
8.4	State the procedures for protecting disconnected system pipelines, controls and electrical cables from damage.	In a classroom.	Correctly.	Course manual.
8.5	State the safety precautions to be observed during lifting operations. End of 8.0	In a classroom.	Without error.	Course manual.

TRADE TRAINING

SECTION: P27 AIRCRAFT SYSTEMS

SUBJECT: 9. PIPELINE AND CONNECTOR COUPLING

TRAINING OBJECTIVE (a)	REFERENCE (b)	ALLOCATION OF PERIODS (c)	Syll Hrs (d)	No of CELLS (e)	INSTR HOURS (f)
9.0 Describe the construction of common pipeline and connector/coupling.		Classroom	6.00	1	6.00
		Practical	0.00		0.00
		Total	6.00		6.00

EQUIPMENT (g)	PUBLICATIONS (h)
Aircraft fuel system component benches. Pipeline and coupling example boards.	Course manual. AP101A-0301-1

FILMS/VIDEOS		
Nº (i)	TITLE (j)	TIME (k)

N° (a)	ENABLING OBJECTIVES (b)	CONDITIONS (c)	STANDARDS (d)	REFERENCE (e)
9.1	State the need for fuel pipelines.	In a classroom.	Correctly.	Course manual.
9.2	State the need to identify fuel system pipelines by standard code, symbols and markings.	In a classroom.	Correctly.	Course manual.
9.3	Describe the construction of and the materials used for rigid fuel pipelines.	In a classroom.	Correctly.	Course manual.
9.4	Describe the construction of and the materials used for fuel flexible hoses and hose assemblies.	In a classroom.	Correctly.	Course manual. AP101A-0301-1
9.5	Identify pipelines and hose assemblies.	In a classroom/workshop given examples from aircraft fuel system component benches and pipeline and coupling boards.	Correctly.	Course manual.
9.6	Identify and describe the construction of the following types of pipeline couplings and connectors :- a. Standard pipe connectors. b. Quick release connector/Self-sealing. c. Banjo connector. d. Simple hose joint. e. HTE coupling. f. Gamma coupling. g. FRS coupling. h. Sliding coupling.	In a classroom/workshop given examples from aircraft fuel system component benches and pipeline and coupling boards.	Correctly.	Course manual.
9.7	Describe the methods of examining pipelines, hose assemblies, couplings and connectors for serviceability.	In a classroom/workshop given examples from aircraft fuel system component benches and pipeline and coupling boards.	Correctly.	Course manual.
9.8	Identify and state the purpose of bonding leads and strips.	In a classroom/workshop given examples from aircraft fuel system component benches and pipeline and coupling boards.	Correctly.	Course manual.

Nº (a)	ENABLING OBJECTIVES (b)	CONDITIONS (c)	STANDARDS (d)	REFERENCE (e)
9.9	Describe the use of lay lines on flexible hose assemblies. End of 9.0	In a classroom/workshop given examples from aircraft fuel system component benches and pipeline and coupling boards.	Correctly.	Course manual. AP101A-0301-1

TRADE TRAINING

SECTION: P27 AIRCRAFT SYSTEMS

SUBJECT: 10. V-BAND CLAMPS

TRAINING OBJECTIVE (a)	REFERENCE (b)	ALLOCATION OF PERIODS (c)	Syll Hrs (d)	No of CELLS (e)	INSTR HOURS (f)
10.0 Identify, remove and refit V-band clamps.		Classroom	2.00	1	2.00
		Practical	1.00	1	1.00
		Total	3.00		3.00

EQUIPMENT (g)	PUBLICATIONS (h)
Aircraft fuel system component benches. Pipeline and coupling example boards. Jaguar Aircraft.	Course manual. Aircraft Topic 1.

FILMS/VIDEOS		
Nº (i)	TITLE (j)	TIME (k)

N^{o} (a)	ENABLING OBJECTIVES (b)	CONDITIONS (c)	STANDARDS (d)	REFERENCE (e)
10.1	Identify the following parts of a V-band clamp:- a. Strap. b. V-grooved segments. c. T-bolt. d. Stiff nut.	In a classroom/workshop given examples from aircraft fuel system component benches and pipeline and coupling boards.	Correctly.	Course manual.
10.2	Examine the items in EO 10.1 for the following defects and faults:- a. Nicks, dents and scratches. b. Distortion. c. Cracks, chafing and fretting. d. Thread damage. e. Rundown torque.	In a classroom/workshop given examples from aircraft fuel system component benches and pipeline and coupling boards.	Correctly.	Course manual.
10.3	Explain the dangers of incorrect rundown torque loading.	In a classroom or workshop.	Correctly.	Course manual.
10.4	Explain the importance of correct minimum installed distance.	In a classroom or workshop.	Correctly.	Course manual.
10.5	Remove and refit V-band clamps.	In a workshop, given clamps fitted to an aircraft	Correctly.	Course manual. Aircraft Topic 1.
10.6	State the typical procedures and safety precautions to be observed when working with V-band clamps. End of 10.0	In a classroom or workshop.	Without error.	Course manual. Aircraft Topic 1.

