KINGDOM OF BAHRAIN
Ministry of Transportation and Telecommunications

مملكة البحرين
وزارة المواصلات والاتصالات

ANTR 66

AIRCRAFT MAINTENANCE LICENCE AEROPLANES AND HELICOPTERS

FOREWORD

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Bahrain CAA Publication Revisions Highlight Sheet

☒ ANTR: Part II (ANTR 66) ☐ CAP: ____ ☐ TPM: ____

The following pages of ANTR 66 have been revised to add regulation on enforcement as per ICAO ICVM Audit and comply with ICAO Annex 1.

Item	Paragraph number	Page	Reason
	ANTR 66	---	Specific instances of the "Authority" in ANTR 66 shall be revised to the "BCAA".
Section A			
1	Foreword	i	Added paragraph 8. Paragraph 9 amended to reflect current revision and date.
2	Contents	v	Added new regulation ANTR 66.A.2 Enforcement.
3	ANTR 66.A.2	A-1	New regulation added as a result of last ICAO ICVM audit.
4	ANTR 66.A.10	A-2	Re-worded and items (b) and (c) added.
5	ANTR 66.A.50	A-8	Amended to comply with ICAO Annex 1.
6	AMC 66.A.70	AMC-6	Paragraph is re-worded.
7	AMC to Section 6 of Appendix III ANTR 66	AMC-13	Item 9 On-the-Job Training (OJT) is re-worded.
Section B			
1	ANTR 66.B.110	B-1	Delete reference to ANTR 66.B.105 in items (a) and (b).
2	AMC 66.B.115	AMC-1	Paragraph (c) is re-worded.

FOREWORD

1 The Kingdom of Bahrain Civil Aviation Affairs, known in these regulations as the "BCAA" has implemented ANTR 66 (Air Navigation Technical Regulations – Aircraft Maintenance Licence Aeroplanes and Helicopters) based on the Annexes to Chicago Convention and European Aviation Safety Agency EASA Part 66 with a view to harmonizing legislation.

2 The BCAA has adopted associated compliance or interpretative material wherever possible and, unless specifically stated otherwise, clarification will be based on this material or other ICAO and EASA documentation.

3 Future development of the requirements of ANTR 66 will be in accordance with Notice of Proposed Amendment (NPA) procedures. These procedures allow for the amendment of ANTR 66 to be harmonized with amendments to EASA and Annexes to Chicago Convention in a timely manner.

4 The editing practices used in this document are as follows:

(a) 'Shall' is used to indicate a mandatory requirement and may appear in ANTRs.

(b) 'Should' is used to indicate a recommendation and normally appears in AMCs and GM.

(c) 'May' is used to indicate discretion by the BCAA, the industry or the applicant, as appropriate.

(d) 'Will' indicates a mandatory requirement and is used to advise of action incumbent on the BCAA.

NOTE: The use of the male gender implies the female gender and vice versa.

5 The BCAA has adopted associated compliance or interpretative material wherever possible and, unless specifically stated otherwise, clarification will be based on this material or other ANTR documentation.

6 New, amended and corrected text will be indicated with a side bar beside paragraphs, until a subsequent "amendment" is issued.

7 Regulations are presented in Times Roman font and guidance material is presented in Arial font.

8 In this ANTR, the word BCAA and Authority are synonymous to each other.

9 This 3rd Edition Revision 4 is dated 19 May 2019.

10 Please refer to the Volume 1 List of Effective Pages and Revision Page for current status.

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AIRCRAFT MAINTENANCE LICENCE AEROPLANES AND HELICOPTERS

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SUBPART A

AIRCRAFT MAINTENANCE LICENCE AEROPLANES AND HELICOPTERS

ANTR 66.A.0 Introduction

These Regulations establish technical requirements and administrative procedures for the issuance of aircraft maintenance licences for aeroplanes and helicopters by the BCAA. In addition;

(a) Certifying staff shall be qualified in accordance with the provisions of ANTR 66, except as provided for in points ANTR 145.A.30(j) of ANTR 145 and Appendix IV to ANTR 145.

(b) Any aircraft maintenance licence and if any, the technical limitations associated with that licence, issued or recognised by the BCAA in accordance with the BCAA requirements and procedures and valid at the time of entry into force of this Regulation, shall be deemed to have been issued in accordance with this Regulation.

(c) Any valid EASA Part 66 aircraft maintenance licence shall be deemed to have been issued in accordance with this Regulation except that it will need to be converted to an ANTR 66 licence after successfully passing an examination on Bahrain legislation and any other requirement deemed necessary by the BCAA.

(d) The BCAA may, after consideration, continue to convert a valid aircraft maintenance licence issued by an ICAO Contracting State, provided it meets equivalent standards of this Regulation.

(e) Technical limitations will be deleted, as appropriate, when the person satisfactorily completes the relevant examinations and gains relevant experience prescribed by ANTR 66.

ANTR 66.A.1 Scope

This section establishes the requirements for the issue of an aircraft maintenance licence and conditions of its validity.

ANTR 66.A.2 Enforcement

The BCAA may impose restrictions, suspend, limit or revoke any Aircraft Maintenance licence issued if the holder cannot demonstrate their capability to maintain the appropriate safety standards. Personnel granted with an Aircraft Maintenance licence shall not engage in, support or conceal unsafe acts.

ANTR 66.A.3 Licence Categories

(See GM 66.A.3)

(a) Aircraft maintenance licence including the following categories:

— Category A

— Category B1

— Category B2

— Category C

(b) Categories A and B1 are subdivided into subcategories relative to combinations of aeroplanes, helicopters, turbine and piston engines. The sub-categories are:

— A1 and B1.1 Aeroplanes Turbine

— A2 and B1.2 Aeroplanes Piston

— A3 and B1.3 Helicopters Turbine

— A4 and B1.4 Helicopters Piston

ANTR 66.A.5 Aircraft groups

For the purpose of ratings on aircraft maintenance licences, aircraft shall be classified in the following groups:

1. Group 1: complex motor-powered aircraft as well as multiple engine helicopters, aeroplanes with maximum certified operating altitude exceeding FL290, aircraft equipped with fly-by-wire systems and other aircraft requiring an aircraft type rating when defined so by the BCAA.

2. Group 2: aircraft other than those in Group 1 belonging to the following subgroups:

- sub-group 2a: single turbo-propeller engine aeroplanes
- sub-group 2b: single turbine engine helicopters
- sub-group 2c: single piston engine helicopters.

3. Group 3: piston engine aeroplanes other than those in Group 1.

ANTR 66.A.10 Application
(See AMC 66.A.10)

(a) An application for an aircraft maintenance licence or change to such licence shall be made on Form ALD/LIC/F037 and in a manner established by the BCAA and submitted thereto.

(b) Each application shall be supported by documentation to demonstrate compliance with the applicable theoretical knowledge, practical training and experience requirements at the time of application.

(c) The organisation requesting the grant or amendment to a licence is responsible for the review of the application before making a recommendation to the BCAA.

ANTR 66.A.15 Eligibility

An applicant for an aircraft maintenance licence shall be at least 18 years of age and, with the exception of a Bahraini national, shall be employed by:

(a) an AOC holder registered in Bahrain, or

(b) by an ANTR 145 organisation with principal place of business in Bahrain which demonstrates the need to maintain an aircraft registered in the Kingdom of Bahrain.

Note: A Bahraini national holding a license issued by a contracting State to the Chicago Convention on International Civil Aviation, not employed by a Bahraini AOC holder or a Bahraini approved maintenance organization, may apply for conversion of his/her foreign license to a Bahraini license provided that other requirements are met and the foreign license is valid at the time of application.

ANTR 66.A.20 Privileges
(See AMC 66.A.20(b)2)
(See AMC 66.A.20(b)3)
(See GM 66.A.20(a))
(See GM 66.A.20(b)2)
(See GM 66.A.20(b)4)

(a) The following privileges shall apply:

1. A category A aircraft maintenance licence permits the holder to issue certificates of release to service following minor scheduled line maintenance and simple defect rectification within the limits of tasks specifically endorsed on the ANTR 145.A.35 certification authorisation. The certification privileges shall be restricted to work that the licence holder has personally performed in the maintenance organisation that issued the certification authorisation.

2. A category B1 aircraft maintenance licence shall permit the holder to issue certificates of release to service and to act as B1 support staff following:

   (i) maintenance performed on aircraft structure, powerplant and mechanical and electrical systems,

   (ii) work on avionic systems requiring only simple tests to prove their serviceability and not requiring troubleshooting.

   Category B1 includes the corresponding A subcategory.

3. A category B2 aircraft maintenance licence shall permit the holder:

   (i) to issue certificates of release to service and to act as B2 support staff for following:

   - maintenance performed on avionic and electrical systems, and
   - electrical and avionics tasks within powerplant and mechanical systems, requiring only simple tests to prove their serviceability; and

   (ii) to issue certificates of release to service following minor scheduled line maintenance and simple defect rectification within the limits of tasks specifically endorsed on the ANTR 145.A.35 certification authorisation. This certification privilege shall be restricted to work that the licence holder has personally performed in the maintenance organisation which issued the certification authorisation and limited to the ratings already endorsed in the B2 licence.

   The category B2 licence does not include any A subcategory.

4. A category C aircraft maintenance licence shall permit the holder to issue certificates of release to service following base maintenance on aircraft. The privileges apply to the aircraft in its entirety in an ANTR 145 organisation.

(b) The holder of an aircraft maintenance licence may not exercise certification privileges unless:

1. in compliance with the applicable requirements of ANTR M and/or ANTR 145.

2. in the preceding two-year period he/she has, either had six months of maintenance experience in accordance with the privileges granted by the aircraft maintenance licence or, met the provision for the issue of the appropriate privileges; and

3. he/she has the adequate competence to certify maintenance on the corresponding aircraft; and

4. he/she is able to read, write and communicate to an understandable level in the language(s) in which the technical documentation and procedures necessary to support the issue of the certificate of release to service are written.

ANTR 66.A.25 Basic knowledge requirements
(See AMC 66.A.25)
(See GM 66.A.25(a))

(a) An applicant for an aircraft maintenance licence or the addition of a category or subcategory to such an aircraft maintenance licence shall demonstrate, by examination, a level of knowledge in the appropriate subject modules in accordance with Appendix I to this ANTR. The basic knowledge examinations shall be conducted by a training organisation appropriately approved under ANTR 147.

(b) The training courses and examinations shall be passed within 10 years prior to the application for an aircraft maintenance licence or the addition of a category or subcategory to such aircraft maintenance licence. Should this not be the case, examination credits may however be obtained in accordance with point (c).

c) The applicant may apply to the BCAA for full or partial examination credit to the basic knowledge requirements for:

1. basic knowledge examinations that do not meet the requirement described in point (b) above; and

2. any other technical qualification considered by the BCAA to be equivalent to the knowledge standard of ANTR-66.

Credits shall be granted in accordance with Subpart E of Section B of this ANTR-66.

(d) Credits expire 10 years after they were granted to the applicant by the BCAA. The applicant may apply for new credits after expiration.

ANTR 66.A.30 Basic Experience requirements

(See AMC 66.A.30(a))
(See AMC 66.A.30(d))
(See AMC 66.A.30(e))

(a) An applicant for an aircraft maintenance licence shall have acquired:

1. for category A and subcategories B1.2 and B1.4:

   (i) three years of practical maintenance experience on operating aircraft, if the applicant has no previous relevant technical training; or

   (ii) two years of practical maintenance experience on operating aircraft and completion of training considered relevant by the BCAA as a skilled worker, in a technical trade; or

   (iii) one year of practical maintenance experience on operating aircraft and completion of an ANTR 147 approved basic training course.

2. for category B2 and subcategories B1.1 and B1.3:

   (i) five years of practical maintenance experience on operating aircraft if the applicant has no previous relevant technical training; or

   (ii) three years of practical maintenance experience on operating aircraft and completion of training considered relevant by the BCAA as a skilled worker, in a technical trade; or

   (iii) two years of practical maintenance experience on operating aircraft and completion of an ANTR 147 approved basic training course.

3. for category C with respect to complex motor-powered aircraft:

   (i) three years of experience exercising category B1.1, B1.3 or B2 privileges complex motor-powered aircraft or as support staff according to point ANTR 145.A.35, or, a combination of both; or

   (ii) five years of experience exercising category B1.2 or B1.4 privileges complex motor-powered aircraft as support staff according to point ANTR 145.A.35, or a combination of both; or

4. for category C with respect to other than complex motor-powered aircraft:

   (i) three years of experience exercising category B1 or B.2 privileges on other than complex motor-powered aircraft support staff according to point ANTR 145.A.35, or a combination of both; or

5. for category C obtained through the academic route: an applicant holding an academic degree in a technical discipline, from a university or other higher educational institution recognised by the BCAA, 3 years of experience working in a civil aircraft maintenance environment on a representative selection of tasks directly associated with aircraft maintenance including 6 months of observation of base maintenance tasks.

(b) An applicant for an extension to an aircraft maintenance licence shall have a minimum civil aircraft maintenance experience requirement appropriate to the additional category or subcategory of licence applied for as defined in Appendix IV to this ANTR 66

(c) The experience must be practical which means being involved with a representative cross section of maintenance tasks on aircraft.

(d) At least one year of the required experience must be recent maintenance experience on aircraft of the category/subcategory for which the initial aircraft maintenance licence is sought. For subsequent category/subcategory additions to an existing aircraft maintenance licence, the additional recent maintenance experience required may be less than one year, but must be at least three months. The required experience must be dependent upon the difference between the licence category/subcategory held and applied for. Such additional experience must be typical of the new licence category/subcategory sought.

(e) Notwithstanding paragraph (a), aircraft maintenance experience gained outside a civil aircraft maintenance environment shall be accepted when such maintenance is equivalent to that required by this ANTR 66 as established by the BCAA. Additional experience of civil aircraft maintenance shall, however, be required to ensure understanding of the civil aircraft maintenance environment.

(f) Experience shall have been acquired within the 10 years preceding the application for an aircraft maintenance licence or the addition of a category or subcategory to such a licence.

ANTR 66.A.40 Continued validity of the aircraft maintenance licence
(See GM 66.A.40)

(a) The aircraft maintenance licence becomes invalid five years after its last issue or amendment, unless the holder submits his/her aircraft maintenance licence to the BCAA, in order to verify that the information contained in the licence is the same as that contained in the BCAA records.

(b) Any certification privileges based upon an aircraft maintenance licence and ANTR 145 maintenance organisation authorisation becomes invalid as soon as the aircraft maintenance licence is invalid.

(c) The aircraft maintenance licence is only valid;

1. when issued and/or changed by the BCAA; and

2. when the holder has signed the document.

ANTR 66.A.45 Endorsement with aircraft rating
(See AMC 66.A.45(d),(e)3,(f)1 and (g))
(See AMC 66.A.45(e))
(See GM 66.A.45)
(See GM 66.A.45(b))

(a) In order to be entitled to exercise certification privileges on a specific aircraft type, the holder of an aircraft maintenance licence need to have his/her licence endorsed with the relevant aircraft ratings.

For category B1, B2 or C the relevant aircraft ratings are the following:

1. For group 1 aircraft, the appropriate aircraft type rating.

2. For group 2 aircraft, the appropriate aircraft type rating, manufacturer sub-group rating or full sub-group rating.

3. For category A, no rating is required, subject to compliance with the requirements of point 145.A.35 of ANTR 145.

(b) The endorsement of aircraft type ratings requires the satisfactory completion of the relevant category B1, B2 or C aircraft type training.

(c) In addition to the requirement of point (b), the endorsement of the first aircraft type rating within a given category/sub-category requires satisfactory completion of the corresponding On the Job Training, as described in Appendix III to ANTR 66 Section A.

(d) By derogation from points (b) and (c), for group 2 and 3 aircraft, aircraft type ratings may also be granted after:

- satisfactory completion of the relevant category B1, B2 or C aircraft type examination described in Appendix III to ANTR 66 Section A, and

- in the case of B1 and B2 category, demonstration of practical experience on the aircraft type. In that case, the practical experience shall include a representative cross section of maintenance activities relevant to the licence category.

In the case of a category C rating for a person qualified by holding an academic degree as specified in point 66.A.30(a)(5), the first relevant aircraft type examination shall be at the category B1 or B2 level.

(e) For group 2 aircraft:

1. the endorsement of manufacturer sub-group ratings for category B1 and C licence holders requires complying with the aircraft type rating requirements of at least two aircraft types from the same manufacturer which combined are representative of the applicable manufacturer sub-group;

2. the endorsement of full sub-group ratings for category B1 and C licence holders requires complying with the aircraft type rating requirements of at least three aircraft types from different manufacturers which combined are representative of the applicable sub-group;

3. the endorsement of manufacturer sub-groups and full sub-group ratings for category B2 licence holders requires demonstration of practical experience which shall include a representative cross section of maintenance activities relevant to the licence category and to the applicable aircraft sub-group.

(f) For group 3 aircraft:

1. the endorsement of the full group 3 rating for category B1, B2 and C licence holders requires demonstration of practical experience, which shall include a representative cross section of maintenance activities relevant to the licence category and to the group 3.

2. for category B1, unless the applicant provides evidence of appropriate experience, the group 3 rating shall be subject to the following limitations, which shall be endorsed on the licence:

   - pressurised aeroplanes
   - metal structure aeroplanes
   - composite structure aeroplanes
   - wooden structure aeroplanes
   - aeroplanes with metal tubing structure covered with fabric.

ANTR 66.A.50 Limitations
(See AMC 66.A.50(b))

(a) Limitations introduced on an aircraft maintenance licence are exclusions from the certification privileges and affect the aircraft in its entirety.

(b) For limitations referred to in point 66.A.45, limitations shall be removed upon:

1. demonstration of appropriate experience; or

2. after a satisfactory practical assessment performed by the BCAA.

ANTR 66.A.55 Evidence of qualification

Personnel exercising certification privileges must produce their licence and ANTR 145 certification authorisation, as evidence of qualification, if requested by an authorised person, within 24 hours.

ANTR 66.A.70 Conversion provisions
(See AMC 66.A.70)
(See GM 66.A.70)

In accordance with ANTR 66.A.0 aircraft maintenance licences issued or recognised by the BCAA in accordance with the BCAA requirements and procedures and valid at the time of entry into force of this Regulation, shall be deemed to have been issued in accordance with this Regulation. As a consequence, a conversion process is not applicable.

SUBPART B

AIRCRAFT OTHER THAN AEROPLANES AND HELICOPTERS

ANTR 66.A.100 General

Reserved

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SUBPART C

COMPONENTS

ANTR 66.A.200 General

Reserved

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APPENDIX I

BASIC KNOWLEDGE REQUIREMENTS

1. Knowledge Levels — Category A, B1, B2, and C Aircraft Maintenance Licence

Basic knowledge for categories A, B1, B2 and are indicated by the allocation of knowledge levels indicators (1, 2 or 3) against each applicable subject. Category C applicants must meet either the category B1 or the category B2 basic knowledge levels.

The knowledge level indicators are defined as follows:

Level 1: A familiarisation with the principal elements of the subject.

Objectives:

(a) The applicant should be familiar with the basic elements of the subject.

(b) The applicant should be able to give a simple description of the whole subject, using common words and examples.

(c) The applicant should be able to use typical terms.

Level 2: A general knowledge of the theoretical and practical aspects of the subject and an ability to apply that knowledge.

Objectives:

(a) The applicant should be able to understand the theoretical fundamentals of the subject.