TRADE TRAINING

SECTION: P27 AIRCRAFT SYSTEMS

SUBJECT: 11. FAULT RECTIFICATION ON AN AIRCRAFT FUEL SYSTEM

TRAINING OBJECTIVE (a)	REFERENCE (b)	ALLOCATION OF PERIODS (c)	Syll Hrs (d)	No of CELLS (e)	INSTR HOURS (f)
11.0 Carry out fault rectification on an aircraft fuel system.		Classroom	0.00		0.00
		Practical	16.00	4	64.00
		Total	16.00		64.00

EQUIPMENT (g)	PUBLICATIONS (h)
Jet Provost and Jaguar aircraft. Associated ground equipment.	Course manual. Aircraft Topic 1. MOD F700. AP 100C-02

FILMS/VIDEOS		
Nº (i)	TITLE (j)	TIME (k)

N^{o} (a)	ENABLING OBJECTIVES (b)	CONDITIONS (c)	STANDARDS (d)	REFERENCE (e)
11.1	Carry out fault rectification on an aircraft fuel system.	In a workshop, given a suitable aircraft and the associated ground equipment.	Correctly.	Course manual. Aircraft Topic 1.
11.2	Select and use appropriate GSE and tools as required during fault rectification.	In a workshop, given a suitable aircraft and the associated ground equipment.	Correctly.	Course manual. Aircraft Topic 1.
11.3	State the need for the following tests to be carried out after any maintenance tasks on a fuel system:- a. Fuel leak test. b. Fuel flow test. c. Fuel contents gauging test.	In a workshop, given a suitable aircraft and the associated ground equipment.	Correctly.	Course manual. Aircraft Topic 1.
11.4	Complete aircraft documentation for fault rectification. End of 11.0	In a workshop, given the relevant aircraft documentation.	Correctly.	Course manual. Aircraft Topic 1. MOD F700 AP100C-02

TRADE TRAINING

SECTION: P27 AIRCRAFT SYSTEMS

SUBJECT: 12. EXAMINE AND TEST FUEL TANKS FOR LEAKS

TRAINING OBJECTIVE (a)	REFERENCE (b)	ALLOCATION OF PERIODS (c)	Syll Hrs (d)	No of CELLS (e)	INSTR HOURS (f)
12.0 Describe the method of examining fuel tanks and methods of testing for leaks.		Classroom	2.00	1	2.00
		Practical	0.00		0.00
		Total	2.00		2.00

EQUIPMENT (g)	PUBLICATIONS (h)
	Course manual. AP106B-0002-1 AP106B-0005-1 AP106B-0100-1

FILMS/VIDEOS		
Nº (i)	TITLE (j)	TIME (k)

N^{o} (a)	ENABLING OBJECTIVES (b)	CONDITIONS (c)	STANDARDS (d)	REFERENCE (e)
12.1	State the safety precautions to be observed when examining fuel tanks.	In a classroom.	Without error.	AP106B-0002-1
12.2	Recognise evidence of fungal growth and other indications of microbiological contamination.	In a classroom.	Correctly.	Course Manual
12.3	Define the following classes of fuel tank leak:- a. Slow seep. b. Seep. c. Heavy seep. d. Running leak.	In a classroom.	Correctly.	AP106B-0005-1
12.4	State the safety precautions to be observed when leak testing fuel tanks.	In a classroom.	Correctly.	AP106B Series Publications
12.5	List the following methods of leak testing fuel tanks:- a. Kerosene with either whiting or french chalk. b. Ammonia and whiting. c. Soap solution or immersion. d. Stand pipe. e. Phenolphthalein/ammonia.	In a classroom.	Correctly.	AP106B-0100-16 AP106B-0005-1
12.6	State the factors which determine the leak test method to be used from EO 12.5. End of 12.0	In a classroom.	Correctly.	