(b) The applicant should be able to give a general description of the subject using, as appropriate, typical examples.

(c) The applicant should be able to use mathematical formulae in conjunction with physical laws describing the subject.

(d) The applicant should be able to read and understand sketches, drawings and schematics describing the subject.

(e) The applicant should be able to apply his knowledge in a practical manner using detailed procedures.

Level 3: A detailed knowledge of the theoretical and practical aspects of the subject and capacity to combine and apply the separate elements of knowledge in a logical and comprehensive manner.

Objectives:

(a) The applicant should know the theory of the subject and interrelationships with other subjects.

(b) The applicant should be able to give a detailed description of the subject using theoretical fundamentals and specific examples.

(c) The applicant should understand and be able to use mathematical formulae related to the subject.

(d) The applicant should be able to read, understand and prepare sketches, simple drawings and schematics describing the subject.

(e) The applicant should be able to apply his knowledge in a practical manner using manufacturer's instructions.

(f) The applicant should be able to interpret results from various sources and measurements and apply corrective action where appropriate.

2. Modularisation

Qualification on basic subjects for each ANTR 66 aircraft maintenance licence category or subcategory should be in accordance with the following matrix. Applicable subjects are indicated by an 'X':

Subject module	A or B1 aeroplane with: Turbine engine(s)	Piston engine(s)	A or B1 helicopter with: Turbine engine(s)	Piston engine(s)	B2 Avionics
1	X	X	X	X	X
2	X	X	X	X	X
3	X	X	X	X	X
4	X	X	X	X	X
5	X	X	X	X	X
6	X	X	X	X	X
7A	X	X	X	X	X
8	X	X	X	X	X
9A	X	X	X	X	X
10	X	X	X	X	X
11A	X				
11B		X			
12			X	X	
13					X
14					X
15	X		X		
16		X		X	
17	X	X			

MODULE 1. MATHEMATICS

	LEVEL		
	A	**B1**	**B2**
1.1 Arithmetic Arithmetical terms and signs, methods of multiplication and division, fractions and decimals, factors and multiples, weights, measures and conversion factors, ratio and proportion, averages and percentages, areas and volumes, squares, cubes, square and cube roots.	1	2	2
1.2 Algebra (a) Evaluating simple algebraic expressions, addition, subtraction, multiplication and division, use of brackets, simple algebraic fractions;	1	2	2
(b) Linear equations and their solutions; Indices and powers, negative and fractional indices; Binary and other applicable numbering systems; Simultaneous equations and second degree equations with one unknown; Logarithms.	—	1	1
1.3 Geometry (a) Simple geometrical constructions;	—	1	1
(b) Graphical representation; nature and uses of graphs, graphs of equations/functions;	2	2	2
(c) Simple trigonometry; trigonometrical relationships, use of tables and rectangular and polar coordinates.	—	2	2

MODULE 2. PHYSICS

	LEVEL		
	A	**B1**	**B2**
2.1 Matter Nature of matter: the chemical elements, structure of atoms, molecules; Chemical compounds; States: solid, liquid and gaseous; Changes between states.	1	1	1
2.2 Mechanics *2.2.1 Statics* Forces, moments and couples, representation as vectors; Centre of gravity; Elements of theory of stress, strain and elasticity: tension, compression, shear and torsion; Nature and properties of solid, fluid and gas; Pressure and buoyancy in liquids (barometers).	1	2	1
2.2.2 Kinetics Linear movement: uniform motion in a straight line, motion under constant acceleration (motion under gravity); Rotational movement: uniform circular motion (centrifugal/centripetal forces); Periodic motion: pendular movement; Simple theory of vibration, harmonics and resonance; Velocity ratio, mechanical advantage and efficiency.	1	2	1
2.2.3 Dynamics (a) Mass; Force, inertia, work, power, energy (potential, kinetic and total energy), heat, efficiency;	1	2	1
(b) Momentum, conservation of momentum; Impulse; Gyroscopic principles; Friction: nature and effects, coefficient of friction (rolling resistance).	1	2	2
2.2.4 Fluid dynamics (a) Specific gravity and density;	2	2	2
(b) Viscosity, fluid resistance, effects of streamlining; Effects of compressibility on fluids; Static, dynamic and total pressure: Bernoulli's Theorem, venturi.	1	2	1
2.3 Thermodynamics (a) Temperature: thermometers and temperature scales: Celsius, Fahrenheit and Kelvin; Heat definition;	2	2	2

(b) Heat capacity, specific heat; Heat transfer: convection, radiation and conduction; Volumetric expansion; First and second law of thermodynamics; Gases: ideal gases laws; specific heat at constant volume and constant pressure, work done by expanding gas; Isothermal, adiabatic expansion and compression, engine cycles, constant volume and constant pressure, refrigerators and heat pumps; Latent heats of fusion and evaporation, thermal energy, heat of combustion.	—	2	2
2.4 Optics (Light) Nature of light; speed of light; Laws of reflection and refraction: reflection at plane surfaces, reflection by spherical mirrors, refraction, lenses; Fibre optics.	—	2	2
2.5 Wave Motion and Sound Wave motion: mechanical waves, sinusoidal wave motion, interference phenomena, standing waves; Sound: speed of sound, production of sound, intensity, pitch and quality, Doppler effect.	—	2	2

MODULE 3. ELECTRICAL FUNDAMENTALS

	LEVEL		
	A	**B1**	**B2**
3.1 Electron Theory Structure and distribution of electrical charges within: atoms, molecules, ions, compounds; Molecular structure of conductors, semiconductors and insulators.	1	1	1
3.2 Static Electricity and Conduction Static electricity and distribution of electrostatic charges; Electrostatic laws of attraction and repulsion; Units of charge, Coulomb's Law; Conduction of electricity in solids, liquids, gases and a vacuum.	1	2	2
3.3 Electrical Terminology Linear movement: uniform motion in a straight line, motion under constant acceleration (motion under gravity); Rotational movement: uniform circular motion (centrifugal/centripetal forces); Periodic motion: pendular movement; Simple theory of vibration, harmonics and resonance; Velocity ratio, mechanical advantage and efficiency.	1	2	2
3.4 Generation of Electricity Production of electricity by the following methods: light, heat, friction, pressure, chemical action, magnetism and motion.	1	1	1
3.5 DC Sources of Electricity Construction and basic chemical action of: primary cells, secondary cells, lead acid cells, nickel cadmium cells, other alkaline cells; Cells connected in series and parallel; Internal resistance and its effect on a battery; Construction, materials and operation of thermocouples; Operation of photo-cells.	1	2	2
3.6 DC Circuits Ohms Law, Kirchoff's Voltage and Current Laws; Calculations using the above laws to find resistance, voltage and current; Significance of the internal resistance of a supply.	—	2	2
3.7 Resistance/Resistor (a) Resistance and affecting factors; Specific resistance; Resistor colour code, values and tolerances, preferred values, wattage ratings; Resistors in series and parallel; Calculation of total resistance using series, parallel and series parallel combinations; Operation and use of potentiometers and rheostats; Operation of Wheatstone Bridge;	—	2	2

(b) Positive and negative temperature coefficient conductance; Fixed resistors, stability, tolerance and limitations, methods of construction; Variable resistors, thermistors, voltage dependent resistors; Construction of potentiometers and rheostats; Construction of Wheatstone Bridge.	—	1	1
3.8 Power Power, work and energy (kinetic and potential); Dissipation of power by a resistor; Power formula; Calculations involving power, work and energy.	—	2	2
3.9 Capacitance/Capacitor Operation and function of a capacitor; Factors affecting capacitance area of plates, distance between plates, number of plates, dielectric and dielectric constant, working voltage, voltage rating; Capacitor types, construction and function; Capacitor colour coding; Calculations of capacitance and voltage in series and parallel circuits; Exponential charge and discharge of a capacitor, time constants; Testing of capacitors.	—	2	2
3.10 Magnetism (a) Theory of magnetism; Properties of a magnet; Action of a magnet suspended in the Earth's magnetic field; Magnetisation and demagnetisation; Magnetic shielding; Various types of magnetic material; Electromagnets construction and principles of operation; Hand clasp rules to determine: magnetic field around current carrying conductor;	—	2	2
(b) Magnetomotive force, field strength, magnetic flux density, permeability, hysteresis loop, retentivity, coercive force reluctance, saturation point, eddy currents; Precautions for care and storage of magnets.	—	2	2
3.11 Inductance/Inductor Faraday's Law; Action of inducing a voltage in a conductor moving in a magneticfield; Induction principles; Effects of the following on the magnitude of an induced voltage: magnetic field strength, rate of change of flux, number of conductor turns; Mutual induction; The effect the rate of change of primary current and mutual inductance has on induced voltage;	—	2	2

Factors affecting mutual inductance: number of turns in coil, physical size of coil, permeability of coil, position of coils with respect to each other; Lenz's Law and polarity determining rules; Back emf, self induction; Saturation point; Principle uses of inductors.	—	2	2
3.12 DC Motor/Generator Theory Basic motor and generator theory; Construction and purpose of components in DC generator; Operation of, and factors affecting output and direction of current flow in DC generators; Operation of, and factors affecting output power, torque, speed and direction of rotation of DC motors; Series wound, shunt wound and compound motors; Starter Generator construction.	—	2	2
3.13 AC Theory Sinusoidal waveform: phase, period, frequency, cycle; Instantaneous, average, root mean square, peak, peak to peak current values and calculations of these values, in relation to voltage, current and power; Triangular/Square waves; Single/3 phase principles.	1	2	2
3.14 Resistive (R), Capacitive (C) and Inductive (L) Circuits Phase relationship of voltage and current in L, C and R circuits, parallel, series and series parallel; Power dissipation in L, C and R circuits; Impedance, phase angle, power factor and current calculations; True power, apparent power and reactive power calculations.	—	2	2
3.15 Transformers Transformer construction principles and operation; Transformer losses and methods for overcoming them; Transformer action under load and no-load conditions; Power transfer, efficiency, polarity markings; Calculation of line and phase voltages and currents; Calculation of power in a three phase system; Primary and Secondary current, voltage, turns ratio, power, efficiency; Auto transformers.	—	2	2
3.16 Filters Operation, application and uses of the following filters: low pass, high pass, band pass, band stop.	—	1	1

3.17 AC Generators Rotation of loop in a magnetic field and waveform produced; Operation and construction of revolving armature and revolving field type AC generators; Single phase, two phase and three phase alternators; Three phase star and delta connections advantages and uses; Permanent Magnet Generators.	—	2	2
3.18 AC Motors Construction, principles of operation and characteristics of: AC synchronous and induction motors both single and polyphase; Methods of speed control and direction of rotation; Methods of producing a rotating field: capacitor, inductor, shaded or split pole.	—	2	2

MODULE 4. ELECTRONIC FUNDAMENTALS

	LEVEL		
	A	**B1**	**B2**
4.1 Semiconductors	—	2	2
4.1.1 Diodes			
(a) Diode symbols; Diode characteristics and properties; Diodes in series and parallel; Main characteristics and use of silicon controlled rectifiers (thyristors), light emitting diode, photo conductive diode, varistor, rectifier diodes; Functional testing of diodes.			
(b) Materials, electron configuration, electrical properties; P and N type materials: effects of impurities on conduction, majority and minority characters; PN junction in a semiconductor, development of a potential across a PN junction in unbiased, forward biased and reverse biased conditions; Diode parameters: peak inverse voltage, maximum forward current, temperature, frequency, leakage current, power dissipation; Operation and function of diodes in the following circuits: clippers, clampers, full and half wave rectifiers, bridge rectifiers, voltage doublers and triplers; Detailed operation and characteristics of the following devices: silicon controlled rectifier (thyristor), light emitting diode, Schottky diode, photo conductive diode, varactor diode, varistor, rectifier diodes, Zener diode.	—	—	2
4.1.2 Transistors	—	1	2
(a) Transistor symbols; Component description and orientation; Transistor characteristics and properties.			
(b) Construction and operation of PNP and NPN transistors; Base, collector and emitter configurations; Testing of transistors; Basic appreciation of other transistor types and their uses; Application of transistors: classes of amplifier (A, B, C); Simple circuits including: bias, decoupling, feedback and stabilisation; Multistage circuit principles: cascades, push-pull, oscillators, multivibrators, flip-flop circuits.	—	—	2
4.1.3 Integrated Circuits	—	1	—
(a) Description and operation of logic circuits and linear circuits/operational amplifiers;			

(b) Description and operation of logic circuits and linear circuits; Introduction to operation and function of an operational amplifier used as: integrator, differentiator, voltage follower, comparator; Operation and amplifier stages connecting methods: resistive capacitive, inductive (transformer), inductive resistive (IR), direct; Advantages and disadvantages of positive and negative feedback.	—	2	2
4.2 Printed Circuit Boards Description and use of printed circuit boards.	—	1	2
4.3 Servomechanisms (a) Understanding of the following terms: Open and closed loop systems, feedback, follow up, analogue transducers; Principles of operation and use of the following synchro system components/features: resolvers, differential, control and torque, transformers, inductance and capacitance transmitters;	—	—	2
(b) Understanding of the following terms: Open and closed loop, follow up, servomechanism, analogue, transducer, null, damping, feedback, deadband; Construction operation and use of the following synchro system components: resolvers, differential, control and torque, E and I transformers, inductance transmitters, capacitance transmitters, synchronous transmitters; Servomechanism defects, reversal of synchro leads, hunting.	—	—	2

MODULE 5. DIGITAL TECHNIQUES/ELECTRONIC INSTRUMENT SYSTEMS

	LEVEL			
	A	**B1-1 B1-3**	**B1-2 B1-4**	**B2**
5.1 Electronic Instrument Systems Typical systems arrangements and cockpit layout of electronic instrument systems.	1	2	2	3
5.2 Numbering Systems Numbering systems: binary, octal and hexadecimal; Demonstration of conversions between the decimal and binary, octal and hexadecimal systems and vice versa.	—	1	—	2
5.3 Data Conversion (Analogue Data, Digital Data; Operation and application of analogue to digital, and digital to analogue converters, inputs and outputs, limitations of various types.	—	1	—	2
5.4 Data Buses Operation of data buses in aircraft systems, including knowledge of ARINC and other specifications. Aircraft Network/Ethernet.	—	2	—	2
5.5 Logic Circuits (a) Identification of common logic gate symbols, tables and equivalent circuits; Applications used for aircraft systems, schematic diagrams.	—	2	—	2
(b) Interpretation of logic diagrams.	—	—	—	2
5.6 Basic Computer Structure (a) Computer terminology (including bit, byte, software, hardware, CPU, IC, and various memory devices such as RAM, ROM, PROM); Computer technology (as applied in aircraft systems).	1	2	—	—
(b) Computer related terminology; Operation, layout and interface of the major components in a micro computer including their associated bus systems; Information contained in single and multi address instruction words; Memory associated terms; Operation of typical memory devices; Operation, advantages and disadvantages of the various data storage systems.	—	—	—	2
5.7 Microprocessors Functions performed and overall operation of a microprocessor; Basic operation of each of the following microprocessor elements: control and processing unit, clock, register, arithmetic logic unit.	—	—	—	2

5.8 Integrated Circuits Operation and use of encoders and decoders; Function of encoder types; Uses of medium, large and very large scale integration.	—	—	—	2
5.9 Multiplexing Operation, application and identification in logic diagrams of multiplexers and demultiplexers.	—	—	—	2
5.10 Fibre Optics Advantages and disadvantages of fibre optic data transmission over electrical wire propagation; Fibre optic data bus; Fibre optic related terms; Terminations; Couplers, control terminals, remote terminals; Application of fibre optics in aircraft systems.	—	1	1	2
5.11 Electronic Displays Principles of operation of common types of displays used in modern aircraft, including Cathode Ray Tubes, Light Emitting Diodes and Liquid Crystal Display.	—	2	1	2
5.12 Electrostatic Sensitive Devices Special handling of components sensitive to electrostatic discharges; Awareness of risks and possible damage, component and personnel anti-static protection devices.	1	2	2	2
5.13 Software Management Control Awareness of restrictions, airworthiness requirements and possible catastrophic effects of unapproved changes to software programmes.	—	2	1	2
5.14 Electromagnetic Environment Influence of the following phenomena on maintenance practices for electronic system: EMC-Electromagnetic Compatibility EMI-Electromagnetic Interference HIRF-High Intensity Radiated Field Lightning/lightning protection.	—	2	2	2

5.15 Typical Electronic/Digital Aircraft Systems General arrangement of typical electronic/digital aircraft systems and associated BITE (Built In Test Equipment) such as: (a) For B1 and B2 only: ACARS-ARINC Communication and Addressing and Reporting System EICAS-Engine Indication and Crew Alerting System FBW-Fly-by-Wire FMS-Flight Management System IRS-Inertial Reference System; (b) For B1, B2 and B3: ECAM-Electronic Centralised Aircraft Monitoring EFIS-Electronic Flight Instrument System GPS-Global Positioning System TCAS-Traffic Alert Collision Avoidance System Integrated Modular Avionics Cabin Systems Information Systems.	—	2	2	2

MODULE 6. MATERIALS AND HARDWARE

	LEVEL		
	A	**B1**	**B2**
6.1 Aircraft Materials — Ferrous (a) Characteristics, properties and identification of common alloy steels used in aircraft; Heat treatment and application of alloy steels.	1	2	1
(b) Testing of ferrous materials for hardness, tensile strength, fatigue strength and impact resistance.	—	1	1
6.2 Aircraft Materials — Non-Ferrous (a) Characteristics, properties and identification of common non-ferrous materials used in aircraft; Heat treatment and application of non-ferrous materials;	1	2	1
(b) Testing of non-ferrous material for hardness, tensile strength, fatigue strength and impact resistance.	—	1	1
6.3 Aircraft Materials — Composite and Non-Metallic *6.3.1 Composite and non-metallic other than wood and fabric* (a) Characteristics, properties and identification of common composite and non-metallic materials, other than wood, used in aircraft; Sealant and bonding agents;	1	2	2
(b) The detection of defects/deterioration in composite and non-metallic material; Repair of composite and non-metallic material.	1	2	—
6.3.2 Wooden structures Construction methods of wooden airframe structures; Characteristics, properties and types of wood and glue used in aeroplanes; Preservation and maintenance of wooden structure; Types of defects in wood material and wooden structures; The detection of defects in wooden structure; Repair of wooden structure.	1	2	—
6.3.3 Fabric covering Characteristics, properties and types of fabrics used in aeroplanes; Inspections methods for fabric; Types of defects in fabric; Repair of fabric covering.	1	2	—
6.4 Corrosion (a) Chemical fundamentals; Formation by, galvanic action process, microbiological, stress;	1	1	1
(b) Types of corrosion and their identification; Causes of corrosion; Material types, susceptibility to corrosion.	2	3	2