TRADE TRAINING

SECTION: P27 AIRCRAFT SYSTEMS

SUBJECT: 13. FUEL VAPOUR

TRAINING OBJECTIVE (a)	REFERENCE (b)	ALLOCATION OF PERIODS (c)	Syll Hrs (d)	No of CELLS (e)	INSTR HOURS (f)
13.0 State the procedure for removing fuel vapour from fuel tanks.		Classroom	1.00	1	1.00
		Practical	0.00		0.00
		Total	1.00		1.00

EQUIPMENT (g)	PUBLICATIONS (h)
Gas measuring equipment.	AP106B-0002-1

FILMS/VIDEOS		
Nº (i)	TITLE (j)	TIME (k)

N^{o} (a)	ENABLING OBJECTIVES (b)	CONDITIONS (c)	STANDARDS (d)	REFERENCE (e)
13.1	State the need to remove residual fuel and fuel vapour from a fuel tank before commencing any maintenance on it.	In a classroom.	Correctly.	AP106B-0002-1
13.2	State the safety precautions to be observed when removing fuel vapour (venting) from fuel tanks.	In a classroom.	Without error.	AP106B-0002-1
13.3	Describe methods of venting fuel tanks including forced air ventilation.	In a classroom.	Correctly.	AP106B-0002-1
13.4	Identify and state the purpose of a gas measuring instrument.	In a classroom, given a gas measuring instrument.	Correctly.	AP106B-0002-1
13.5	State the importance of air being delivered to the vent hose before it is inserted into and after it is removed from a fuel tank.	In a classroom.	Correctly.	AP106B-0002-1
13.6	State the factors that affect the time required to remove fuel vapour from a fuel tank. End of 13.0	In a classroom.	Correctly.	AP106B-0002-1

TRADE TRAINING

SECTION: P27 AIRCRAFT SYSTEMS

SUBJECT: 14. PACKING AND STORING FLEXIBLE FUEL TANKS

TRAINING OBJECTIVE (a)	REFERENCE (b)	ALLOCATION OF PERIODS (c)	Syll Hrs (d)	No of CELLS (e)	INSTR HOURS (f)
14.0 State the procedure for packing and storing aircraft flexible fuel tanks.		Classroom	1.00	1	1.00
		Practical	0.00		0.00
		Total	1.00		1.00

EQUIPMENT (g)	PUBLICATIONS (h)
Flexible fuel tank.	AP106B-0200-16

FILMS/VIDEOS		
Nº (i)	TITLE (j)	TIME (k)

N^{o} (a)	ENABLING OBJECTIVES (b)	CONDITIONS (c)	STANDARDS (d)	REFERENCE (e)
14.1	State the requirements and limitations of storage for an aircraft flexible fuel tank.	In a classroom.	Correctly.	AP106B-0200-16
14.2	Describe the preparation of the work area prior to carrying out any work on a flexible fuel tank.	In a classroom.	Correctly.	AP106B-0200-16
14.3	List the packing materials required to pack an aircraft flexible fuel tank.	In a classroom.	Correctly.	AP106B-0200-16
14.4	State the purpose of isolating metal components from corrugated paper.	In a classroom.	Correctly.	AP106B-0200-16
14.5	State the purpose of attaching warning labels.	In a classroom.	Correctly.	AP106B-0200-16
14.6	Describe the method of folding and packing an aircraft flexible fuel tank.	In a classroom, given a flexible fuel tank.	Correctly.	AP106B-0200-16
14.7	Describe the method of packing a semi-flexible aircraft fuel tank. End of 14.0	In a classroom.	Correctly.	AP106B-0200-16

TRADE TRAINING

SECTION: P27 AIRCRAFT SYSTEMS

SUBJECT: 15. PRE-USE CHECKS ON AIRCRAFT FUEL TANKS

TRAINING OBJECTIVE (a)	REFERENCE (b)	ALLOCATION OF PERIODS (c)	Syll Hrs (d)	No of CELLS (e)	INSTR HOURS (f)
15.0 State the procedure for carrying out pre-use checks on aircraft fuel tanks.		Classroom	1.00	1	1.00
		Practical	0.00		0.00
		Total	1.00		1.00

EQUIPMENT (g)	PUBLICATIONS (h)
Flexible fuel tank.	AP106B-0200-16

FILMS/VIDEOS		
Nº (i)	TITLE (j)	TIME (k)

N^{o} (a)	ENABLING OBJECTIVES (b)	CONDITIONS (c)	STANDARDS (d)	REFERENCE (e)
15.1	State the purpose of pre-use checks on aircraft fuel tanks.	In a classroom.	Correctly.	AP106B-0200-16
15.2	State when a fuel tank would be subject to a pre-use check.	In a classroom.	Correctly.	AP106B-0200-16
15.3	Describe the procedure for carrying out a pre-use check.	In a classroom, given a flexible fuel tank.	Correctly.	AP106B-0200-16
15.4	State the dangers of using fuel tanks that are not compatible with the intended role of the aircraft. End of 15.0	In a classroom.	Correctly.	AP106B-0200-16

TRADE TRAINING

SECTION: P27 AIRCRAFT SYSTEMS

SUBJECT: 16. IDENTIFY, REMOVE AND FIT FUEL TANKS AND COMPONENTS

TRAINING OBJECTIVE (a)	REFERENCE (b)	ALLOCATION OF PERIODS (c)	Syll Hrs (d)	No of CELLS (e)	INSTR HOURS (f)
16.0 Identify, remove and fit aircraft fuel tanks and fuel system components.		Classroom	4.00	1	4.00
		Practical	20.00	4	80.00
		Total	24.00		84.00

EQUIPMENT (g)	PUBLICATIONS (h)
Jet Provost aircraft flexible fuel tank.	Course manual. AP106B-0002-1 AP106B-0200-16 Aircraft Topic 1

FILMS/VIDEOS		
Nº (i)	TITLE (j)	TIME (k)

N^{o} (a)	ENABLING OBJECTIVES (b)	CONDITIONS (c)	STANDARDS (d)	REFERENCE (e)
16.1	State where the information regarding the removal and fitting of aircraft fuel tanks can be found.	In a classroom.	Correctly.	Relevant Aircraft Topic 1
16.2	State the precautions to be observed to safeguard personnel and equipment when carrying out the following:- a. Removing and fitting fuel tanks. b. Entering fuel tanks and tank compartments.	In a classroom.	Correctly.	AP106B-0002-1
16.3	State the actions to be carried out before attempting to remove a fuel tank.	In a classroom.	Correctly.	AP106B-0002-1
16.4	State the general procedure for removing a typical flexible fuel tank and it's associated components.	In a classroom.	Correctly.	Course Manual / Aircraft Topic 1
16.5	State the general procedure for protecting a flexible fuel tank after removal.	In a classroom.	Correctly.	AP106B-0200-16
16.6	State the need to examine fuel tank compartments before fitting fuel tanks.	In a classroom.	Correctly.	AP106B-0200-16
16.7	State the actions to be taken if faults are found in a fuel tank compartment.	In a classroom.	Correctly.	Course Manual / Aircraft Topic 1
16.8	State the general procedure for fitting a typical flexible fuel tank and its associated components.	In a classroom.	Correctly.	AP106B-0200-16
16.9	State the need for the following tests to be carried out after any maintenance tasks on a fuel tank:- a. Fuel leak test. b. Fuel flow test. c. Fuel contents gauging test.	In a classroom.	Correctly.	AP106B-0200-16
16.10	Consolidate fuel tanks with the following practical tasks:- a. Drain a fuel tank. b. Remove fuel vapour from fuel tanks. c. Remove and fit fuel tanks. d. Examine fuel tanks for fungal growth and other contamination. e. Pack and store flexible fuel tanks. f. Carry out a pre-use check on an aircraft fuel tank. End of 16.0	In a workshop, given a Jet Provost aircraft and a flexible fuel tank.	Correctly.	Relevant Aircraft AMM

TRADE TRAINING

SECTION: P27 AIRCRAFT SYSTEMS

SUBJECT: 17. INTEGRAL TANK REPAIRS

TRAINING OBJECTIVE (a)	REFERENCE (b)	ALLOCATION OF PERIODS (c)	Syll Hrs (d)	No of CELLS (e)	INSTR HOURS (f)
17.0 Describe how to repair integral fuel tanks using approved sealing compounds.		Classroom	2.00	1	2.00
		Practical	0.00		0.00
		Total	2.00		2.00

EQUIPMENT (g)	PUBLICATIONS (h)
Examples of temporary fuel tank repairs	AP106B-0005-1

FILMS/VIDEOS		
Nº (i)	TITLE (j)	TIME (k)

N^{o} (a)	ENABLING OBJECTIVES (b)	CONDITIONS (c)	STANDARDS (d)	REFERENCE (e)
17.1	State the precautions to be observed when repairing aircraft fuel tanks and when using approved sealing compounds.	In a classroom.	Without error.	AP106B-0005-1
17.2	Describe the method of:- a. Preparing a tank for application of a sealing compound. b. Preparing and measuring quantities of sealing compounds. c. Applying sealing compounds to fuel tanks.	In a classroom.	Correctly.	AP106B-0005-1
17.3	Describe the methods of temporary repair used on integral fuel tanks. End of 17.0	In a classroom.	Correctly.	AP106B-0005-1

TRADE TRAINING

SECTION: P27 AIRCRAFT SYSTEMS

SUBJECT: 18. FAULT DIAGNOSIS ON AIRCRAFT FUEL SYSTEMS

TRAINING OBJECTIVE (a)	REFERENCE (b)	ALLOCATION OF PERIODS (c)	Syll Hrs (d)	No of CELLS (e)	INSTR HOURS (f)
18.0 Carry out fault diagnosis to identify faults in an aircraft fuel system.		Classroom	14.00	1	14.00
		Practical	20.00	4	80.00
		Total	34.00		94.00