6.5 Fasteners *6.5.1 Screw threads* Screw nomenclature; Thread forms, dimensions and tolerances for standard threads used in aircraft; Measuring screw threads.	2	2	2
6.5.2 Bolts, studs and screws Bolt types: specification, identification and marking of aircraft bolts, international standards; Nuts: self locking, anchor, standard types; Machine screws: aircraft specifications; Studs: types and uses, insertion and removal; Self tapping screws, dowels.	2	2	2
6.5.3 Locking devices Tab and spring washers, locking plates, split pins, pal-nuts, wire locking, quick release fasteners, keys, circlips, cotter pins.	2	2	2
6.5.4 Aircraft rivets Types of solid and blind rivets: specifications and identification, heat treatment.	1	2	1
6.6 Pipes and Unions (a) Identification of, and types of rigid and flexible pipes and their connectors used in aircraft;	2	2	2
(b) Standard unions for aircraft hydraulic, fuel, oil, pneumatic and air system pipes.	2	2	1
6.7 Springs Types of springs, materials, characteristics and applications	—	2	1
6.8 Bearings Purpose of bearings, loads, material, construction; Types of bearings and their application.	1	2	2
6.9 Transmissions Gear types and their application; Gear ratios, reduction and multiplication gear systems, driven and driving gears, idler gears, mesh patterns; Belts and pulleys, chains and sprockets.	1	2	2
6.10 Control Cables Types of cables; End fittings, turnbuckles and compensation devices; Pulleys and cable system components; Bowden cables; Aircraft flexible control systems.	1	2	1

6.11 Electrical Cables and Connectors Cable types, construction and characteristics; High tension and co-axial cables; Crimping; Connector types, pins, plugs, sockets, insulators, current and voltage rating, coupling, identification codes.	1	2	2

MODULE 7A. MAINTENANCE PRACTICES

	LEVEL		
	A	**B1**	**B2**
7.1 Safety Precautions-Aircraft and Workshop Aspects of safe working practices including precautions to take when working with electricity, gases especially oxygen, oils and chemicals. Also, instruction in the remedial action to be taken in the event of a fire or another accident with one or more of these hazards including knowledge on extinguishing agents.	3	3	3
7.2 Workshop Practices Care of tools, control of tools, use of workshop materials; Dimensions, allowances and tolerances, standards of workmanship; Calibration of tools and equipment, calibration standards.	3	3	3
7.3 Tools Common hand tool types; Common power tool types; Operation and use of precision measuring tools; Lubrication equipment and methods. Operation, function and use of electrical general test equipment.	3	3	3
7.4 Avionic General Test Equipment Operation, function and use of avionic general test equipment.	—	2	3
7.5 Engineering Drawings, Diagrams and Standards Drawing types and diagrams, their symbols, dimensions, tolerances and projections; Identifying title block information; Microfilm, microfiche and computerised presentations; Specification 100 of the Air Transport Association (ATA) of America; Aeronautical and other applicable standards including ISO, AN, MS, NAS and MIL; Wiring diagrams and schematic diagrams.	1	2	2
7.6 Fits and Clearances Drill sizes for bolt holes, classes of fits; Common system of fits and clearances; Schedule of fits and clearances for aircraft and engines; Limits for bow, twist and wear; Standard methods for checking shafts, bearings and other parts.	1	2	1

7.7 Electrical Wiring Interconnection System (EWIS) Continuity, insulation and bonding techniques and testing; Use of crimp tools: hand and hydraulic operated; Testing of crimp joints; Connector pin removal and insertion; Co-axial cables: testing and installation precautions; Identification of wire types, their inspection criteria and damage tolerance. Wiring protection techniques: Cable looming and loom support, cable clamps, protective sleeving techniques including heat shrink wrapping, shielding; EWIS installations, inspection, repair, maintenance and cleanliness standards.	1	3	3
7.8 Riveting Riveted joints, rivet spacing and pitch; Tools used for riveting and dimpling; Inspection of riveted joints.	1	2	—
7.9 Pipes and Hoses Bending and belling/flaring aircraft pipes; Inspection and testing of aircraft pipes and hoses; Installation and clamping of pipes.	1	2	—
7.10 Springs Inspection and testing of springs.	1	2	—
7.11 Bearings Testing, cleaning and inspection of bearings; Lubrication requirements of bearings; Defects in bearings and their causes.	1	2	—
7.12 Transmissions Inspection of gears, backlash; Inspection of belts and pulleys, chains and sprockets; Inspection of screw jacks, lever devices, push-pull rod systems.	1	2	—
7.13 Control Cables Swaging of end fittings; Inspection and testing of control cables; Bowden cables; aircraft flexible control systems.	1	2	—
7.14 Material handling *7.14.1 Sheet Metal* Marking out and calculation of bend allowance; Sheet metal working, including bending and forming; Inspection of sheet metal work.	—	2	—

7.14.2 Composite and non-metallic Bonding practices; Environmental conditions; Inspection methods.	—	2	—
7.15 Welding, Brazing, Soldering and Bonding (a) Soldering methods; inspection of soldered joints.	—	2	2
(b) Welding and brazing methods; Inspection of welded and brazed joints; Bonding methods and inspection of bonded joints.	—	2	—
7.16 Aircraft Weight and Balance (a) Centre of Gravity/Balance limits calculation: use of relevant documents;	—	2	2
(b) Preparation of aircraft for weighing; Aircraft weighing.	—	2	—
7.17 Aircraft Handling and Storage Aircraft taxiing/towing and associated safety precautions; Aircraft jacking, chocking, securing and associated safety precautions; Aircraft storage methods; Refuelling/defuelling procedures; De-icing/anti-icing procedures; Electrical, hydraulic and pneumatic ground supplies. Effects of environmental conditions on aircraft handling and operation.	2	2	2
7.18 Disassembly, Inspection, Repair and Assembly Techniques (a) Types of defects and visual inspection techniques; Corrosion removal, assessment and reprotection;	2	3	3
(b) General repair methods, Structural Repair Manual; Ageing, fatigue and corrosion control programmes;	—	2	—
(c) Non-destructive inspection techniques including, penetrant, radiographic, eddy current, ultrasonic and boroscope methods;	—	2	1
(d) Disassembly and re-assembly techniques;	2	2	2
(e) Trouble shooting techniques.	—	2	2
7.19 Abnormal Events (a) Inspections following lightning strikes and HIRF penetration;	2	2	2
(b) Inspections following abnormal events such as heavy landings and flight through turbulence.	2	2	—

7.20 Maintenance Procedures Maintenance planning; Modification procedures; Stores procedures; Certification/release procedures; Interface with aircraft operation; Maintenance Inspection/Quality Control/Quality Assurance; Additional maintenance procedures; Control of life limited components.	1	2	2

MODULE 8. BASIC AERODYNAMICS

	LEVEL		
	A	**B1**	**B2**
8.1 Physics of the Atmosphere International Standard Atmosphere (ISA), application to aerodynamics.	1	2	2
8.2 Aerodynamics Airflow around a body; Boundary layer, laminar and turbulent flow, free stream flow, relative airflow, upwash and downwash, vortices, stagnation; The terms: camber, chord, mean aerodynamic chord, profile (parasite) drag, induced drag, centre of pressure, angle of attack, wash in and wash out, fineness ratio, wing shape and aspect ratio; Thrust, Weight, Aerodynamic Resultant; Generation of Lift and Drag: Angle of Attack, Lift coefficient, Drag coefficient, polar curve, stall; Aerofoil contamination including ice, snow, frost.	1	2	2
8.3 Theory of Flight Relationship between lift, weight, thrust and drag; Glide ratio; Steady state flights, performance; Theory of the turn; Influence of load factor: stall, flight envelope and structural limitations; Lift augmentation.	1	2	2
8.4 Flight Stability and Dynamics Longitudinal, lateral and directional stability (active and passive).	1	2	2

MODULE 9A. HUMAN FACTORS

	LEVEL		
	A	**B1**	**B2**
9.1 General The need to take human factors into account; Incidents attributable to human factors/human error; 'Murphy's' law.	1	2	2
9.2 Human Performance and Limitations Vision; Hearing; Information processing; Attention and perception; Memory; Claustrophobia and physical access.	1	2	2
9.3 Social Psychology Responsibility: individual and group; Motivation and de-motivation; Peer pressure; Culture' issues; Team working; Management, supervision and leadership.	1	1	1
9.4 Factors Affecting Performance Fitness/health; Stress: domestic and work related; Time pressure and deadlines; Workload: overload and underload; Sleep and fatigue, shiftwork; Alcohol, medication, drug abuse.	2	2	2
9.5 Physical Environment Noise and fumes; Illumination; Climate and temperature; Motion and vibration; Working environment.	1	1	1
9.6 Tasks Physical work; Repetitive tasks; Visual inspection; Complex systems.	1	1	1

9.7 Communication Within and between teams; Work logging and recording; Keeping up to date, currency; Dissemination of information.	2	2	2
9.8 Human Error Error models and theories; Types of error in maintenance tasks; Implications of errors (i.e. accidents); Avoiding and managing errors.	1	2	2
9.9 Hazards in the Workplace Recognising and avoiding hazards; Dealing with emergencies.	1	2	2

MODULE 10. AVIATION LEGISLATION

	LEVEL		
	A	**B1**	**B2**
10.1 Regulatory Framework Role of the International Civil Aviation Organisation; Role of the National Aviation Authorities CAA Civil Aviation Law Air Navigation Technical Regulation ANTR Relationship between the various regulation (ANTR) such as 21, M, 145, 66, and 147.	1	1	1
10.2 Certifying Staff — Maintenance Detailed understanding of ANTR 66.	2	2	2
10.3 Approved Maintenance Organisations Detailed understanding of ANTR 145.	2	2	2
10.4 Air operations General understanding of ANTR Operator's responsibilities, in particular regarding continuing airworthiness and maintenance; Aircraft Maintenance Programme; MEL//CDL; Documents to be carried on board; Aircraft placarding (markings).	1	1	1
10.5 Certification of aircraft, parts and appliances (a) General General understanding of ANTR 21 and EASA/FAA aircraft certification specifications CS/FAR-23, 25, 27, 29.	—	1	1
(b) Documents Certificate of Airworthiness; restricted certificates of airworthiness and permit to fly; Certificate of Registration; Noise Certificate; Weight Schedule; Radio Station Licence and Approval.	—	2	2
10.6 Continuing airworthiness Detailed understanding of ANTR 21 provisions related to continuing airworthiness. Detailed understanding of ANTR M.	2	2	2
10.7 Applicable National and International Requirements for (if not superseded by CAA requirements).	1	2	2

(a) Maintenance Programmes, Maintenance checks and inspections; Airworthiness Directives; Service Bulletins, manufacturers service information; Modifications and repairs; Maintenance documentation: maintenance manuals, structural repair manual, illustrated parts catalogue, etc.; Only for A to B2 licences: Master Minimum Equipment Lists, Minimum Equipment List, Dispatch Deviation Lists;	1	2	2
(b) Continuing airworthiness; Minimum equipment requirements — Test flights; Only for B1 and B2 licences: ETOPS/EDTO, maintenance and dispatch requirements; All Weather Operations, Category 2/3 operations.	—	1	1

MODULE 11A. TURBINE AEROPLANE AERODYNAMICS, STRUCTURES AND SYSTEMS

	LEVEL		
	A	**B1.1**	**B2**
11.1 Theory of Flight			
11.1.1. Aeroplane Aerodynamics and Flight Controls	1	2	—
Operation and effect of: - roll control: ailerons and spoilers, - pitch control: elevators, stabilators, variable incidence stabilisers and canards, - yaw control, rudder limiters; Control using elevons, ruddervators; High lift devices, slots, slats, flaps, flaperons; Drag inducing devices, spoilers, lift dumpers, speed brakes; Effects of wing fences, saw tooth leading edges; Boundary layer control using, vortex generators, stall wedges or leading edge devices; Operation and effect of trim tabs, balance and antibalance (leading) tabs, servo tabs, spring tabs, mass balance, control surface bias, aerodynamic balance panels.	—	—	—
11.1.2. High Speed Flight Speed of sound, subsonic flight, transonic flight, supersonic flight; Mach number, critical Mach number, compressibility buffet, shock wave, aerodynamic heating, area rule; Factors affecting airflow in engine intakes of high speed aircraft; Effects of sweepback on critical Mach number.	1	2	—
11.2 Airframe Structures — General Concepts			
(a) Airworthiness requirements for structural strength; Structural classification, primary, secondary and tertiary; Fail safe, safe life, damage tolerance concepts; Zonal and station identification systems; Stress, strain, bending, compression, shear, torsion, tension, hoop stress, fatigue; Drains and ventilation provisions; System installation provisions; Lightning strike protection provision; Aircraft bonding.	2	2	—
(b) Construction methods of: stressed skin fuselage, formers, stringers, longerons, bulkheads, frames, doublers, struts, ties, beams, floor structures, reinforcement, methods of skinning, anti-corrosive protection, wing, empennage and engine attachments; Structure assembly techniques: riveting, bolting, bonding; Methods of surface protection, such as chromating, anodising, painting; Surface cleaning; Airframe symmetry: methods of alignment and symmetry checks.	1	2	—

11.3 Airframe Structures — Aeroplanes *11.3.1 Fuselage (ATA 52/53/56)* Construction and pressurisation sealing; Wing, stabiliser, pylon and undercarriage attachments; Seat installation and cargo loading system; Doors and emergency exits: construction, mechanisms, operation and safety devices; Windows and windscreen construction and mechanisms.	1	2	—
11.3.2 Wings (ATA 57) Construction; Fuel storage; Landing gear, pylon, control surface and high lift/drag attachments.	1	2	—
11.3.3 Stabilisers (ATA 55) Construction; Control surface attachment.	1	2	—
11.3.4 Flight Control Surfaces (ATA 55/57) Construction and attachment; Balancing — mass and aerodynamic.	1	2	—
11.4 Air Conditioning and Cabin Pressurisation (ATA 21) *11.4.1 Air supply* Sources of air supply including engine bleed, APU and ground cart.	1	2	—
11.4.2 Air Conditioning Air conditioning systems; Air cycle and vapour cycle machines; Distribution systems; Flow, temperature and humidity control system.	1	3	—
11.4.3 Pressurisation Pressurisation systems; Control and indication including control and safety valves; Cabin pressure controllers.	1	3	—
11.4.4 Safety and warning devices Protection and warning devices.	1	3	—
11.5 Instruments/Avionic Systems *11.5.1 Instrument Systems (ATA 31)* Pitot static: altimeter, air speed indicator, vertical speed indicator; Gyroscopic: artificial horizon, attitude director, direction indicator, horizontal situation indicator, turn and slip indicator, turn coordinator; Compasses: direct reading, remote reading; Angle of attack indication, stall warning systems; Glass cockpit; Other aircraft system indication.	1	2	—

11.5.2 Avionic Systems Fundamentals of system lay-outs and operation of: - Auto Flight (ATA 22), - Communications (ATA 23), - Navigation Systems (ATA 34).	1 —	1 —	—
11.6 Electrical Power (ATA 24) Batteries Installation and Operation; DC power generation; AC power generation; Emergency power generation; Voltage regulation; Power distribution; Inverters, transformers, rectifiers; Circuit protection; External/Ground power.	1	3	—
11.7 Equipment and Furnishings (ATA 25) (a) Emergency equipment requirements; Seats, harnesses and belts.	2	2	—
(b) Cabin lay-out; Equipment lay-out; Cabin Furnishing installation; Cabin entertainment equipment; Galley installation; Cargo handling and retention equipment; Airstairs.	1	1	—
11.8 Fire Protection (ATA 26) (a) Fire and smoke detection and warning systems; Fire extinguishing systems; System tests;	1	3	—
(b) Portable fire extinguisher.	1	1	—
11.9 Flight Controls (ATA 27) Primary controls: aileron, elevator, rudder, spoiler; Trim control; Active load control; High lift devices; Lift dump, speed brakes; System operation: manual, hydraulic, pneumatic, electrical, fly-by-wire; Artificial feel, Yaw damper, Mach trim, rudder limiter, gust lock systems; Balancing and rigging; Stall protection/warning system.	1	3	—

11.10 Fuel Systems (ATA 28) System lay-out; Fuel tanks; Supply systems; Dumping, venting and draining; Cross-feed and transfer; Indications and warnings; Refuelling and defuelling; Longitudinal balance fuel systems.	1	3	—
11.11 Hydraulic Power (ATA 29) System lay-out; Hydraulic fluids; Hydraulic reservoirs and accumulators; Pressure generation: electric, mechanical, pneumatic; Emergency pressure generation; Filters; Pressure Control; Power distribution; Indication and warning systems; Interface with other systems.	1	3	—
11.12 Ice and Rain Protection (ATA 30) Ice formation, classification and detection; Anti-icing systems: electrical, hot air and chemical; De-icing systems: electrical, hot air, pneumatic and chemical; Rain repellent; Probe and drain heating; Wiper systems.	1	3	—
11.13 Landing Gear (ATA 32) Construction, shock absorbing; Extension and retraction systems: normal and emergency; Indications and warning; Wheels, brakes, antiskid and autobraking; Tyres; Steering; Air-ground sensing.	2	3	—
11.14 Lights (ATA 33) External: navigation, anti collision, landing, taxiing, ice; Internal: cabin, cockpit, cargo; Emergency.	2	3	—
11.15 Oxygen (ATA 35) System lay-out: cockpit, cabin; Sources, storage, charging and distribution; Supply regulation; Indications and warnings.	1	3	—

11.16 Pneumatic/Vacuum (ATA 36) System lay-out; Sources: engine/APU, compressors, reservoirs, ground supply; Pressure control; Distribution; Indications and warnings; Interfaces with other systems.	1	3	—
11.17 Water/Waste (ATA 38) Water system lay-out, supply, distribution, servicing and draining; Toilet system lay-out, flushing and servicing; Corrosion aspects.	2	3	—
11.18 On Board Maintenance Systems (ATA 45) Central maintenance computers; Data loading system; Electronic library system; Printing; Structure monitoring (damage tolerance monitoring).	1	2	—
11.19 Integrated Modular Avionics (ATA 42) Functions that may be typically integrated in the Integrated Modular Avionic (IMA) modules are, among others: Bleed Management, Air Pressure Control, Air Ventilation and Control, Avionics and Cockpit Ventilation Control, Temperature Control, Air Traffic Communication, Avionics Communication Router, Electrical Load Management, Circuit Breaker Monitoring, Electrical System BITE, Fuel Management, Braking Control, Steering Control, Landing Gear Extension and Retraction, Tyre Pressure Indication, Oleo Pressure Indication, Brake Temperature Monitoring, etc. Core System; Network Components.	1	2	—
11.20 Cabin Systems (ATA 44) The units and components which furnish a means of entertaining the passengers and providing communication within the aircraft (Cabin Intercommunication Data System) and between the aircraft cabin and ground stations (Cabin Network Service). Includes voice, data, music and video transmissions. The Cabin Intercommunication Data System provides an interface between cockpit/cabin crew and cabin systems. These systems support data exchange of the different related LRU's and they are typically operated via Flight Attendant Panels. The Cabin Network Service typically consists on a server, typically interfacing with, among others, the following systems: - Data/Radio Communication, In-Flight Entertainment System.	1	2	—

The Cabin Network Service may host functions such as: - Access to pre-departure/departure reports, - E-mail/intranet/Internet access, - Passenger database; Cabin Core System; In-flight Entertainment System; External Communication System; Cabin Mass Memory System; Cabin Monitoring System; Miscellaneous Cabin System.	1	2	—
11.21 Information Systems (ATA 46) The units and components which furnish a means of storing, updating and retrieving digital information traditionally provided on paper, microfilm or microfiche. Includes units that are dedicated to the information storage and retrieval function such as the electronic library mass storage and controller. Does not include units or components installed for other uses and shared with other systems, such as flight deck printer or general use display. Typical examples include Air Traffic and Information Management Systems and Network Server Systems Aircraft General Information System; Flight Deck Information System; Maintenance Information System; Passenger Cabin Information System; Miscellaneous Information System.	1	2	—

MODULE 11B. PISTON AEROPLANE AERODYNAMICS, STRUCTURES AND SYSTEMS

Note: The scope of this Module shall reflect the technology of aeroplanes pertinent to the A2 and B1.2 subcategory.

	LEVEL	
	A2	**B1.2**
11.1 Theory of Flight		
11.1.1. Aeroplane Aerodynamics and Flight Controls	1	2
Operation and effect of: - roll control: ailerons and spoilers, - pitch control: elevators, stabilators, variable incidence stabilisers and canards, - yaw control, rudder limiters; Control using elevons, ruddervators; High lift devices, slots, slats, flaps, flaperons; Drag inducing devices, spoilers, lift dumpers, speed brakes; Effects of wing fences, saw tooth leading edges; Boundary layer control using, vortex generators, stall wedges or leading edge devices; Operation and effect of trim tabs, balance and antibalance (leading) tabs, servo tabs, spring tabs, mass balance, control surface bias, aerodynamic balance panels.	—	—
11.1.2. High Speed Flight — N/A	—	—
11.2 Airframe Structures — General Concepts		
(a) Airworthiness requirements for structural strength; Structural classification, primary, secondary and tertiary; Fail safe, safe life, damage tolerance concepts; Zonal and station identification systems; Stress, strain, bending, compression, shear, torsion, tension, hoop stress, fatigue; Drains and ventilation provisions; System installation provisions; Lightning strike protection provision; Aircraft bonding.	2	2
(b) Construction methods of: stressed skin fuselage, formers, stringers, longerons, bulkheads, frames, doublers, struts, ties, beams, floor structures, reinforcement, methods of skinning, anti-corrosive protection, wing, empennage and engine attachments; Structure assembly techniques: riveting, bolting, bonding; Methods of surface protection, such as chromating, anodising, painting; Surface cleaning; Airframe symmetry: methods of alignment and symmetry checks.	1	2
11.3 Airframe Structures — Aeroplanes		
11.3.1 Fuselage (ATA 52/53/56) Construction and pressurisation sealing; Wing, tail-plane, pylon and undercarriage attachments; Seat installation; Doors and emergency exits: construction and operation; Windows and windscreen attachment.	1	2

11.3.2 Wings (ATA 57) Construction; Fuel storage; Landing gear, pylon, control surface and high lift/drag attachments.	1	2
11.3.3 Stabilisers (ATA 55) Construction; Control surface attachment.	1	2
11.3.4 Flight Control Surfaces (ATA 55/57) Construction and attachment; Balancing — mass and aerodynamic.	1	2
11.3.5 Nacelles/Pylons (ATA 54) Nacelles/Pylons: - Construction, - Firewalls, - Engine mounts.	1 —	2 —
11.4 Air Conditioning and Cabin Pressurisation (ATA 21) Pressurisation and air conditioning systems; Cabin pressure controllers, protection and warning devices; Heating systems.	1	3
11.5 Instruments/Avionic Systems *11.5.1 Instrument Systems (ATA 31)* Pitot static: altimeter, air speed indicator, vertical speed indicator; Gyroscopic: artificial horizon, attitude director, direction indicator, horizontal situation indicator, turn and slip indicator, turn coordinator; Compasses: direct reading, remote reading; Angle of attack indication, stall warning systems; Glass cockpit; Other aircraft system indication.	1	2
11.5.2 Avionic Systems Fundamentals of system lay-outs and operation of: - Auto Flight (ATA 22), - Communications (ATA 23), - Navigation Systems (ATA 34).	1 —	1 —
11.6 Electrical Power (ATA 24) Batteries Installation and Operation; DC power generation; Voltage regulation; Power distribution; Circuit protection; Inverters, transformers.	1	3
11.7 Equipment and Furnishings (ATA 25) (a) Emergency equipment requirements; Seats, harnesses and belts;	2	2
(b) Cabin lay-out; Equipment lay-out;	1	1

Cabin Furnishing installation; Cabin entertainment equipment; Galley installation; Cargo handling and retention equipment; Airstairs.	1	1
11.8 Fire Protection (ATA 26) (a) Fire and smoke detection and warning systems; Fire extinguishing systems; System tests;	1	3
(b) Portable fire extinguisher.	1	3
11.9 Flight Controls (ATA 27) Primary controls: aileron, elevator, rudder; Trim tabs; High lift devices; System operation: manual; Gust locks; Balancing and rigging; Stall warning system.	1	3
11.10 Fuel Systems (ATA 28) System lay-out; Fuel tanks; Supply systems; Cross-feed and transfer; Indications and warnings; Refuelling and defuelling.	1	3
11.11 Hydraulic Power (ATA 29) System lay-out; Hydraulic fluids; Hydraulic reservoirs and accumulators; Pressure generation: electric, mechanical; Filters; Pressure Control; Power distribution; Indication and warning systems.	1	3
11.12 Ice and Rain Protection (ATA 30) Ice formation, classification and detection; De-icing systems: electrical, hot air, pneumatic and chemical; Probe and drain heating; Wiper systems.	1	3

11.13 Landing Gear (ATA 32) Construction, shock absorbing; Extension and retraction systems: normal and emergency; Indications and warning; Wheels, brakes, antiskid and autobraking; Tyres; Steering; Air-ground sensing.	2	3
11.14 Lights (ATA 33) External: navigation, anti collision, landing, taxiing, ice; Internal: cabin, cockpit, cargo; Emergency.	2	3
11.15 Oxygen (ATA 35) System lay-out: cockpit, cabin; Sources, storage, charging and distribution; Supply regulation; Indications and warnings.	1	3
11.16 Pneumatic/Vacuum (ATA 36) System lay-out; Sources: engine/APU, compressors, reservoirs, ground supply; Pressure control; Distribution; Indications and warnings; Interfaces with other systems.	1	3
11.17 Water/Waste (ATA 38) Water system lay-out, supply, distribution, servicing and draining; Toilet system lay-out, flushing and servicing; Corrosion aspects.	2	3

MODULE 12. HELICOPTER AERODYNAMICS, STRUCTURES AND SYSTEMS

	LEVEL	
	A3 A4	**B1.3 B1.4**
12.1 Theory of Flight — Rotary Wing Aerodynamics Terminology; Effects of gyroscopic precession; Torque reaction and directional control; Dissymmetry of lift, Blade tip stall; Translating tendency and its correction; Coriolis effect and compensation; Vortex ring state, power settling, overpitching; Auto-rotation; Ground effect.	1	2
12.2 Flight Control Systems Cyclic control; Collective control; Swashplate; Yaw control: Anti-Torque Control, Tail rotor, bleed air; Main Rotor Head: Design and Operation features; Blade Dampers: Function and construction; Rotor Blades: Main and tail rotor blade construction and attachment; Trim control, fixed and adjustable stabilisers; System operation: manual, hydraulic, electrical and fly-by-wire; Artificial feel; Balancing and rigging.	2	3
12.3 Blade Tracking and Vibration Analysis Rotor alignment; Main and tail rotor tracking; Static and dynamic balancing; Vibration types, vibration reduction methods; Ground resonance.	1	3
12.4 Transmission Gear boxes, main and tail rotors; Clutches, free wheel units and rotor brake; Tail rotor drive shafts, flexible couplings, bearings, vibration dampers and bearing hangers.	1	3
12.5 Airframe Structures (a) Airworthiness requirements for structural strength; Structural classification, primary, secondary and tertiary; Fail safe, safe life, damage tolerance concepts; Zonal and station identification systems; Stress, strain, bending, compression, shear, torsion, tension, hoop stress, fatigue;	2	2

Drains and ventilation provisions; System installation provisions; Lightning strike protection provision;	2	2
(b) Construction methods of: stressed skin fuselage, formers, stringers, longerons, bulkheads, frames, doublers, struts, ties, beams, floor structures, reinforcement, methods of skinning and anti-corrosive protection. Pylon, stabiliser and undercarriage attachments; Seat installation; Doors: construction, mechanisms, operation and safety devices; Windows and windscreen construction; Fuel storage; Firewalls; Engine mounts; Structure assembly techniques: riveting, bolting, bonding; Methods of surface protection, such as chromating, anodising, painting; Surface cleaning. Airframe symmetry: methods of alignment and symmetry checks.	1	2
12.6 Air Conditioning (ATA 21) *12.6.1 Air supply* Sources of air supply including engine bleed and ground cart.	1	2
12.6.2 Air conditioning Air conditioning systems; Distribution systems; Flow and temperature control systems; Protection and warning devices.	1	3
12.7 Instruments/Avionic Systems *12.7.1 Instrument Systems (ATA 31)* Pitot static: altimeter, air speed indicator, vertical speed indicator; Gyroscopic: artificial horizon, attitude director, direction indicator, horizontal situation indicator, turn and slip indicator, turn coordinator; Compasses: direct reading, remote reading; Vibration indicating systems — HUMS; Glass cockpit; Other aircraft system indication.	1	2
12.7.2 Avionic Systems Fundamentals of system layouts and operation of: Auto Flight (ATA 22); Communications (ATA 23); Navigation Systems (ATA 34).	1	1

12.8 Electrical Power (ATA 24) Batteries Installation and Operation; DC power generation, AC power generation; Emergency power generation; Voltage regulation, Circuit protection. Power distribution; Inverters, transformers, rectifiers; External/Ground power.	1	3
12.9 Equipment and Furnishings (ATA 25) (a) Emergency equipment requirements; Seats, harnesses and belts; Lifting systems;	2 —	2 —
(b) Emergency flotation systems; Cabin lay-out, cargo retention; Equipment lay-out; Cabin Furnishing Installation.	1	1
12.10 Fire Protection (ATA 26) Fire and smoke detection and warning systems; Fire extinguishing systems; System tests.	1	3
12.11 Fuel Systems (ATA 28) System lay-out; Fuel tanks; Supply systems; Dumping, venting and draining; Cross-feed and transfer; Indications and warnings; Refuelling and defuelling.	1	3
12.12 Hydraulic Power (ATA 29) System lay-out; Hydraulic fluids; Hydraulic reservoirs and accumulators; Pressure generation: electric, mechanical, pneumatic; Emergency pressure generation; Filters; Pressure Control; Power distribution; Indication and warning systems; Interface with other systems.	1	3
12.13 Ice and Rain Protection (ATA 30) Ice formation, classification and detection; Anti-icing and De-icing systems: electrical, hot air and chemical; Rain repellent and removal; Probe and drain heating; Wiper system.	1	3

12.14 Landing Gear (ATA 32) Construction, shock absorbing; Extension and retraction systems: normal and emergency; Indications and warning; Wheels, Tyres, brakes; Steering; Air-ground sensing; Skids, floats.	2	3
12.15 Lights (ATA 33) External: navigation, landing, taxiing, ice; Internal: cabin, cockpit, cargo; Emergency.	2	3
12.16 Pneumatic/Vacuum (ATA 36) System lay-out; Sources: engine/APU, compressors, reservoirs, ground supply; Pressure control; Distribution; Indications and warnings; Interfaces with other systems.	1	3
12.17 Integrated Modular Avionics (ATA 42) Functions that may be typically integrated in the Integrated Modular Avionic (IMA) modules are, among others: Bleed Management, Air Pressure Control, Air Ventilation and Control, Avionics and Cockpit Ventilation Control, Temperature Control, Air Traffic Communication, Avionics Communication Router, Electrical Load Management, Circuit Breaker Monitoring, Electrical System BITE, Fuel Management, Braking Control, Steering Control, Landing Gear Extension and Retraction, Tyre Pressure Indication, Oleo Pressure Indication, Brake Temperature Monitoring, etc. Core System; Network Components.	1	2
12.18 On Board Maintenance Systems (ATA 45) Central maintenance computers; Data loading system; Electronic library system; Printing; Structure monitoring (damage tolerance monitoring).	1	2

12.19 Information Systems (ATA46) The units and components which furnish a means of storing, updating and retrieving digital information traditionally provided on paper, microfilm or microfiche. Includes units that are dedicated to the information storage and retrieval function such as the electronic library mass storage and controller. Does not include units or components installed for other uses and shared with other systems, such as flight deck printer or general use display. Typical examples include Air Traffic and Information Management Systems and Network Server Systems. Aircraft General Information System; Flight Deck Information System; Maintenance Information System; Passenger Cabin Information System; Miscellaneous Information System.	1	2

MODULE 13. AIRCRAFT AERODYNAMICS, STRUCTURES AND SYSTEMS

	LEVEL B2
13.1 Theory of Flight (a) Aeroplane Aerodynamics and Flight Controls Operation and effect of: - roll control: ailerons and spoilers, - pitch control: elevators, stabilators, variable incidence stabilisers and canards; - yaw control, rudder limiters; Control using elevons, ruddervators; High lift devices: slots, slats, flaps; Drag inducing devices: spoilers, lift dumpers, speed brakes; Operation and effect of trim tabs, servo tabs, control surface bias;	1 —
(b) High Speed Flight Speed of sound, subsonic flight, transonic flight, supersonic flight; Mach number, critical Mach number;	1
(c) Rotary Wing Aerodynamics Terminology; Operation and effect of cyclic, collective and anti-torque controls.	1
13.2 Structures — General Concepts (a) Fundamentals of structural systems;	1
(b) Zonal and station identification systems; Electrical bonding; Lightning strike protection provision.	2
13.3 Autoflight (ATA 22) Fundamentals of automatic flight control including working principles and current terminology; Command signal processing; Modes of operation: roll, pitch and yaw channels; Yaw dampers; Stability Augmentation System in helicopters; Automatic trim control; Autopilot navigation aids interface; Autothrottle systems; Automatic Landing Systems: principles and categories, modes of operation, approach, glideslope, land, go-around, system monitors and failure conditions.	3
13.4 Communication/Navigation (ATA 23/34) Fundamentals of radio wave propagation, antennas, transmission lines, communication, receiver and transmitter; Working principles of following systems: - Very High Frequency (VHF) communication, - High Frequency (HF) communication, - Audio,	3 —

- Emergency Locator Transmitters, - Cockpit Voice Recorder, - Very High Frequency omnidirectional range (VOR), - Automatic Direction Finding (ADF), - Instrument Landing System (ILS), - Microwave Landing System (MLS), - Flight Director systems, Distance Measuring Equipment (DME), - Very Low Frequency and hyperbolic navigation (VLF/Omega), - Doppler navigation, - Area navigation, RNAV systems, - Flight Management Systems, - Global Positioning System (GPS), Global Navigation Satellite Systems (GNSS), - Inertial Navigation System, - Air Traffic Control transponder, secondary surveillance radar, - Traffic Alert and Collision Avoidance System (TCAS), - Weather avoidance radar, - Radio altimeter, - ARINC communication and reporting.	
13.5 Electrical Power (ATA 24) Batteries Installation and Operation; DC power generation; AC power generation; Emergency power generation; Voltage regulation; Power distribution; Inverters, transformers, rectifiers; Circuit protection; External/Ground power.	3
13.6 Equipment and Furnishings (ATA 25) Electronic emergency equipment requirements; Cabin entertainment equipment.	3
13.7 Flight Controls (ATA 27) (a) Primary controls: aileron, elevator, rudder, spoiler; Trim control; Active load control; High lift devices; Lift dump, speed brakes; System operation: manual, hydraulic, pneumatic; Artificial feel, Yaw damper, Mach trim, rudder limiter, gust locks. Stall protection systems;	2
(b) System operation: electrical, fly-by-wire.	3

13.8 Instruments (ATA 31) Classification; Atmosphere; Terminology; Pressure measuring devices and systems; Pitot static systems; Altimeters; Vertical speed indicators; Airspeed indicators; Machmeters; Altitude reporting/alerting systems; Air data computers; Instrument pneumatic systems; Direct reading pressure and temperature gauges; Temperature indicating systems; Fuel quantity indicating systems; Gyroscopic principles; Artificial horizons; Slip indicators; Directional gyros; Ground Proximity Warning Systems; Compass systems; Flight Data Recording systems; Electronic Flight Instrument Systems; Instrument warning systems including master warning systems and centralised warning panels; Stall warning systems and angle of attack indicating systems; Vibration measurement and indication; Glass cockpit.	3
13.9 Lights (ATA 33) External: navigation, landing, taxiing, ice; Internal: cabin, cockpit, cargo; Emergency.	3
13.10 On Board Maintenance Systems (ATA 45) Central maintenance computers; Data loading system; Electronic library system; Printing; Structure monitoring (damage tolerance monitoring).	3
13.11 Air Conditioning and Cabin Pressurisation (ATA 21) *13.11.1. Air supply* Sources of air supply including engine bleed, APU and ground cart;	2

13.11.2. Air Conditioning	
Air conditioning systems;	2
Air cycle and vapour cycle machines;	3
Distribution systems;	1
Flow, temperature and humidity control system.	3
13.11.3. Pressurisation	3
Pressurisation systems;	
Control and indication including control and safety valves;	
Cabin pressure controllers.	
13.11.4. Safety and warning devices	3
Protection and warning devices.	
13.12 Fire Protection (ATA 26)	3
(a) Fire and smoke detection and warning systems;	
Fire extinguishing systems;	
System tests;	
(b) Portable fire extinguisher.	1
13.13 Fuel Systems (ATA 28)	
System lay-out;	1
Fuel tanks;	1
Supply systems;	1
Dumping, venting and draining;	1
Cross-feed and transfer;	2
Indications and warnings;	3
Refuelling and defuelling;	2
Longitudinal balance fuel systems.	3
13.14 Hydraulic Power (ATA 29)	
System lay-out;	1
Hydraulic fluids;	1
Hydraulic reservoirs and accumulators;	1
Pressure generation: electrical, mechanical, pneumatic;	3
Emergency pressure generation;	3
Filters;	1
Pressure control;	3
Power distribution;	1
Indication and warning systems;	3
Interface with other systems.	3
13.15 Ice and Rain Protection (ATA 30)	
Ice formation, classification and detection;	1
Anti-icing systems: electrical, hot air and chemical;	3

De-icing systems: electrical, hot air, pneumatic, chemical;	3
Rain repellent;	3
Rain repellent;	1
Probe and drain heating;	3
Wiper Systems.	3
13.16 Landing Gear (ATA 32)	
Construction, shock absorbing;	1
Extension and retraction systems: normal and emergency;	3
Indications and warnings;	3
Wheels, brakes, antiskid and autobraking;	3
Tyres;	1
Steering;	3
Air-ground sensing.	3
13.17 Oxygen (ATA 35)	
System lay-out: cockpit, cabin;	3
Sources, storage, charging and distribution;	3
Supply regulation;	3
Indications and warnings.	3
13.18 Pneumatic/Vacuum (ATA 36)	
System lay-out;	2
Sources: engine/APU, compressors, reservoirs, ground supply;	2
Pressure control;	3
Distribution;	1
Indications and warnings;	3
Interfaces with other systems.	3
13.19 Water/Waste (ATA 38) Water system lay-out, supply, distribution, servicing and draining; Toilet system lay-out, flushing and servicing.	2
13.20 Integrated Modular Avionics (ATA42) Functions that may be typically integrated in the Integrated Modular Avionic (IMA) modules are, among others: Bleed Management, Air Pressure Control, Air Ventilation and Control, Avionics and Cockpit Ventilation Control, Temperature Control, Air Traffic Communication, Avionics Communication Router, Electrical Load Management, Circuit Breaker Monitoring, Electrical System BITE, Fuel Management, Braking Control, Steering Control, Landing Gear Extension and Retraction, Tyre Pressure Indication, Oleo Pressure Indication, Brake Temperature Monitoring, etc.; Core System; Network Components.	3