EQUIPMENT (g)	PUBLICATIONS (h)
Animated Fuel System Display. Jaguar Aircraft.	Course manual. Aircraft Topic 1

FILMS/VIDEOS		
Nº (i)	TITLE (j)	TIME (k)

N^{o} (a)	ENABLING OBJECTIVES (b)	CONDITIONS (c)	STANDARDS (d)	REFERENCE (e)
18.1	State the safety precautions to be taken when carrying out maintenance on a fuel system and its components.	In a classroom or workshop.	Correctly.	Course Manual / Aircraft AMM
18.2	List indications or symptoms of faults that are common to fuel systems and its components.	In a classroom or workshop.	Correctly.	Course Manual
18.3	Carry out the following practical tasks:- a. Fault diagnose and isolate faulty components. b. Rectify faults by replacement. c. Determine the serviceability of fuel system components and their sub-assemblies. d. Detail the functional tests required during and after maintenance tasks on an aircraft fuel system. End of 18.0	In a workshop, given the animated fuel system display unit and a Jaguar aircraft	Correctly.	Course Manual / Aircraft Topic 1

TRADE TRAINING

SECTION: P27 AIRCRAFT SYSTEMS

SUBJECT: 19. FIRE DETECTION AND EXTINGUISHING SYSTEMS

TRAINING OBJECTIVE (a)	REFERENCE (b)	ALLOCATION OF PERIODS (c)	Syll Hrs (d)	No of CELLS (e)	INSTR HOURS (f)
19.0 Describe the construction and operation of aircraft fire detection and extinguishing systems.		Classroom	6.00	1	6.00
		Practical	0.00		0.00
		Total	6.00		6.00

EQUIPMENT (g)	PUBLICATIONS (h)
Aircraft fire system component benches and boards.	Course manual. AP107E series AP's

FILMS/VIDEOS		
Nº (i)	TITLE (j)	TIME (k)

N° (a)	ENABLING OBJECTIVES (b)	CONDITIONS (c)	STANDARDS (d)	REFERENCE (e)
19.1	State the causes of fire and the hazards associated with aircraft.	In a classroom.	Correctly.	Course Manual
19.2	Describe the purpose and construction of an aircraft fire zone.	In a classroom.	Correctly.	Course Manual
19.3	State the purpose of a fire detection system.	In a classroom.	Correctly.	Course Manual
19.4	Identify and state the purpose of the following fire detection system components:- a. Warning indicator. b. Fire detector. c. H.S.R.S. d. Firewire. e. F.F.F.D. f. Pneumatic firewire.	In a classroom or workshop, given aircraft fires system component benches and boards.	Correctly.	Course Manual 107E Series AP's
19.5	Describe the basic operation of the components listed in EO 19.4.	In a classroom or workshop, given aircraft fires system component benches and boards.	Correctly.	Course Manual 107E Series AP's
19.6	Explain the need for care when working on firewire elements.	In a classroom or workshop, given aircraft fires system component benches and boards.	Correctly.	Course Manual 107E Series AP's
19.7	State the purpose of a fire extinguishing system.	In a classroom.	Correctly.	Course Manual
19.8	Identify and state the purpose of the following fire extinguishing system components:- a. Indicator fuses. b. Automatic fire extinguishers:- (1) Graviner. (2) Graviner twin head. (3) Kiddie. (4) Wire wound. c. Extinguisher cartridges. d. Support brackets. e. System pipelines, spray rings and nozzles. f. Directional flow valves. g. Pressure relief indicators.	In a classroom or workshop, given aircraft fires system component benches and boards.	Correctly.	Course Manual 107E Series AP's
19.9	Describe the basic operation of the components listed in EO 19.8.	In a classroom or workshop, given aircraft fires system component benches and boards.	Correctly.	Course Manual 107E Series AP's

Nº (a)	ENABLING OBJECTIVES (b)	CONDITIONS (c)	STANDARDS (d)	REFERENCE (e)
19.10	Identify crew compartment extinguishers and their mounting brackets.	In a classroom or workshop, given examples.	Correctly.	Course Manual 107E Series AP's
19.11	Describe the basic operation of crew compartment extinguishers.	In a classroom or workshop, given examples.	Correctly.	Course Manual 107E Series AP's
19.12	Identify and state the purpose of:- a. Inertia crash switches. b. Crash strips. c. Smoke detectors.	In a classroom or workshop, given aircraft fires system component benches and boards.	Correctly.	Course Manual 107E Series AP's
19.13	Describe the basic operation of the items listed in EO 19.12.	In a classroom or workshop, given aircraft fires system component benches and boards.	Correctly.	Course Manual 107E Series AP's
19.14	State the types of extinguishers used in aircraft automatic fire extinguishing systems and their associated hazards.	In a classroom.	Correctly.	Course Manual 107E Series AP's
19.15	State the procedures and safety precautions to be observed when working with automatic fire extinguishers and their components.	In a classroom.	Correctly.	Course Manual 107E Series AP's
19.16	State the procedures and safety precautions to be observed when working with electrically initiated explosive devices.	In a classroom.	Correctly.	Course Manual 107E Series AP's
19.17	State the hazards of fire extinguishant contamination.	In a classroom.	Correctly.	Course Manual 107E Series AP's
19.18	State the procedures and safety precautions to be observed when dealing with fire extinguishant contamination. End of 19.0	In a classroom.	Without error.	Course Manual 107E Series AP's