13.21 Cabin Systems (ATA44) The units and components which furnish a means of entertaining the passengers and providing communication within the aircraft (Cabin Intercommunication Data System) and between the aircraft cabin and ground stations (Cabin Network Service). Includes voice, data, music and video transmissions. The Cabin Intercommunication Data System provides an interface between cockpit/cabincrew and cabin systems. These systems support data exchange of the different related LRU's and they are typically operated via Flight Attendant Panels.	3
The Cabin Network Service typically consists on a server, typically interfacing with, among others, the following systems: - Data/Radio Communication, In-Flight Entertainment System.	—
The Cabin Network Service may host functions such as: - Access to pre-departure/departure reports, - E-mail/intranet/Internet access, - Passenger database; Cabin Core System; In-flight Entertainment System; External Communication System; Cabin Mass Memory System; Cabin Monitoring System; Miscellaneous Cabin System.	—
13.22 Information Systems (ATA46) The units and components which furnish a means of storing, updating and retrieving digital information traditionally provided on paper, microfilm or microfiche. Includes units that are dedicated to the information storage and retrieval function such as the electronic library mass storage and controller. Does not include units or components installed for other uses and shared with other systems, such as flight deck printer or general use display. Typical examples include Air Traffic and Information Management Systems and Network Server Systems. Aircraft General Information System; Flight Deck Information System; Maintenance Information System; Passenger Cabin Information System; Miscellaneous Information System.	3

MODULE 14. PROPULSION

	LEVEL B2
14.1 Turbine Engines (a) Constructional arrangement and operation of turbojet, turbofan, turboshaft and turbopropeller engines;	1
(b) Electronic Engine control and fuel metering systems (FADEC).	2
14.2 Engine Indicating Systems Exhaust gas temperature/Interstage turbine temperature systems; Engine speed; Engine Thrust Indication: Engine Pressure Ratio, engine turbine discharge pressure or jet pipe pressure systems; Oil pressure and temperature; Fuel pressure, temperature and flow; Manifold pressure; Engine torque; Propeller speed.	2
14.3 Starting and Ignition Systems Operation of engine start systems and components; Ignition systems and components; Maintenance safety requirements.	2

MODULE 15. GAS TURBINE ENGINE

	LEVEL	
	A	**B1**
15.1 Fundamentals Potential energy, kinetic energy, Newton's laws of motion, Brayton cycle; The relationship between force, work, power, energy, velocity, acceleration; Constructional arrangement and operation of turbojet, turbofan, turboshaft, turboprop.	1	2
15.2 Engine Performance Gross thrust, net thrust, choked nozzle thrust, thrust distribution, resultant thrust, thrust horsepower, equivalent shaft horsepower, specific fuel consumption; Engine efficiencies; By-pass ratio and engine pressure ratio; Pressure, temperature and velocity of the gas flow; Engine ratings, static thrust, influence of speed, altitude and hot climate, flat rating, limitations.	—	2
15.3 Inlet Compressor inlet ducts Effects of various inlet configurations; Ice protection.	2	2
15.4 Compressors Axial and centrifugal types; Constructional features and operating principles and applications; Fan balancing; Operation: Causes and effects of compressor stall and surge; Methods of air flow control: bleed valves, variable inlet guide vanes, variable stator vanes, rotating stator blades; Compressor ratio.	1	2
15.5 Combustion Section Constructional features and principles of operation.	1	2
15.6 Turbine Section Operation and characteristics of different turbine blade types; Blade to disk attachment; Nozzle guide vanes; Causes and effects of turbine blade stress and creep.	2	2
15.7 Exhaust Constructional features and principles of operation; Convergent, divergent and variable area nozzles; Engine noise reduction; Thrust reversers.	1	2
15.8 Bearings and Seals Constructional features and principles of operation.	—	2

15.9 Lubricants and Fuels Properties and specifications; Fuel additives; Safety precautions.	1	2
15.10 Lubrication Systems System operation/lay-out and components.	1	2
15.11 Fuel Systems Operation of engine control and fuel metering systems including electronic engine control (FADEC); Systems lay-out and components.	1	2
15.12 Air Systems Operation of engine air distribution and anti-ice control systems, including internal cooling, sealing and external air services.	1	2
15.13 Starting and Ignition Systems Operation of engine start systems and components; Ignition systems and components; Maintenance safety requirements.	1	2
15.14 Engine Indication Systems Exhaust Gas Temperature/Interstage Turbine Temperature; Engine Thrust Indication: Engine Pressure Ratio, engine turbine discharge pressure or jet pipe pressure systems; Oil pressure and temperature; Fuel pressure and flow; Engine speed; Vibration measurement and indication; Torque; Power.	1	2
15.15 Power Augmentation Systems Operation and applications; Water injection, water methanol; Afterburner systems.	—	1
15.16 Turbo-prop Engines Gas coupled/free turbine and gear coupled turbines; Reduction gears; Integrated engine and propeller controls; Overspeed safety devices.	1	2
15.17 Turbo-shaft Engines Arrangements, drive systems, reduction gearing, couplings, control systems.	1	2
15.18 Auxiliary Power Units (APUs) Purpose, operation, protective systems.	1	2
15.19 Powerplant Installation Configuration of firewalls, cowlings, acoustic panels, engine mounts, anti-vibration mounts, hoses, pipes, feeders, connectors, wiring looms, control cables and rods, lifting points and drains.	1	2

15.20 Fire Protection Systems Operation of detection and extinguishing systems.	1	2
15.21 Engine Monitoring and Ground Operation Procedures for starting and ground run-up; Interpretation of engine power output and parameters; Trend (including oil analysis, vibration and boroscope) monitoring; Inspection of engine and components to criteria, tolerances and data specified by engine manufacturer; Compressor washing/cleaning; Foreign Object Damage.	1	3
15.22 Engine Storage and Preservation Preservation and depreservation for the engine and accessories/systems.	—	2

MODULE 16. PISTON ENGINE

	LEVEL	
	A	**B1**
16.1 Fundamentals Mechanical, thermal and volumetric efficiencies; Operating principles — 2 stroke, 4 stroke, Otto and Diesel; Piston displacement and compression ratio; Engine configuration and firing order.	1	2
16.2 Engine Performance Power calculation and measurement; Factors affecting engine power; Mixtures/leaning, pre-ignition.	1	2
16.3 Engine Construction Crank case, crank shaft, cam shafts, sumps; Accessory gearbox; Cylinder and piston assemblies; Connecting rods, inlet and exhaust manifolds; Valve mechanisms; Propeller reduction gearboxes.	1	2
16.4 Engine Fuel Systems *16.4.1 Carburettors* Types, construction and principles of operation; Icing and heating.	1	2
16.4.2 Fuel injection systems Types, construction and principles of operation.	1	2
16.4.3 Electronic engine control Operation of engine control and fuel metering systems including electronic engine control (FADEC); Systems lay-out and components.	1	2
16.5 Starting and Ignition Systems Starting systems, pre-heat systems; Magneto types, construction and principles of operation; Ignition harnesses, spark plugs; Low and high tension systems.	1	2
16.6 Induction, Exhaust and Cooling Systems Construction and operation of: induction systems including alternate air systems; Exhaust systems, engine cooling systems — air and liquid.	1	2
16.7 Supercharging/Turbocharging Principles and purpose of supercharging and its effects on engine parameters; Construction and operation of supercharging/turbocharging systems; System terminology; Control systems; System protection.	1	2

16.8 Lubricants and Fuels Properties and specifications; Fuel additives; Safety precautions.	1	2
16.9 Lubrication Systems System operation/lay-out and components.	1	2
16.10 Engine Indication Systems Engine speed; Cylinder head temperature; Coolant temperature; Oil pressure and temperature; Exhaust Gas Temperature; Fuel pressure and flow; Manifold pressure.	1	2
16.11 Powerplant Installation Configuration of firewalls, cowlings, acoustic panels, engine mounts, anti-vibration mounts, hoses, pipes, feeders, connectors, wiring looms, control cables and rods, lifting points and drains.	1	2
16.12 Engine Monitoring and Ground Operation Procedures for starting and ground run-up; Interpretation of engine power output and parameters; Inspection of engine and components: criteria, tolerances, and data specified by engine manufacturer.	1	3
16.13 Engine Storage and Preservation Preservation and depreservation for the engine and accessories/systems.	—	2

MODULE 17. PROPELLER

	LEVEL	
	A	**B1**
17.1 Fundamentals Blade element theory; High/low blade angle, reverse angle, angle of attack, rotational speed; Propeller slip; Aerodynamic, centrifugal, and thrust forces; Torque; Relative airflow on blade angle of attack; Vibration and resonance.	1	2
17.2 Propeller Construction Construction methods and materials used in wooden, composite and metal propellers; Blade station, blade face, blade shank, blade back and hub assembly; Fixed pitch, controllable pitch, constant speeding propeller; Propeller/spinner installation.	1	2
17.3 Propeller Pitch Control Speed control and pitch change methods, mechanical and electrical/electronic; Feathering and reverse pitch; Overspeed protection.	1	2
17.4 Propeller Synchronising Synchronising and synchrophasing equipment.	—	2
17.5 Propeller Ice Protection Fluid and electrical de-icing equipment.	1	2
17.6 Propeller Maintenance Static and dynamic balancing; Blade tracking; Assessment of blade damage, erosion, corrosion, impact damage, delamination; Propeller treatment/repair schemes; Propeller engine running.	1	3
17.7 Propeller Storage and Preservation Propeller preservation and depreservation.	1	2

APPENDIX II

BASIC EXAMINATION STANDARD

1. Standardisation Basis for Examinations

1.1. All basic examinations must be carried out using the multi-choice question format and essay questions as specified below.

1.2. Each multi-choice question must have three alternative answers of which only one must be the correct answer and the candidate must be allowed a time per module which is based upon a nominal average of 75 seconds per question.

1.3. Each essay question requires the preparation of a written answer and the candidate must be allowed 20 minutes to answer each such question.

1.4. Suitable essay questions must be drafted and evaluated using the knowledge syllabus in ANTR 66 Appendix I Modules 7A, 9A, and 10.

1.5. Each question will have a model answer drafted for it, which will also include any known alternative answers that may be relevant for other subdivisions.

1.6. The model answer will also be broken down into a list of the important points known as Key Points.

1.7. The pass mark for each module and sub-module multi-choice part of the examination is 75 %.

1.8. The pass mark for each essay question is 75 % in that the candidates answer must contain 75 % of the required key points addressed by the question and no significant error related to any required key point.

1.9. If either the multi-choice part only or the essay part only is failed, then it is only necessary to retake the multi-choice or essay part, as appropriate.

1.10. Penalty marking systems must not be used to determine whether a candidate has passed.

1.11. A failed module may not be retaken for at least 90 days following the date of the failed module examination, except in the case of an ANTR 147 approved maintenance training organisation which conducts a course of retraining tailored to the failed subjects in the particular module when the failed module may be retaken after 30 days.

1.12. The time periods required by ANTR 66.A.25 apply to each individual module examination, with the exception of those module examinations which were passed as part of another category licence, where the licence has already been issued.

1.13 The maximum number of consecutive attempts for each module is three. Further sets of three attempts are allowed with a 1 year waiting period between sets.

The applicant shall confirm in writing to the approved maintenance training organisation to which they apply for an examination, the number and dates of attempts during the last year and the organisation where these attempts took place. The maintenance training organisation is responsible for checking the number of attempts within the applicable timeframes.

2. Question Numbers for the ANTR 66 Appendix I Modules

2.1. Subject Module 1 Mathematics:

Category A-16 multi-choice and 0 essay questions. Time allowed 20 minutes.

Category B1-32 multi-choice and 0 essay questions. Time allowed 40 minutes.

Category B2-32 multi-choice and 0 essay questions. Time allowed 40 minutes.

2.2. Subject Module 2 Physics:

Category A-32 multi-choice and 0 essay questions. Time allowed 40 minutes.

Category B1-52 multi-choice and 0 essay questions. Time allowed 65 minutes.

Category B2-52 multi-choice and 0 essay questions. Time allowed 65 minutes.

2.3. Subject Module 3 Electrical Fundamentals:

Category A-20 multi-choice and 0 essay questions. Time allowed 25 minutes.

Category B1-52 multi-choice and 0 essay questions. Time allowed 65 minutes.

Category B2-52 multi-choice and 0 essay questions. Time allowed 65 minutes.

2.4. Subject Module 4 Electronic Fundamentals:

Category B1-20 multi-choice and 0 essay questions. Time allowed 25 minutes.

Category B2-40 multi-choice and 0 essay questions. Time allowed 50 minutes.

2.5. Subject Module 5 Digital Techniques/Electronic Instrument Systems:

Category A-16 multi-choice and 0 essay questions. Time allowed 20 minutes.

Category B1.1 & B1.3-40 multi-choice and 0 essay questions. Time allowed 50 minutes.

Category B1.2 & B1.4-20 multi-choice and 0 essay questions. Time allowed 25 minutes.

Category B2-72 multi-choice and 0 essay questions. Time allowed 90 minutes.

2.6. Subject Module 6 Materials and Hardware:

Category A-52 multi-choice and 0 essay questions. Time allowed 65 minutes.

Category B1-72 multi-choice and 0 essay questions. Time allowed 90 minutes.

Category B2-60 multi-choice and 0 essay questions. Time allowed 75 minutes.

2.7. Subject Module 7A Maintenance Practices:

Category A-72 multi-choice and 2 essay questions. Time allowed 90 minutes plus 40 minutes.

Category B1-80 multi-choice and 2 essay questions. Time allowed 100 minutes plus 40 minutes.

Category B2-60 multi-choice and 2 essay questions. Time allowed 75 minutes plus 40 minutes.

2.8. Subject Module 8 Basic Aerodynamics:

Category A-20 multi-choice and 0 essay questions. Time allowed 25 minutes.

Category B1-20 multi-choice and 0 essay questions. Time allowed 25 minutes.

Category B2-20 multi-choice and 0 essay questions. Time allowed 25 minutes.

2.9. Subject Module 9 Human factors:

Category A-20 multi-choice and 1 essay question. Time allowed 25 minutes plus 20 minutes.

Category B1-20 multi-choice and 1 essay question. Time allowed 25 minutes plus 20 minutes.

Category B2-20 multi-choice and 1 essay question. Time allowed 25 minutes plus 20 minutes.

2.10. Subject Module 10 Aviation Legislation:

Category A-32 multi-choice and 1 essay question. Time allowed 40 minutes plus 20 minutes.

Category B1-40 multi-choice and 1 essay question. Time allowed 50 minutes plus 20 minutes.

Category B2-40 multi-choice and 1 essay question. Time allowed 50 minutes plus 20 minutes.

2.11. Subject Module 11A Turbine Aeroplane Aerodynamics, Structures and Systems:

Category A-108 multi-choice and 0 essay questions. Time allowed 135 minutes.

Category B1-140 multi-choice and 0 essay questions. Time allowed 175 minutes.

Subject Module 11B Piston Aeroplane Aerodynamics, Structures and Systems:

Category A-72 multi-choice and 0 essay questions. Time allowed 90 minutes.

Category B1-100 multi-choice and 0 essay questions. Time allowed 125 minutes.

2.12. Subject Module 12 Helicopter Aerodynamics, Structures and Systems:

Category A-100 multi-choice and 0 essay questions. Time allowed 125 minutes.

Category B1-128 multi-choice and 0 essay questions. Time allowed 160 minutes.

2.13. Subject Module 13 Aircraft Aerodynamics, Structures and Systems:

Category B2- 180 multi-choice and 0 essay questions. Time allowed 225 minutes. Questions and time allowed may be split into two examinations as appropriate.

2.14. Subject Module 14 Propulsion:

Category B2-24 multi-choice and 0 essay questions. Time allowed 30 minutes.

2.15. Subject Module 15 Gas Turbine Engine:

Category A-60 multi-choice and 0 essay questions. Time allowed 75 minutes.

Category B1-92 multi-choice and 0 essay questions. Time allowed 115 minutes.

2.16. Subject Module 16 Piston Engine:

Category A-52 multi-choice and 0 essay questions. Time allowed 65 minutes.

Category B1-72 multi-choice and 0 essay questions. Time allowed 90 minutes.

Category B2-None.

2.17. Subject Module 17 Propeller:

Category A-20 multi-choice and 0 essay questions. Time allowed 25 minutes.

Category B1-32 multi-choice and 0 essay questions. Time allowed 40 minutes.

APPENDIX III

AIRCRAFT TYPE TRAINING AND EXAMINATION STANDARD ON THE JOB TRAINING

1. General

Aircraft type training shall consist of theoretical training and examination, and, except for the category C ratings, practical training and assessment.

(a) Theoretical training and examination shall comply with the following requirements:

(i) Shall be conducted by a maintenance training organisation appropriately approved in accordance with ANTR 147 or, when conducted by other organisations, as directly approved by the BCAA.

(ii) Shall comply, except as permitted by the differences training described in point (c), with:

- the relevant elements defined in the mandatory part of the operational suitability data established in accordance with ANTR 21 or, if such elements are not available, the standard described in paragraph 3.1 of this Appendix, and

- the type training examination standard described in point 4.1 of this Appendix.

(iii) In the case of a category C person qualified by holding an academic degree as specified in ANTR 66.A.30(a)(5), the first relevant aircraft type theoretical training shall be at the category B1 or B2 level.

(iv) Shall have been started and completed within the 3 years preceding the application for a type rating endorsement.

(b) Practical training and assessment shall comply with the following requirements:

(i) Shall be conducted by a maintenance training organisation appropriately approved in accordance with ANTR 147 or, when conducted by other organisations, as directly approved by the BCAA.

(ii) Shall comply, except as permitted by the differences training described in point (c), with:

- the relevant elements defined in the mandatory part of the operational suitability data established in accordance with ANTR 21 or, if such elements are not available, the standard described in paragraph 3.2 of this Appendix, and

- the type training assessment standard described in paragraph 4.2 of this Appendix.

(iii) Shall include a representative cross section of maintenance activities relevant to the aircraft type.

(iv) Shall include demonstrations using equipment, components, simulators, other training devices or aircraft.

(v) Shall have been started and completed within the 3 years preceding the application for a type rating endorsement.

(c) Differences training

(i) Differences training is the training required in order to cover the differences between two different aircraft type ratings of the same manufacturer as determined by the BCAA.

(ii) Differences training has to be defined on a case-to-case basis taking into account the requirements contained in this Appendix III in respect of both theoretical and practical elements of type rating training.

(iii) A type rating shall only be endorsed on a licence after differences training when the applicant also complies with one of the following conditions:

- having already endorsed on the licence the aircraft type rating from which the differences are being identified, or

- having completed the type training requirements for the aircraft from which the differences are being identified.

2. Aircraft Type training levels

The three levels listed below define the objectives that a particular level of training is intended to achieve.

Level 1

A brief overview of the airframe, systems and powerplant as outlined in the Systems Description Section of the Aircraft Maintenance Manual/Instructions for continued Airworthiness.

Course objectives: Upon completion of Level 1 training, the student will be able to:

1. Provide a simple description of the whole subject, using common word and examples, using typical terms and identify safety precautions related to the airframe, its systems and powerplant

2. Identify aircraft manuals, maintenance practices important to the airframe, its systems and powerplant

3. Define the general layout of the aircraft's major systems

4. Define the general layout and characteristics of the powerplant

5. Identify special tooling and test equipment used with the aircraft

Level 2

Basic system overview of controls, indicators, principal components including their location and purpose, servicing and minor troubleshooting. General knowledge of the theoretical and practical aspects of the subject.

Course objectives: In addition to the information contained in the Level 1training, at the completion of Level 2 training, the student will be able to:

1. Understand the theoretical fundamentals; apply knowledge in a practical manner using detailed procedures;

2. Recall the safety precautions to be observed when working on or near the aircraft, powerplant and systems.

3. Describe systems and aircraft handling particularly access, power availability and sources.

4. Identify the locations of the principal components.

5. Explain the normal functioning of each major system, including terminology and nomenclature.

6. Perform the procedures for ramp and transit servicing associated with the aircraft for the following systems: Fuel, Power Plants, Hydraulics, Landing Gear, Water/Waste, Oxygen.

7. Demonstrate proficiency in use of crew reports and on-board reporting systems (minor troubleshooting) and determine aircraft airworthiness per the MEL/CDL.

8. Demonstrate the use, interpretation and application of appropriate documentation including instructions for continued airworthiness, maintenance manual, illustrated parts catalogue, etc.

Level 3

Detailed description, operation, component location, removal/installation and bite and troubleshooting procedures to maintenance manual level.

Course objectives: In addition to the information contained in Level 1 and Level 2 training, at the completion of Level 3 training, the student will be able to:

(a) Demonstrate a theoretical knowledge of aircraft systems and structures and interrelationships with other systems, provide a detailed description of the subject using theoretical fundamentals and specific examples and to interpret results from various sources and measurements and apply corrective action where appropriate;

(b) Perform system, powerplant, component and functional checks as specified in the maintenance manual.

(c) Correlate information for the purpose of making decisions in respect of fault diagnosis and rectification to maintenance manual level.

(d) Describe procedures for replacement of components unique to aircraft type.

3. Aircraft Type training standard

Although aircraft type training includes both theoretical and practical elements, courses can be approved for the theoretical element, the practical element or for a combination of both.

3.1 Theoretical element

(a) Objective:

On completion of a theoretical training course the student shall be able to demonstrate, to the levels identified in the Appendix III syllabus, the detailed theoretical knowledge of the aircraft's applicable systems, structure, operations, maintenance, repair, and troubleshooting according to

approved maintenance data. The student shall be able to demonstrate the use of manuals and approved procedures, including the knowledge of relevant inspections and limitations.

(b) Level of training:

Training levels are those levels defined in point 2 above.

After the first type course for category C certifying staff all subsequent courses need only be to level 1.

During a level 3 theoretical training, level 1 and 2 training material may be used to teach the full scope of the chapter if required. However, during the training the majority of the course material and training time shall be at the higher level.

(c) Duration:

The theoretical training minimum tuition hours are contained in the following table:

Category	Hours
Aeroplanes with a maximum take-off mass above 30000 kg:	
B1.1	150
B1.2	120
B2	100
C	30
Aeroplanes with a maximum take-off mass equal or less than 30000 kg and above 5700 kg:	
B1.1	120
B1.2	100
B2	100
C	25
Aeroplanes with a maximum take-off mass of 5700 kg and below [Note 1]	
B1.1	80
B1.2	60
B2	60
C	15
Helicopters [Note 2]	
B1.3	120
B1.4	100
B2	100
C	25

Note 1: For non-pressurised piston engine aeroplanes below 2 000 kg MTOM the minimum duration can be reduced by 50%.

Note 2: For helicopters in group 2 (as defined in point 66.A.42) the minimum duration can be reduced by 30%.

For the purpose of the table above, a tuition hour means 60 minutes of teaching and exclude any breaks, examination, revision, preparation and aircraft visit.

These hours apply only to theoretical courses for complete aircraft/engine combinations according to the type rating as defined by the BCAA.

(d) Justification of course duration:

Training courses carried out in a maintenance training organisation approved in accordance with ANTR-147) and courses directly approved by the BCAA shall justify their hour duration and the coverage of the full syllabus by a training needs analysis based on:

- the design of the aircraft type, its maintenance needs and the types of operation,
- detailed analysis of applicable chapters — see contents table in point 3.1(e) below,
- detailed competency analysis showing that the objectives as stated in point 3.1(a) above are fully met.

Where the training needs analysis shows that more hours are needed, course lengths shall be longer than the minimum specified in the table.

Similarly, tuition hours of differences courses or other training course combinations (such as combined B1/B2 courses), and in cases of theoretical type training courses below the figures given in point 3.1(c) above, these shall be justified to the BCAA by the training needs analysis as described above.

In addition, the course must describe and justify the following:

- The minimum attendance required to the trainee, in order to meet the objectives of the course.
- The maximum number of hours of training per day, taking into account pedagogical and human factors principles.

If the minimum attendance required is not met, the certificate of recognition shall not be issued.

Additional training may be provided by the training organisation in order to meet the minimum attendance time.

(e) Content:

As a minimum, the elements in the Syllabus below that are specific to the aircraft type shall be covered. Additional elements introduced due to type variations, technological changes, etc. shall also be included.

The training syllabus shall be focused on mechanical and electrical aspects for B1 personnel, and electrical and avionic aspects for B2.

Level / Chapters / Licence category	Aeroplanes turbine B1 C		Aeroplanes piston B1 C		Helicopters turbine B1 C		Helicopters piston B1 C		Avionics B2
Introduction module:									
05 Time limits/maintenance checks	1	1	1	1	1	1	1	1	1
06 Dimensions/Areas (MTOM, etc.)	1	1	1	1	1	1	1	1	1
07 Lifting and Shoring	1	1	1	1	1	1	1	1	1
08 Levelling and weighing	1	1	1	1	1	1	1	1	1
09 Towing and taxiing	1	1	1	1	1	1	1	1	1
10 Parking/mooring, Storing and Return to Service	1	1	1	1	1	1	1	1	1
11 Placards and Markings	1	1	1	1	1	1	1	1	1
12 Servicing	1	1	1	1	1	1	1	1	1
20 Standard practices — only type particular	1	1	1	1	1	1	1	1	1

Level / Chapters / Licence category	Aeroplanes turbine B1 C		Aeroplanes piston B1 C		Helicopters turbine B1 C		Helicopters piston B1 C		Avionics B2
Helicopters									
18 Vibration and Noise Analysis (Blade tracking)	—	—	—	—	3	1	3	1	—
60 Standard Practices Rotor	—	—	—	—	3	1	3	1	—
62 Rotors	—	—	—	—	3	1	3	1	1
62A Rotors — Monitoring and indicating	—	—	—	—	3	1	3	1	3
63 Rotor Drives	—	—	—	—	3	1	3	1	1
63A Rotor Drives — Monitoring and indicating	—	—	—	—	3	1	3	1	3
64 Tail Rotor	—	—	—	—	3	1	3	1	1
64A Tail rotor — Monitoring and indicating	—	—	—	—	3	1	3	1	3
65 Tail Rotor Drive	—	—	—	—	3	1	3	1	1
65A Tail Rotor Drive — Monitoring and indicating	—	—	—	—	3	1	3	1	3
66 Folding Blades/Pylon	—	—	—	—	3	1	3	1	—
67 Rotors Flight Control	—	—	—	—	3	1	3	1	—
53 Airframe Structure (Helicopter)	—	—	—	—	3	1	3	1	—
25 Emergency Flotation Equipment	—	—	—	—	3	1	3	1	1
Airframe structures									
51 Standard practices and structures (damage classification, assessment and repair)	3	1	3	1	—	—	—	—	1
53 Fuselage	3	1	3	1	—	—	—	—	1
54 Nacelles/Pylons	3	1	3	1	—	—	—	—	1
55 Stabilisers	3	1	3	1	—	—	—	—	1
56 Windows	3	1	3	1	—	—	—	—	1
57 Wings	3	1	3	1	—	—	—	—	1
27A Flight Control Surfaces (All)	3	1	3	1	—	—	—	—	1
52 Doors	3	1	3	1	—	—	—	—	1
Zonal and Station Identification Systems.	1	1	1	1	1	1	1	1	1
Airframe systems:									
21 Air Conditioning	3	1	3	1	3	1	3	1	3
21A Air Supply	3	1	3	1	1	3	3	1	2
21B Pressurisation	3	1	3	1	3	1	3	1	3
21C Safety and Warning Devices	3	1	3	1	3	1	3	1	3

Level Chapters Licence category	Aeroplanes turbine B1 C		Aeroplanes piston B1 C		Helicopters turbine B1 C		Helicopters piston B1 C		Avionics B2
22 Autoflight	2	1	2	1	2	1	2	1	3
23 Communications	2	1	2	1	2	1	2	1	3
24 Electrical Power	3	1	3	1	3	1	3	1	3
25 Equipment and Furnishings	3	1	3	1	3	1	3	1	1
25A Electronic Equipment including emergency equipment	1	1	1	1	1	1	1	1	3
26 Fire Protection	3	1	3	1	3	1	3	1	3
27 Flight Controls	3	1	3	1	3	1	3	1	2
27A Sys. Operation: Electrical/Fly-by-Wire	3	1	—	—	—	—	—	—	3
28 Fuel Systems	3	1	3	1	3	1	3	1	2
28A Fuel Systems — Monitoring and indicating	3	1	3	1	3	1	3	1	3
29 Hydraulic Power	3	1	3	1	3	1	3	1	2
29A Hydraulic Power — Monitoring and indicating	3	1	3	1	3	1	3	1	3
30 Ice and Rain Protection	3	1	3	1	3	1	3	1	3
31 Indicating/Recording Systems	3	1	3	1	3	1	3	1	3
31A Instrument Systems	3	1	3	1	3	1	1	3	3
32 Landing Gear	3	1	3	1	3	1	3	1	2
32A Landing Gear — Monitoring and indicating	3	1	3	1	3	1	3	1	3
33 Lights	3	1	3	1	3	1	3	1	3
34 Navigation	2	1	2	1	2	1	2	1	3
35 Oxygen	3	1	3	1	—	—	—	—	2
36 Pneumatic	3	1	3	1	3	1	3	1	2
36A Pneumatic — Monitoring and indicating	3	1	3	1	3	1	3	1	3
37 Vacuum	3	1	3	1	3	1	3	1	2
38 Water/Waste	3	1	3	1	—	—	—	—	2
41 Water Ballast	3	1	3	1	—	—	—	—	1
42 Integrated modular avionics	2	1	2	1	2	1	2	1	3
44 Cabin Systems	2	1	2	1	2	1	2	1	3
45 On-Board Maintenance System (or covered in 31)	3	1	3	1	3	1	—	—	3
46 Information Systems	2	1	2	1	2	1	2	1	3
50 Cargo and Accessory Compartments	3	1	3	1	3	1	3	1	1
Turbine Engine									
70 Standard Practices — Engines,	3	1	—	—	3	1	—	—	1
70A constructional arrangement and operation	3	1	—	—	3	1	—	—	1

Level / Chapters / Licence category	Aeroplanes turbine B1	C	Aeroplanes piston B1	C	Helicopters turbine B1	C	Helicopters piston B1	C	Avionics B2
Bearings and Seals, Lubrication Systems).									
70B Engine Performance	3	1	—	—	3	1	—	—	1
71 Powerplant	3	1	—	—	3	1	—	—	1
72 Engine Turbine/Turbo Prop/Ducted Fan/Unducted fan	3	1	—	—	3	1	—	—	1
73 Engine Fuel and Control	3	1	—	—	3	1	—	—	1
75 Air	3	1	—	—	3	1	—	—	1
76 Engine controls	3	1	—	—	3	1	—	—	1
78 Exhaust	3	1	—	—	3	1	—	—	1
79 Oil	3	1	—	—	3	1	—	—	1
80 Starting	3	1	—	—	3	1	—	—	1
82 Water Injections	3	1	—	—	3	1	—	—	1
83 Accessory Gear Boxes	3	1	—	—	3	1	—	—	1
84 Propulsion Augmentation	3	1	—	—	3	1	—	—	1
73A FADEC	3	1	—	—	3	1	—	—	3
74 Ignition	3	1	—	—	3	1	—	—	3
77 Engine Indicating Systems	3	1	—	—	3	1	—	—	3
49 Auxiliary Power Units (APUs)	3	1	—	—	—	—	—	—	2
Piston Engine									
70 Standard Practices — Engines	—	—	3	1	—	—	3	1	1
70A Constructional arrangement and operation (Installation, Carburettors, Fuel injection systems, Induction, Exhaust and Cooling Systems, Supercharging/Turbochargin, Lubrication Systems).	—	—	3	1	—	—	3	1	1
70B Engine Performance	—	—	3	1	—	—	3	1	1
71 Powerplant	—	—	3	1	—	—	3	1	1
73 Engine Fuel and Control	—	—	3	1	—	—	3	1	1
76 Engine Control	—	—	3	1	—	—	3	1	1
79 Oil	—	—	3	1	—	—	3	1	1
80 Starting	—	—	3	1	—	—	3	1	1
81 Turbines	—	—	3	1	—	—	3	1	1
82 Water Injections	—	—	3	1	—	—	3	1	1
83 Accessory Gear Boxes	—	—	3	1	—	—	3	1	1
84 Propulsion Augmentation	—	—	3	1	—	—	3	1	1
73A FADEC	—	—	3	1	—	—	3	1	3
74 Ignition	—	—	3	1	—	—	3	1	3
77 Engine Indication Systems	—	—	3	1	—	—	3	1	3

Level / Chapters / Licence category	Aeroplanes turbine B1 C		Aeroplanes piston B1 C		Helicopters turbine B1 C		Helicopters piston B1 C		Avionics B2
Propellers									
60A Standard Practices — Propeller	3	1	3	1	—	—	—	—	1
61 Propellers/Propulsion	3	1	3	1	—	—	—	—	1
61A Propeller Construction	3	1	3	1	—	—	—	—	—
61B Propeller Pitch Control	3	1	3	1	—	—	—	—	—
61C Propeller Synchronising	3	1	3	1	—	—	—	—	1
61D Propeller Electronic control	2	1	2	1	—	—	—	—	3
61E Propeller Ice Protection	3	1	3	1	—	—	—	—	—
61F Propeller Maintenance	3	1	3	1	—	—	—	—	1

(f) Multimedia Based Training (MBT) methods may be used to satisfy the theoretical training element either in the classroom or in a virtual controlled environment subject to the acceptance of the BCAA approving the training course.

3.2 Practical element

(a) Objective:

The objective of practical training is to gain the required competence in performing safe maintenance, inspections and routine work according to the maintenance manual and other relevant instructions and tasks as appropriate for the type of aircraft, for example troubleshooting, repairs, adjustments, replacements, rigging and functional checks. It includes the awareness of the use of all technical literature and documentation for the aircraft, the use of specialist/special tooling and test equipment for performing removal and replacement of components and modules unique to type, including any on-wing maintenance activity.

(b) Content

At least 50 % of the crossed items in the table below, which are relevant to the particular aircraft type, shall be completed as part of the practical training.

Tasks crossed represent subjects that are important for practical training purposes to ensure that the operation, function, installation and safety significance of key maintenance tasks is adequately addressed; particularly where these cannot be fully explained by theoretical training alone. Although the list details the minimum practical training subjects, other items may be added where applicable to the particular aircraft type.

Tasks to be completed shall be representative of the aircraft and systems both in complexity and in the technical input required to complete that task. While relatively simple tasks may be included, other more complex tasks shall also be incorporated and undertaken as appropriate to the aircraft type.

Glossary of the table: LOC: Location; FOT: Functional/Operational Test; SGH: Service and Ground Handling; R/I: Removal/Installation; MEL: Minimum Equipment List; TS: Trouble Shooting.

Chapters	B1/B2 LOC	B1 FOT	SGH	R/I	MEL	TS	B2 FOT	SGH	R/I	MEL	TS
Introduction module:											
5 Time limits/maintenance checks	X/X	—	—	—	—	—	—	—	—	—	—
6 Dimensions/Areas (MTOM, etc.)	X/X	—	—	—	—	—	—	—	—	—	—
7 Lifting and Shoring	X/X	—	—	—	—	—	—	—	—	—	—
8 Levelling and weighing	X/X	—	X	—	—	—	—	X	—	—	—
9 Towing and taxiing	X/X	—	X	—	—	—	—	X	—	—	—
10 Parking/mooring, Storing and Return to Service	X/X	—	X	—	—	—	—	X	—	—	—
11 Placards and Markings	X/X	—	—	—	—	—	—	—	—	—	—
12 Servicing	X/X	—	X	—	—	—	—	X	—	—	—
20 Standard practices — only type particular	X/X	—	X	—	—	—	—	X	—	—	—
Helicopters:											
18 Vibration and Noise Analysis (Blade tracking)	X/—	—	—	—	—	X	—	—	—	—	—
60 Standard Practices Rotor — only type specific	X/X	—	X	—	—	—	—	X	—	—	—
62 Rotors	X/—	—	X	X	—	X	—	—	—	—	—
62A Rotors — Monitoring and indicating	X/X	X	X	X	X	X	—	—	X	—	X
63 Rotor Drives	X/—	X	—	—	—	X	—	—	—	—	—
63A Rotor Drives — Monitoring and indicating	X/X	X	—	X	X	X	—	—	X	—	X
64 Tail Rotor	X/—	—	X	—	—	X	—	—	—	—	—
64A Tail rotor - Monitoring and indicating	X/X	X	—	X	X	X	—	—	X	—	X
65 Tail Rotor Drive	X/—	X	—	—	—	X	—	—	—	—	—
65A Tail Rotor Drive — Monitoring and indicating	X/X	X	—	X	X	X	—	—	X	—	X

Chapters	B1/B2 LOC	B1 FOT	B1 SGH	B1 R/I	B1 MEL	B1 TS	B2 FOT	B2 SGH	B2 R/I	B2 MEL	B2 TS
66 Folding Blades/Pylon	X/—	X	X	—	—	X	—	—	—	—	—
67 Rotors Flight Control	X/—	X	X	—	X	X	—	—	—	—	—
53 Airframe Structure (Helicopter)											
25 Emergency Flotation Equipment	X/X	X	X	X	X	X	X	X	—	—	—
Airframe structures:											
51 Standard Practices and Structures (damage											
53 Fuselage	X/—	—	—	—	—	X	—	—	—	—	—
54 Nacelles/Pylons	X/—	—	—	—	—	—	—	—	—	—	—
55 Stabilisers	X/—	—	—	—	—	—	—	—	—	—	—
56 Windows	X/—	—	—	—	—	X	—	—	—	—	—
57 Wings	X/—	—	—	—	—	—	—	—	—	—	—
27A Flight Control Surfaces	X/—	—	—	—	—	X	—	—	—	—	—
52 Doors	X/X	X	X	—	—	—	—	X	—	—	—
Airframe systems:											
21 Air Conditioning	X/X	X	X	—	X	X	X	X	—	X	X
21A Air Supply	X/X	X	—	—	—	—	X	—	—	—	—
21B Pressurisation	X/X	X	—	—	X	X	X	—	—	X	X
21C Safety and warning Devices	X/X	—	X	—	—	—	—	X	—	—	—
22 Autoflight	X/X	—	—	—	X	—	X	X	X	X	X
23 Communications	X/X	—	X	—	X	—	X	X	X	X	X
24 Electrical Power	X/X	X	X	X	X	X	X	X	X	X	X
25 Equipment and Furnishings	X/X	X	X	X	—	—	X	X	X	—	—
25A Electronic Equipment including emergency equipment	X/X	X	X	X	—	—	X	X	X	—	—