TRADE TRAINING

SECTION: P27 AIRCRAFT SYSTEMS

SUBJECT: 20. EXAMINATION

TRAINING OBJECTIVE (a)	REFERENCE (b)	ALLOCATION OF PERIODS (c)	Syll Hrs (d)	No of CELLS (e)	INSTR HOURS (f)
20.0 Obtain a pass mark in an examination of P23 and P27.		Classroom	2.00	1	2.00
		Practical	0.00		0.00
		Total	2.00		2.00

EQUIPMENT (g)	PUBLICATIONS (h)

FILMS/VIDEOS		
Nº (i)	TITLE (j)	TIME (k)

N^{o} (a)	ENABLING OBJECTIVES (b)	CONDITIONS (c)	STANDARDS (d)	REFERENCE (e)
20.1	Undertake and pass an examination on subjects taught during the P23 and P27 phases.	In a classroom, under examination conditions.	Attaining the examination pass amrk.	

TRADE TRAINING

SECTION: P27 AIRCRAFT SYSTEMS

SUBJECT: 21. DEBRIEF

TRAINING OBJECTIVE (a)	REFERENCE (b)	ALLOCATION OF PERIODS (c)	Syll Hrs (d)	No of CELLS (e)	INSTR HOURS (f)
21.0 Participate in a debrief of P23 and P27.		Classroom	2.00	1	2.00
		Practical	0.00		0.00
		Total	2.00		2.00

EQUIPMENT (g)	PUBLICATIONS (h)

FILMS/VIDEOS		
Nº (i)	TITLE (j)	TIME (k)

N^{o} (a)	ENABLING OBJECTIVES (b)	CONDITIONS (c)	STANDARDS (d)	REFERENCE (e)
21.1	Participate in an end of phase debrief of the subjects taught in the P23 and P27 phases as laid down in RAF Cosford Training Instructions and Training Squadron ORP.			

PART III

TRADE TRAINING

SECTION: P40 SECOND LINE MAINTENANCE

SUBJECT: 2. EXTERNAL ELECTRICAL POWER

TRAINING OBJECTIVE (a)	REFERENCE (b)	ALLOCATION OF PERIODS			
		(c)	SYLL HOURS (d)	No of CELLS (e)	INSTR HOURS (f)
2.0 Apply external electrical power.		Classroom	1.00	1	1.00
		Practical	2.00	2	4.00
		Total	3.00		5.00

EQUIPMENT (g)	PUBLICATIONS (h)
Training aircraft. GPU/Power distribution point.	AP3373 Sect. 2. Relevant aircraft 5A2, 2(R)1 & Topic1.

FILMS/VIDEOS		
No (i)	TITLE (j)	TIME (k)

PART III

No (a)	ENABLING OBJECTIVES (b)	CONDITIONS (c)	STANDARDS (d)	REFERENCE (e)
2.1	State the safety precautions to be observed before and during the application of ground power to an aircraft.	In a classroom or hangar.	Without error.	
2.2	Recognise a ground power unit (GPU) or power distribution point.	In a hangar, given examples.	Correctly.	AP3373 Sect. 2
2.3	Carry out a practical task to apply external electrical power to an aircraft. a. Carry out pre power-on checks. b. Set up and connect the power source. c. Apply power. d. Carry out any further checks required, after application of power. e. Disconnect ground power after use. End of 2.0	In a hangar, on a training aircraft, given the equipment, AP's and a task.	Correctly.	Relevant aircraft Topic 5A2 and 2(R)1.

PART III

TRADE TRAINING

SECTION: P40 SECOND LINE MAINTENANCE

SUBJECT: 3. COCKPIT CHECKS

TRAINING OBJECTIVE (a)	REFERENCE (b)	ALLOCATION OF PERIODS (c)	SYLL HOURS (d)	No of CELLS (e)	INSTR HOURS (f)
3.0 Carry out cockpit checks prior to moving an aircraft.		Classroom	1.00	1	1.00
		Practical	2.00	4	8.00
		Total	3.00		9.00

EQUIPMENT (g)	PUBLICATIONS (h)
Training aircraft.	Relevant aircraft 5A2, 2(R)1 & Topic1. Course manual.