Chapters	B1/B2 LOC	B1 FOT	B1 SGH	B1 R/I	B1 MEL	B1 TS	B2 FOT	B2 SGH	B2 R/I	B2 MEL	B2 TS
26 Fire Protection	X/X	X	X	X	X	X	X	X	X	X	X
27 Flight Controls	X/X	X	X	X	X	X	X	—	—	—	—
27A Sys. Operation: Electrical/Fly-by- Wire	X/X	X	X	X	X	—	X	—	X	—	X
28 Fuel Systems	X/X	X	X	X	X	X	X	X	—	X	—
28A Fuel Systems — Monitoring and indicating	X/X	X	—	—	—	—	X	—	X	—	X
29 Hydraulic Power	X/X	X	X	X	X	X	X	X	—	X	—
29A Hydraulic Power — Monitoring and indicating	X/X	X	—	X	X	X	X	—	X	X	X
30 Ice and Rain Protection	X/X	X	X	—	X	X	X	X	—	X	X
31 Indicating/Recording Systems	X/X	X	X	X	X	X	X	X	X	X	X
31A Instrument Systems	X/X	X	X	X	X	X	X	X	X	X	X
32 Landing Gear	X/X	X	X	X	X	X	X	X	X	X	—
32A Landing Gear — Monitoring and indicating	X/X	X	—	X	X	X	X	—	X	X	X
33 Lights	X/X	X	X	—	X	—	X	X	X	X	—
34 Navigation	X/X	—	X	—	X	—	X	X	X	X	X
35 Oxygen	X/—	X	X	X	—	—	X	X	—	—	—
36 Pneumatic	X/—	X	—	X	X	X	X	—	X	X	X
36A Pneumatic — Monitoring and indicating	X/X	X	X	X	X	X	X	X	X	X	X
37 Vacuum	X/—	X	—	X	X	X	—	—	—	—	—
38 Water/Waste	X/—	X	X	—	—	—	X	X	—	—	—
41 Water Ballast	X/—	—	—	—	—	—	—	—	—	—	—
42 Integrated modular avionics	X/X	—	—	—	—	—	X	X	X	X	X
44 Cabin Systems	X/X	—	—	—	—	—	X	X	X	X	X
45 On-Board Maintenance System (or covered in 31)	X/X	X	X	X	X	X	X	X	X	X	X
46 Information Systems	X/X	—	—	—	—	—	X	—	X	X	X
50 Cargo and Accessory Compartments	X/X	—	X	—	—	—	—	—	—	—	—

Chapters	B1/B2 LOC	B1 FOT	B1 SGH	B1 R/I	B1 MEL	B1 TS	B2 FOT	B2 SGH	B2 R/I	B2 MEL	B2 TS
Turbine/Piston Engine Module:											
70 Standard Practices — Engines — only type particular	—	—	X	—	—	—	—	X	—	—	—
70A Constructional arrangement and operation (Installation Inlet, Compressors, Combustion Section, Turbine Section, Bearings and Seals, Lubrication Systems)	X/X	—	—	—	—	—	—	—	—	—	—
Turbine engines:											
70B Engine Performance	—	—	—	—	—	X	—	—	—	—	—
71 Power Plant	X/—	X	X	—	—	—	—	X	—	—	—
72 Engine Turbine/Turbo Prop/Ducted Fan/ Unducted fan	X/—	—	—	—	—	—	—	—	—	—	—
73 Engine Fuel and Control	X/X	X	—	—	—	—	—	—	—	—	—
73A FADEC Systems	X/X	X	—	X	X	X	X	—	X	X	X
74 Ignition	X/X	X	—	—	—	—	X	—	—	—	—
75 Air	X/—	—	—	X	—	X	—	—	—	—	—
76 Engine Controls	X/—	X	—	—	—	X	—	—	—	—	—
77 Engine Indicating	X/X	X	—	—	X	X	X	—	—	X	X
78 Exhaust	X/—	X	—	—	X	—	—	—	—	—	—
79 Oil	X/—	—	X	X	—	—	—	—	—	—	—
80 Starting	X/—	X	—	—	X	X	—	—	—	—	—
82 Water Injection	X/—	X	—	—	—	—	—	—	—	—	—
83 Accessory Gearboxes	X/—	—	X	—	—	—	—	—	—	—	—
84 Propulsion Augmentation	X/—	X	—	—	—	—	—	—	—	—	—
Auxiliary Power Units (APUs):											
49 Auxiliary Power Units (APUs)	X/—	X	X	—	—	X	—	—	—	—	—

Chapters	B1/B2 LOC	B1 FOT	B1 SGH	B1 R/I	B1 MEL	B1 TS	B2 FOT	B2 SGH	B2 R/I	B2 MEL	B2 TS
Piston Engines:											
70 Standard Practices — Engines — only type particular	—	—	X	—	—	—	—	X	—	—	—
70A Constructional arrangement and operation (Installation Inlet, Compressors, Combustion Section, Turbine Section, Bearings and Seals, Lubrication Systems)	X/X	—	—	—	—	—	—	—	—	—	—
70B Engine Performance	—	—	—	—	—	X	—	—	—	—	—
71 Power Plant	X/—	X	X	—	—	—	—	X	—	—	—
73 Engine Fuel and Control	X/X	X	—	—	—	—	—	—	—	—	—
73A FADEC Systems	X/X	X	—	X	X	X	X	X	X	X	X
74 Ignition	X/X	X	—	—	—	—	X	—	—	—	—
76 Engine Controls	X/—	X	—	—	—	X	—	—	—	—	—
77 Engine Indicating	X/X	X	—	—	X	X	X	—	—	X	X
78 Exhaust	X/—	X	—	—	X	X	—	—	—	—	—
79 Oil	X/—	—	X	X	—	—	—	—	—	—	—
80 Starting	X/—	X	—	—	X	X	—	—	—	—	—
81 Turbines	X/—	X	X	X	—	X	—	—	—	—	—
82 Water Injection	X/—	X	—	—	—	—	—	—	—	—	—
83 Accessory Gearboxes	X/—	—	X	X	—	—	—	—	—	—	—
84 Propulsion Augmentation	X/—	X	—	—	—	—	—	—	—	—	—
Propellers:											
60A Standard Practices — Propeller	—	—	—	X	—	—	—	—	—	—	—
61 Propellers/ Propulsion	X/X	X	X	—	X	X	—	—	—	—	—
61A Propeller Construction	X/X	—	X	—	—	—	—	—	—	—	—
61B Propeller Pitch Control	X/—	X	—	X	X	X	—	—	—	—	—
61C Propeller Synchronising	X/—	X	—	—	—	X	—	—	—	X	—
61D Propeller Electronic control	X/X	X	X	X	X	X	X	X	X	X	X

Chapters	B1/B2 LOC	B1 FOT	B1 SGH	B1 R/I	B1 MEL	B1 TS	B2 FOT	B2 SGH	B2 R/I	B2 MEL	B2 TS
61E Propeller Ice Protection	X/—	X	—	X	X	X	—	—	—	—	—
61F Propeller Maintenance	X/X	X	X	X	X	X	X	X	X	X	X

4. Type training examination and assessment standard

4.1 Theoretical element examination standard

After the theoretical portion of the aircraft type training has been completed, a written examination shall be performed, which shall comply with the following:

(a) Format of the examination is of the multi-choice type. Each multi-choice question shall have 3 alternative answers of which only one shall be the correct answer. The total time is based on the total number of questions and the time for answering is based upon a nominal average of 90 seconds per question.

(b) The incorrect alternatives shall seem equally plausible to anyone ignorant of the subject. All the alternatives shall be clearly related to the question and of similar vocabulary, grammatical construction and length.

(c) In numerical questions, the incorrect answers shall correspond to procedural errors such as the use of incorrect sense (+ versus -) or incorrect measurement units. They shall not be mere random numbers.

(d) The level of examination for each 'chapter' shall be the one defined in point 2 'Aircraft type training levels'. However, the use of a limited number of questions at a lower level is acceptable.

Note: A 'chapter' means each on the rows preceded by a number in the tables contained in point 3.1(e).

(e) The examination shall be of the closed book type. No reference material is permitted. An exception will be made for the case of examining a B1 or B2 candidate's ability to interpret technical documents.

(f) The number of questions shall be at least 1 question per hour of instruction. The number of questions for each chapter and level shall be proportionate to:

- the effective training hours spent teaching at that chapter and level,

- the learning objectives as given by the training needs analysis.

The BCAA will assess the number and the level of the questions when approving the course.

(g) The minimum examination pass mark is 75 %. When the type training examination is split in several examinations, each examination shall be passed with at least a 75 % mark. In order to be possible to achieve exactly a 75 % pass mark, the number of questions in the examination shall be a multiple of 4.

(h) Penalty marking (negative points for failed questions) is not to be used.

(i) End of module phase examinations cannot be used as part of the final examination unless they contain the correct number and level of questions required.

4.2 Practical element assessment standard

After the practical element of the aircraft type training has been completed, an assessment must be performed, which must comply with the following:

(a) The assessment shall be performed by designated assessors appropriately qualified.

(b) The assessment shall evaluate the knowledge and skills of the trainee.

5. Type examination standard

Type examination shall be conducted by training organisations appropriately approved under ANTR 147 or by the BCAA.

The examination shall be oral, written or practical assessment based, or a combination thereof and it shall comply with the following requirements:

(a) Oral examination questions shall be open.

(b) Written examination questions shall be essay type or multi-choice questions.

(c) Practical assessment shall determine a person's competence to perform a task.

(d) Examinations shall be on a sample of 'chapters' drawn from point 3 type training/examination syllabus, as the indicated level.

Note: A 'chapter' means each on the rows preceded by a number in the tables contained in points 3.1(e) and 3.2(b).

(e) The incorrect alternatives shall seem equally plausible to anyone ignorant of the subject. All of the alternatives shall be clearly related to the question and of similar vocabulary, grammatical construction and length.

(f) In numerical questions, the incorrect answers shall correspond to procedural errors such as corrections applied in the wrong sense or incorrect unit conversions: they shall not be mere random numbers.

(g) The examination shall ensure that the following objectives are met:

1. Properly discuss with confidence the aircraft and its systems.

2. Ensure safe performance of maintenance, inspections and routine work according to the maintenance manual and other relevant instructions and tasks as appropriate for the type of aircraft, for example troubleshooting, repairs, adjustments, replacements, rigging and functional checks such as engine run, etc., if required.

3. Correctly use all technical literature and documentation for the aircraft.

4. Correctly use specialist/special tooling and test equipment, perform removal and replacement of components and modules unique to type, including any on-wing maintenance activity

(h) The following conditions apply to the examination:

1. The maximum number of consecutive attempts is three. Further sets of three attempts are allowed with a 1 year waiting period between sets. A waiting period of 30 days is required after the first failed attempt within one set, and a waiting period of 60 days is required after the second failed attempt.

   The applicant shall confirm in writing to the maintenance training organisation or the BCAA for an examination, the number and dates of attempts during the last year and the maintenance training organisation or the BCAA where these attempts took place. The maintenance training organisation or BCAA is responsible for checking the number of attempts within the applicable timeframes.

2. The type examination shall be passed and the required practical experience shall be completed within the 3 years preceding the application for the rating endorsement on the aircraft maintenance licence.

3. Type examination shall be performed with at least one examiner present. The examiner(s) shall not have been involved in the applicant's training.

(i) A written and signed report shall be made by the examiner(s) to explain why the candidate has passed or failed.

6. <u>On the Job Training</u>

On the Job Training (OJT) shall be approved by BCAA who has issued the licence.

It shall be conducted at and under the control of a maintenance organisation appropriately approved for the maintenance of the particular aircraft type and shall be assessed by designated assessors appropriately qualified.

It shall have been started and completed within the 3 years preceding the application for a type rating endorsement.

(a) Objective:

The objective of OJT is to gain the required competence and experience in performing safe maintenance.

(b) Content:

OJT shall cover a cross section of tasks acceptable to the BCAA. The OJT tasks to be completed shall be representative of the aircraft and systems both in complexity and in the technical input required to complete that task. While relatively simple tasks may be included, other more complex maintenance tasks shall also be incorporated and undertaken as appropriate to the aircraft type.

Each task shall be signed off by the student and countersigned by a designated supervisor. The tasks listed shall refer to an actual job card/work sheet, etc.

The final assessment of the completed OJT is mandatory and shall be performed by a designated assessor appropriately qualified.

The following data shall be addressed on the OJT worksheets/logbook:

1. Name of Trainee;

2. Date of Birth;

3. Approved Maintenance Organisation;

4. Location;

5. Name of supervisor(s) and assessor, (including licence number if applicable);

6. Date of task completion;

7. Description of task and job card/work order/tech log, etc.;

8. Aircraft type and aircraft registration;

9. Aircraft rating applied for.

In order to facilitate the verification by the BCAA, demonstration of the OJT shall consist of (i) detailed worksheets/logbook and (ii) a compliance report demonstrating how the OJT meets the requirement of this Part.

APPENDIX IV

EXPERIENCE REQUIREMENTS FOR EXTENDING AN ANTR 66 AIRCRAFT MAINTENANCE LICENCE

The table below shows the experience requirements for adding a new category or subcategory to an existing ANTR 66 licence.

The experience must be practical maintenance experience on operating aircraft in the subcategory relevant to the application.

The experience requirement will be reduced by 50 % if the applicant has completed an approved ANTR 147 course relevant to the subcategory.

To: / From:	A1	A2	A3	A4	B1.1	B1.2	B1.3	B1.4	B2
A1	-	6 months	6 months	6 months	2 years	6 months	2 years	1 year	2 years
A2	6 months	-	6 months	6 months	2 years	6 months	2 years	1 year	2 years
A3	6 months	6 months	-	6 months	2 years	1 year	2 years	6 months	2 years
A4	6 months	6 months	6 months	-	2 years	1 year	2 years	6 months	2 years
B1.1	None	6 months	6 months	6 months	-	6 months	6 months	6 months	1 years
B1.2	6 months	None	6 months	6 months	2 years	-	2 year s-	6 months	2 years
B1.3	6 months	6 months	None	6 months	6 months	6 months	-	6 months	1 year
B1.4	6 months	6 months	6 months	None	2 years	6 months	2 years	-	2 years
B2	6 months	6 months	6 months	6 months	1 year	1 year	1 year	1 year	-

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APPENDIX V

ANTR 66 AIRCRAFT MAINTENANCE LICENCE

1. An example of the ANTR 66 aircraft maintenance licence can be found on the following pages. (reserved)

2. The document must be printed in the standardised form shown but may be reduced in size to accommodate its computer generation if desired. When the size is reduced care should be exercised to ensure sufficient space is available in those places where official seals/stamps are required. Computer generated documents need not have all the boxes incorporated when any such box remains blank so long as the document can clearly be recognised as the ANTR 66 aircraft maintenance licence.

3. The document shall be printed in the English.

4. Each licence holder must have a unique licence number based upon a National identifier and an alpha-numeric designator.

5. The document may have the pages in any order and need not have some or any divider lines as long as the information contained is positioned such that each page layout can clearly be identified with the format of the example ANTR 66 aircraft maintenance licence contained herein. The aircraft type rating page need not be issued until the first type endorsement is included.

6. The document shall be prepared and issued by BCAA.

7. Any variation to an existing ANTR 66 aircraft maintenance licence shall be prepared and issued by the BCAA.

8. The ANTR 66 aircraft maintenance licence once issued is required to be kept by the person to whom it applies in good condition and who shall remain accountable for ensuring that no unauthorised entries are made.

9. Failure to comply with paragraph 8 may invalidate the document and could lead to the holder not being permitted to hold any ANTR 145 certification authorisation and may result in prosecution under National law.

10. With regard to the aircraft type rating page the BCAA may choose not to issue this page until the first aircraft type rating needs to be endorsed and will need to issue more than one aircraft type rating page when there are a number to be listed.

11. Notwithstanding 10 each page issued will be in this format and contain the specified information for that page.

12. If there are no limitations applicable, the LIMITATIONS page will be issued stating ‘No limitations’.

13. Where a pre-printed format is used, any category, subcategory or type rating box which does not contain a rating entry shall be marked to show that the rating is not held.

Example of licence (reserved)

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SECTION A – TECHNICAL REQUIREMENTS

ACCEPTABLE MEANS OF COMPLIANCE

AMC 66.A.10 Application

1. Maintenance experience should be written up in a manner that the reader has a reasonable understanding of where, when and what maintenance constitutes the experience. A task by task account is not necessary but at the same time a bland statement "X years maintenance experience completed" is not acceptable. A log book of maintenance experience is desirable and the BCAA may require such log book to be kept. It is acceptable to cross refer in the application form ALD/LIC/F037 to other documents containing information on maintenance.

2. Applicants claiming the maximum reduction in AMC 66.A.30(a) total experience based upon having successfully completed ANTR 147.A.200 approved basic training, should include the ANTR 147 certificate of recognition for approved basic training.

3. Applicants claiming reduction in 66.A.30(a) total experience based upon having successfully completed technical training in an organisation or institute recognised by the BCAA as a competent organisation or institute, should include the relevant certificate of successful completion of training.

AMC 66.A.20(b)2 Privileges

The 6 months maintenance experience in 2 years should be understood as consisting of two elements, duration and nature of the experience. The minimum to meet the requirements for these elements may vary depending on the size and complexity of the aircraft and type of operation and maintenance.

1. Duration:

   Within an approved maintenance organisation:

   - 6 months continuous employment within the same organisation; or

   - 6 months split up into different blocks, employed within the same or in different organisations.

   The 6 months period can be replaced by 100 days of maintenance experience in accordance with the privileges, whether they have been performed within an approved organisation.

2. Nature of the experience:

   Depending on the category of the aircraft maintenance licence, the following activities are considered relevant for maintenance experience:

   - Servicing;

   - Inspection;

   - Operational and functional testing;

   - Trouble-shooting;

   - Repairing;

   - Modifying;

   - Changing component;

- Supervising these activities;

- Releasing aircraft to service.

For category A licence holder, the experience should include exercising the privileges, by means of performing tasks related to the authorisation on at least one aircraft type for each licence subcategory. This means tasks as mentioned in ANTR AMC 145.A.30(g), including servicing, component changes and simple defect rectifications.

For category B1 and B2 and, for every aircraft included in the authorisation the experience should be on that particular aircraft or on a similar aircraft within the same licence subcategory. Two aircraft can be considered as similar when they have similar technology, construction and comparable systems, which means equally equipped with the following (as applicable to the licence category):

a) Propulsion systems (piston or turboprop or turbofan or turboshaft or jet-engine or push propellers); and

b) Flight control systems (only mechanical controls or hydro-mechanically powered controls or electro-mechanically powered controls); and

c) Avionic systems (analog systems or digital systems); and

d) Structure (manufactured of metal or composite or wood).

For licences endorsed with (sub)group ratings:

- In the case of B1 licence endorsed with group ratings (either manufacturer group or full group) as defined in 66.A.45 the holder may show experience on at least one aircraft type per group and per aircraft structure (metal, composite, wood).

- In the case of a B2 licence endorsed with group ratings (either manufacturer group or full group) as defined in 66.A.45 the holder may show experience on at least one aircraft type per group.

For category C, the experience should cover at least one of the aircraft types endorsed on the licence.

For a combination of categories, the experience should include some activities of the nature shown in paragraph 2 in each category.