FILMS/VIDEOS		
No (i)	TITLE (j)	TIME (k)

PART III

No (a)	ENABLING OBJECTIVES (b)	CONDITIONS (c)	STANDARDS (d)	REFERENCE (e)
3.1	Check the AAES for safety.	In a hangar, given a training aircraft.	Without error.	Relevant aircraft Topic 4A2/5A2.
3.2	State how to prevent the ingress of FOD into a cockpit.	In a hangar.	Correctly.	
3.3	Identify common external and internal emergency switches, levers and handles.	In a hangar, given a training aircraft.	Correctly.	Course manual.
3.4	Identify and state the purpose of tell-tale/restraint wire.	In a hangar, given a training aircraft.	Correctly.	Course manual.
3.5	State how switches, levers and handles are protected against inadvertent operation by use of: a. Spring loaded guards. b. Safety pins and clips. c. Restraint/tell tale wire. d. Fixed guards.	In a hangar, given a training aircraft.	Correctly.	
3.6	State where information on emergency switches can be found.	In a hangar, given a training aircraft and the Topic 1.	Correctly.	Aircraft Topic 1.
3.7	Check that all emergency switches, levers and handles in an aircraft are: a. In the correct position. b. With safety pins and clips in the correct position. c. With restraint wire or tell tale wire intact.	In a hangar, given a training aircraft and the Topic 1.	Correctly.	Aircraft Topic 1.
3.8	State the reporting action to be taken on finding any emergency switch, lever or handle has been operated.	In a hangar.	Correctly.	Course manual.
3.9	State the danger to an aircraft or to personnel by resetting or re-locking emergency switches, levers and handles without reporting the fault.	In a hangar.	Without error.	Course manual.
3.10	State the precautions to be taken prior to applying internal power.	In a hangar.	Without error.	
3.11	State where information can be found on the safety checks required prior to applying internal power.	In a hangar, given a training aircraft and the Topic 1.	Correctly.	Aircraft Topic 1 & 5A2.
3.12	State the purpose of the landing gear indicator.	In a hangar.	Correctly.	Course manual.
3.13	State the purpose of the day/night changeover switch.	In a hangar.	Correctly.	Course manual.
3.14	Interpret the indications on the landing gear indicator.	In a hangar, given a training aircraft.	Correctly.	Course manual.
3.15	Apply internal power and check the landing gear indicator. End of 3.0	In a hangar, given a training aircraft and the Topic 1.	Correctly.	Aircraft Topic 1.

PART III

TRADE TRAINING

SECTION: P40 SECOND LINE MAINTENANCE

SUBJECT: 4. SECOND LINE MAINTENANCE

TRAINING OBJECTIVE (a)	REFERENCE (b)	ALLOCATION OF PERIODS			
		(c)	SYLL HOURS (d)	No of CELLS (e)	INSTR HOURS (f)
4.0 Demonstrate the ability to carry out aircraft maintenance.		Classroom	2.00	1	2.00
		Practical	22.00	4	88.00
		Total	24.00		90.00

EQUIPMENT (g)	PUBLICATIONS (h)
Training aircraft. Relevant documentation.	AP100A-01.

FILMS/VIDEOS		
No (i)	TITLE (j)	TIME (k)
7715.	Jaguar-Introduction to Servicing.	18 mins.
7843.	Flight Safety is Your Business.	21 mins.
8005.	Dangerous Play.	20 mins.
8170.	Jaguar in Operation.	25 mins.

PART III

No (a)	ENABLING OBJECTIVES (b)	CONDITIONS (c)	STANDARDS (d)	REFERENCE (e)
4.1	State why the maintenance policy within the RAF is based on a balance of preventative and corrective maintenance.	In a classroom.	Correctly.	
4.2	Identify, state the purpose of and use the documentation that is required to maintain aircraft and aircraft engines.	In a classroom.	Correctly.	
4.3	Examine and lubricate engine control systems.	In a hangar, given a training aircraft and all relevant documentation.	Correctly.	
4.4	Carry out maintenance of associated propulsion services.	In a hangar, given a training aircraft and all relevant documentation.	Correctly.	
4.5	Operate relevant engine test equipment. End of 4.0	In a hangar, given a training aircraft, all relevant documentation and the relevant test equipment.	Correctly.	

PART III

TRADE TRAINING

SECTION: P40 SECOND LINE MAINTENANCE

SUBJECT: 5. ENGINE CHANGE

TRAINING OBJECTIVE (a)	REFERENCE (b)	ALLOCATION OF PERIODS			
		(c)	SYLL HOURS (d)	No of CELLS (e)	INSTR HOURS (f)
5.0 Carry out removal and fitment of an engine change unit.		Classroom	0.00		0.00
		Practical	14.00	4	56.00
		Total	14.00		56.00

EQUIPMENT (g)	PUBLICATIONS (h)
Training aircraft. Associated ground equipment/specialist tools.	Aircraft Topic 1 & 5A3.

FILMS/VIDEOS		
No (i)	TITLE (j)	TIME (k)

PART III

No (a)	ENABLING OBJECTIVES (b)	CONDITIONS (c)	STANDARDS (d)	REFERENCE (e)
5.1	Remove and fit an engine change unit completing all relevant paperwork. End of 5.0	In a hangar, given a training aircraft and all relevant equipment and documentation.	Correctly and iaw relevant Topic 1.	Relevant aircraft Topic 1 & 5A3.

PART III

TRADE TRAINING

SECTION: P40 SECOND LINE MAINTENANCE

SUBJECT: 6. ENGINE TEST

TRAINING OBJECTIVE (a)	REFERENCE (b)	ALLOCATION OF PERIODS (c)	SYLL HOURS (d)	No of CELLS (e)	INSTR HOURS (f)
6.0 Carry out a ground test of an installed aircraft engine.		Classroom	10.00	1	10.00
		Practical	8.00	4	32.00
		Total	18.00		42.00

EQUIPMENT (g)	PUBLICATIONS (h)
Training aircraft. GPU. Relevant test equipment. Communications equipment. Stop-watch.	AP100B-01. Aircraft Topic 1, 5A2 and 5A3.

FILMS/VIDEOS		
No (i)	TITLE (j)	TIME (k)

PART III

No (a)	ENABLING OBJECTIVES (b)	CONDITIONS (c)	STANDARDS (d)	REFERENCE (e)
6.1	State the reasons for the ground testing of aircraft engines.	In a classroom.	Correctly.	Aircraft Topic 1.
6.2	State the composition and responsibilities of a running team.	In a classroom.	Correctly.	AP100B-01 order 4105.
6.3	State the safety precautions to be observed before and during an engine ground test.	In a classroom.	Without error.	AP100B-01 order 4105 & aircraft Topic 1.
6.4	Identify and locate the air publications, maintenance procedures and work cards required to ground test an engine.	In a classroom.		Aircraft Topic 1 and/or 5A3.
6.5	Identify relevant engine test equipment.	In a classroom, given the relevant publications.	Correctly.	Aircraft Topic 1.
6.6	Recognise and locate, on an aircraft he is to ground run: a. Engine controls and instruments. b. Fuel controls and instruments. c. Hydraulic controls and instruments. d. Cabin/air pressurisation controls and instruments. e. Electrical power supply controls and instruments. f. Other controls and instruments applicable to type.	In a hangar, given a training aircraft and the relevant documentation.	Correctly.	Aircraft Topic 1.
6.7	State the aircraft maintenance documentation that must be inspected prior to ground running and give the reasons.	In a classroom, given the relevant publications.	Correctly.	Aircraft F700.
6.8	State the actions to be taken in the event of: a. Excessive resonance and/or vibration. b. Excessive rise or fall of specified temperatures. c. Low or excessive oil pressures. d. Over or under speeding. e. Indications of fire. f. Compressor surge or stall.	In a classroom or hangar.	Correctly.	Aircraft Topic 1.
6.9	Participate as a member of a ground running team to include the duties and responsibilities of: a. Engine operator. b. Safety person. c. First Aid Fire Appliance operator. d. Other personnel as directed. End of 6.0	Supervised, on an approved location, given a training aircraft, all relevant equipment, publications and documentation.	Correctly.	AP100B-01 order 4105.

PART III

TRADE TRAINING

SECTION: P40 SECOND LINE MAINTENANCE

SUBJECT: 7. DEBRIEF

TRAINING OBJECTIVE (a)	REFERENCE (b)	ALLOCATION OF PERIODS			
		(c)	SYLL HOURS (d)	No of CELLS (e)	INSTR HOURS (f)
7.0 Debrief the students on their performance in P40 second line maintenance.		Classroom	2.00	1	2.00
		Practical	0.00		0.00
		Total	2.00		2.00

EQUIPMENT (g)	PUBLICATIONS (h)		
		FILMS/VIDEOS		
	No (i)	TITLE (j)	TIME (k)

PART III

No (a)	ENABLING OBJECTIVES (b)	CONDITIONS (c)	STANDARDS (d)	REFERENCE (e)
7.1	Participate in a debrief of P40 second line maintenance. End of 7.0	In a classroom or interview room.		