A maximum of 20% of the experience duration required may be replaced by the following relevant activities on an aircraft type of similar technology, construction and with comparable systems:

- Aircraft maintenance related training as an instructor/assessor or as a student;

- Maintenance technical support/engineering;

- Maintenance management/planning.

The experience should be documented in an individual log book or in any other recording system (which may be an automated one) containing the following data:

a) Date;

b) Aircraft type;

c) Aircraft identification i.e. registration;

d) ATA chapter (optional);

e) Operation performed i.e. 100 FH check, MLG wheel change, engine oil check and complement, SB embodiment, trouble shooting, structural repair, STC embodiment…;

f) Type of maintenance i.e. base, line;

g) Type of activity i.e. perform, supervise, release;

h) Category used A, B1, B2 or C;

i) Duration in days or partial.

AMC 66.A.20(b)3 Privileges

The wording *'has the adequate competence to certify maintenance on the corresponding aircraft'* means that the licence holder and, if applicable, the organisation where he/she is contracted/employed, should ensure that he/she has acquired the appropriate knowledge, skills, attitude and experience to release the aircraft being maintained. This is essential because some systems and technology present in the particular aircraft being maintained may not have been covered by the training/examination/experience required to obtain the licence and ratings.

This is typically the case, among others, in the following situations:

- Type ratings which have been endorsed on a licence in accordance with Appendix I to AMC to ANTR -66 'List of Type Ratings' after attending type training/on-the-job training which did not cover all the models/variants included in such rating. For example, a licence endorsed with the rating Airbus A318/A319/A320/A321 (CFM56) after attending type training/on-the-job training covering only the Airbus 320 (CFM56).

- Type ratings which have been endorsed on a licence in accordance with Appendix I to AMC to ANTR-66 'List of Type Ratings' after a new variant has been added to the rating in Appendix I, without performing difference training. For example, a licence endorsed with the rating Boeing737-600/700/800/900 for a person who already had the rating Boeing 737-600/700/800, without performing any difference training for the 737-900.

- Work being carried out on a model/variant for which the technical design and maintenance techniques have significantly evolved from the original model used in the type training/on-the-job training.

- Specific technology and options selected by each customer which may not have been covered by the type training/on-the-job training.

- Changes in the basic knowledge requirements of Appendix I to ANTR -66 not requiring re-examination of existing licence holders (grandfathered privileges).

- The endorsement of group/subgroup ratings based on experience on a representative number of tasks/aircraft or based on type training/examination on a representative number of aircraft.

- Persons meeting the requirements of 6 months of experience every 2 years only on certain similar aircraft types as allowed by ANTR AMC 66.A.20(b)2.

- Persons holding ANTR-66 licence with limitations, obtained through conversion of national qualifications ANTR (66.A.70), where such limitations are going to be lifted after performing the corresponding basic knowledge examinations. In this case, the type ratings endorsed in the licence may have been obtained in the national system without covering all the aircraft systems (because of the previous limitations) and there will be a need to assess and, if applicable, to train this person on the missing systems.

Additional information is provided in AMC ANTR 145.A.35(a).

AMC 66.A.25 Basic knowledge requirements

1 For an applicant being a person qualified by holding an academic degree in a aeronautical, mechanical or electronic discipline from a recognised university or other higher educational institute the need for any examination will depend upon the course taken in relation to Appendix I to ANTR 66

2 Knowledge gained and examinations passed during previous experiences, for example, in military aviation and civilian apprenticeships will be credited where the BCAA is satisfied that such knowledge and examinations are equivalent to that required by Appendix I to ANTR 66.

AMC 66.A.30(a) Basic Experience requirements

1. For a category C applicant holding an academic degree the representative selection of tasks should include the observation of hangar maintenance, maintenance planning, quality assurance, record-keeping, approved spare parts control and engineering development.

2. While an applicant to an ANTR 66 category C licence may be qualified by having 3 years experience as category B1 or B2 certifying staff only in line maintenance, it is however recommended that any applicant to a category C holding a B1 or B2 licence demonstrate at least 12 months experience as a B1 or B2 base maintenance support staff.

3. A skilled worker is a person who has successfully completed a course of training, acceptable to the BCAA, involving the manufacture, repair, overhaul or inspection of mechanical, electrical or electronic equipment. The training would include the use of tools and measuring devices.

4. Maintenance experience on operating aircraft:

- Means the experience of being involved in maintenance tasks on aircraft which are being operated by airlines, air taxi organisations, etc:

- Should cover a wide range of tasks in length, complexity and variety;

- Aims at gaining sufficient experience in the real environment of maintenance as opposed to only the training school environment.

- May be gained within different types of maintenance organisations (ANTR-145, FAR-145, etc);

- May be combined with Part-147 approved training so that periods of training can be intermixed with periods of experience, similar to an apprenticeship.

AMC 66.A.30(d) Basic Experience requirements

To be considered as recent experience, at least 50% of the required 12 month experience should be gained within the 12 month period prior to the date of application for the aircraft maintenance licence. The remainder of the experience should have been gained within the 7 year period prior to application. It must be noted that the rest of the basic experience required by ANTR 66.A.30 must be obtained within the 10 years prior to the application as required by ANTR 66.A.30(f).

AMC 66.A.30(e) Basic Experience requirements

1. For category A the additional experience of civil aircraft maintenance should be a minimum of 6 months. For category B1, or B2 the additional experience of civil aircraft maintenance should be a minimum of 12 months.

2. Aircraft maintenance experience gained outside a civil aircraft maintenance environment can include aircraft maintenance experience gained in armed forces, coast guards, police etc. or in aircraft manufacturing.

AMC 66.A.45(d),(e)3,(f)1 and (g) Endorsement with aircraft ratings

1. The 'practical experience' should cover a representative cross section including at least 50% of tasks contained in Appendix II to AMC relevant to the licence category and to the applicable aircraft type ratings or aircraft (sub)group ratings being endorsed. This experience should cover tasks from each paragraph of the Appendix II list. Other tasks than those in the Appendix II may be considered as a replacement when they are relevant. In the case of (sub)group ratings, this experience may be shown by covering one or several aircraft types of the applicable (sub)group and may include experience on aircraft classified in group 1, 2 and/or 3 as long as the experience is relevant. The practical experience should be obtained under the supervision of authorised certifying staff.

2. In the case of endorsement of individual type ratings for Group 2 and Group 3 aircraft, for the second aircraft type of each manufacturer (sub)group the practical experience should be reduced to 30% of the tasks contained in Appendix II to AMC relevant to the licence category and to the applicable aircraft type. For subsequent aircraft types of each manufacturer (sub) group this should be reduced to 20%.

3. Practical experience should be demonstrated by the submission of records or a log book showing the Appendix II tasks performed by the applicant. Typical data to be recorded are similar to those described in AMC 66.A.20(b)2.

AMC 66.A.45(e) Endorsement with aircraft ratings

1. For the granting of manufacturer subgroup ratings for Group 2 aircraft, for B1 and C licence holders, the sentence 'at least two aircraft types from the same manufacturer which combined are representative of the applicable manufacturer subgroup' means that the selected aircraft types should cover the technologies relevant to the manufacturer subgroup in the following areas:

   - Flight control systems (mechanical controls/hydromechanically powered controls/electromechanically powered controls); and

   - Avionic systems (analogue systems / digital systems); and

   - Structure (manufactured of metal / composite / wood).

   In cases where there are very different aircraft types within the same manufacturer subgroup, it may be necessary to cover more than two aircraft types to ensure adequate representation.

   For this purpose it may be possible to use aircraft types from the same manufacturer classified in Group 1 as long as the selected aircraft belong to the same licence subcategory for which the rating will be endorsed.

2. For the granting of full subgroup ratings for Group 2 aircraft, for B1 and C licence holders, the sentence 'at least three aircraft types from different manufacturers which combined are representative of the applicable subgroup' means that the selected aircraft types should cover all the technologies relevant to the manufacturer subgroup in the following areas:

   - Flight control systems (mechanical controls/hydromechanically powered controls/ electromechanically powered controls); and

   - Avionic systems (analogue systems / digital systems); and

   - Structure (manufactured of metal / composite / wood).

In cases where there are very different aircraft types within the same subgroup, it may be necessary to cover more than three aircraft types to ensure adequate representation.

For this purpose it may be possible to use aircraft types from different manufacturers classified in Group 1 as long as the selected aircraft belong to the same licence subcategory for which the rating will be endorsed.

3. For manufacturer subgroup ratings, the term 'manufacturer' means the TC holder defined in the certification data sheet, which is reflected in the list of type ratings in Appendix I to AMC to this Part.

In the case of an aircraft rating where the type rating refers to a TC holder made of a combination of two manufacturers which produce a similar aircraft (i.e. AGUSTA / BELL HELICOPTER TEXTRON or any case of aircraft similarly built by another manufacturer) this combination should be considered as one manufacturer.

As a consequence:

- When a licence holder gets a manufacturer type or a manufacturer subgroup rating made of a combination of manufacturers, it covers the combination of such manufacturers.

- When a licence holder who intends to endorse a full subgroup rating selects three aircraft from different manufacturers, this means from different combinations of manufacturers as applicable.

AMC 66.A.50(b) Limitations

1. The appropriate experience required to remove the limitations referred in 66.A.45(f) and (g) should consist of the performance of a variety of tasks appropriate to the limitations under the supervision of authorised certifying staff. This should include the tasks required by a scheduled annual inspection. Alternatively, this experience may also be gained, if agreed by the BCAA, by theoretical and practical training provided by the manufacturer, as long as an assessment is further carried out and recorded by this manufacturer.

2. It may be acceptable to have this experience on just one aircraft type, provided this type is representative of the (sub)group in relation to the limitation being removed.

3. The application for the limitation removal should be supported by a record of experience signed by the authorised certifying staff or by an assessment signed by the manufacturer after completion of the applicable theoretical and practical training.

AMC 66.A.70 Conversion provisions

Technical limitations will be deleted, as appropriate, when the person satisfactorily completes the relevant conversion examination conducted by the BCAA approved/accepted training organisation and gains relevant experience.

AMC to Appendix III ANTR 66 'Aircraft Type Training and Examination Standard. On-Job-Training'

Aircraft Type Training and On-the-Job Training

The theoretical and practical training providers, as well as the OJT provider, may contract the services of a language translator in the case where training is imparted to students not conversant in the language of the training material. Nevertheless, it remains essential that the students understand all the relevant maintenance documentation.

During the performance of examinations and assessments, the assistance of the translator should be limited to the translation of the questions, but should not provide clarifications or help in relation to those questions.

AMC to Section 1 of Appendix III ANTR 66 'Aircraft Type Training and Examination Standard. On-the-Job-Training'

Aircraft Type Training

1. Aircraft type training may be sub-divided in airframe and/or powerplant and/or avionics/electrical systems type training courses.

   - Airframe type training course means a type training course including all relevant aircraft structure and electrical and mechanical systems excluding the powerplant.

   - Powerplant type training course means a type training course on the bare engine, including the build-up to a quick engine change unit.

   - The interface of the engine/airframe systems should be addressed by either airframe or powerplant type training course

   - Avionics/electrical systems type training course means type training on avionics and electrical systems covered by but not necessarily limited to ATA (Air Transport Association) Chapters 22, 23, 24, 25, 27, 31, 33, 34, 42, 44, 45, 46, 73 and 77 or equivalent.

2. Practical training may be performed either following or integrated with the theoretical elements. However, it should not be performed before theoretical training.

3. The content of the theoretical and practical training should:

   - address the different parts of the aircraft which are representative of the structure, the systems/components installed and the cabin; and include training on the use of technical manuals, maintenance procedures and the interface with the operation of the aircraft.

   Therefore it should be based on the following elements Type design including relevant type design variants, new technology and techniques;

   - Feedback from in-service difficulties, occurrence reporting, etc;

   - Significant applicable airworthiness directives and service bulletins;

   - Known human factor issues associated with the particular aircraft type;

   - Use of common and specific documentation, (when applicable, such as MMEL, AMM, MPD, TSM, SRM, WD, AFM, tool handbook), philosophy of the troubleshooting, etc.;

   - Knowledge of the maintenance on-board reporting systems and ETOPS maintenance conditions where applicable;

   - Use of special tooling and test equipment and specific maintenance practises including critical safety items and safety precautions;

   - Significant and critical tasks/aspects from the MMEL, CDL, Fuel Tank Safety (FTS), airworthiness limitation items (ALI) including Critical Design Configuration Control Limitations (CDCCL), CMR and all ICA documentation such as MRB, MPD, SRM, AMM, etc., when applicable.

   - Maintenance actions and procedures to be followed as a consequence of specific certification requirements, such as, but not limited to, RVSM (Reduced Vertical Separation Minimum) and NVIS (Night Vision Imaging Systems);

   - Knowledge of relevant inspections and limitations as applicable to the effects of environmental factors or operational procedures such as cold and hot climates, wind, moisture, sand, de-icing/anti-icing, etc.

The type training does not necessarily need to include all possible customer options corresponding to the type rating described in the Appendix I to AMC to ANTR-66.

4. Limited avionic system training should be included in the category B1 type training as the B1 privileges include work on avionics systems requiring simple tests to prove their serviceability.

5. Electrical systems should be included in both categories of B1 and B2 type training.

6. The theoretical and practical training should be complementary and may be:

   - Integrated or split

   - Supported by the use of training aids, such as trainers, virtual aircraft, aircraft components, synthetic training devices (STD), computer based training devices (CBT), etc.

AMC to Paragraphs 1(b), 3.2 and 4.2 of Appendix III ANTR 66 'Aircraft Type Training and Examination Standard. On-the-Job-Training'

Practical Element of the Aircraft Type Training

1. The practical training may include instruction in a classroom or in simulators but part of the practical training should be conducted in a real maintenance or manufacturer environment

2. The tasks should be selected because of their frequency, complexity, variety, safety, criticality, novelty, etc. The selected tasks should cover all the chapters described in the table contained in paragraph 3.2 of Appendix III to ANTR-66.

3. The duration of the practical training should ensure that the content of training required by paragraph 3.2 of Appendix III to ANTR-66 is completed.

   Nevertheless, for aeroplanes with a MTOM equal or above 30000kg, the duration for the practical element of a type rating training course should not be less than two weeks unless a shorter duration meeting the objectives of the training and taking into account pedagogical aspects (maximum duration per day) is justified to the BCAA

4. The organisation providing the practical element of the type training should provide trainees a schedule or plan indicating the list of tasks to be performed under instruction or supervision. A record of the tasks completed should be entered into a logbook which should be designed such that each task or group of tasks may be countersigned by the designated assessor. The logbook format and its use should be clearly defined.

5. In paragraph 4.2 of Appendix III to ANTR-66, the term 'designated assessors appropriately qualified' means that the assessors should demonstrate training and experience on the assessment process being undertaken and be authorised to do so by the organisation.

   Further guidance about the assessment and the designated assessors is provided in Appendix III to AMC to ANTR-66.

6. The practical element (for powerplant and avionic systems) of the Type Rating Training may be subcontracted by the approved ANTR 147 organisation under its quality system according to the provisions of 147.A.145(d)3 and the corresponding Guidance Material.

AMC to Paragraph 1(c) of Appendix III ANTR 66 'Aircraft Type Training and Examination Standard. On-the-Job-Training'

Differences Training

Approved difference training is not required for different variants within the same aircraft type rating (as specified in Appendix I to AMC to ANTR-66) for the purpose of type rating endorsement on the aircraft maintenance licence.

However, this does not necessarily mean that no training is required before a certifying staff authorisation can be issued by the maintenance organisation (refer to AMC 66.A.20(b)3).

AMC to Paragraph 3.1(d) of Appendix III ANTR 66 'Aircraft Type Training and Examination Standard. On-the-Job Training

Training Needs Analysis for the Theoretical Element of the Aircraft Type Training

1. The minimum duration for the theoretical element of the type rating training course, as described in Appendix III to ANTR-66, has been determined based on:

   - generic categories of aircraft and minimum standard equipment fit

   - the estimated average duration of standard courses

2. The purpose of the Training Needs Analysis (TNA) is to adapt and justify the duration of the course for a specific aircraft type. This means that the TNA is the main driver for determining the duration of the course, regardless of whether it is above or below the minimum duration described in Appendix III to ANTR-66.

3. The content and the duration deriving from this TNA may be supported by an analysis from the Type Certificate holder.

4. In order to approve a reduction of such minimum duration, the evaluation done by the BCAA should be performed on a case-by-case basis appropriate to the aircraft type. For example, while it would be exceptional for a theoretical course for a transport category complex motor-powered aircraft such as an A330 or B757 to be below the minimum duration shown.

5. When developing the TNA the following should be considered:

   (a) The TNA should include an analysis identifying all the areas and elements where there is a need for training as well as the associated learning objectives, considering the design philosophy of the aircraft type, the operational environment, the type of operations and the operational experience. This analysis should be written in a manner which provides a reasonable understanding of which areas and elements constitute the course in order to meet the learning objectives.

   (b) As a minimum, the Training Need Analysis (TNA) should take into account all the applicable elements contained in paragraph 3.1 of ANTR-66 Appendix III and associated AMCs.

   (c) The TNA should set-up the course content considering the Appendix III objectives for each level of training and the prescribed topics in the theoretical element table contained in paragraph 3.1 of ANTR-66 Appendix III.

   (d) For each chapter described in the theoretical element table contained in paragraph 3.1 of ANTR-66 Appendix III, the corresponding training time should be recorded.

   (e) Typical documents to be used in order to identify the areas and elements where there is a need for training typically include, among others, the Aircraft Maintenance Manual, MRB

report, CMRs, airworthiness limitations, Troubleshooting Manual, Structural Repair Manual, Illustrated Parts Catalogue, Airworthiness Directives and Service Bulletins.

(f) During the analysis of these documents:

- Consideration should be given to the following typical activities:
  - Activation/reactivation;
  - Removal/Installation
  - Testing;
  - Servicing;
  - Inspection, check and repairs;
  - Troubleshooting / diagnosis.
- For the purpose of identifying the specific elements constituting the training course, it is acceptable to use a filtering method based on criteria such as:
  - Frequency of the task;
  - Human factor issues associated to the task;
  - Difficulty of the task;
  - Criticality and safety impact of the task;
  - In-service experience;
  - Novel or unusual design features (not covered by ANTR-66 Appendix I);
  - Similarities with other aircraft types;
  - Special tests and tools/equipment.
- It is acceptable to follow an approach based on:
  - Tasks or groups of tasks, or
  - Systems or subsystems or components

(g) The TNA should:

- Identify the learning objectives for each task, group of tasks, system, subsystem or component;
- Associate the identified tasks to be trained to the regulatory requirements (table in Paragraph 3.1 of Appendix III to ANTR-66);
- Organise the training into modules in a logical sequence (adequate combination of chapters as defined in Appendix III of ANTR-66);
- Determine the sequence of learning (within a DE Determine the sequence of learning (within a lesson and for the whole syllabus);
- Identify the scope of information and level of detail with regard the minimum

standard to which the topics of the TNA should be taught according to the set-up objectives.

- Address the following:

  - Description of each system/component including the structure (where applicable);

  - System/component operation taking into account:

    (a) Complexity of the system (e.g. the need of further break down into subsystems, etc.);

    (b) Design specifics which may require more detailed presentation or may contribute to maintenance errors;

    (c) Normal and emergency functioning;

    (d) Troubleshooting;

    (e) Interpretation of indications and malfunctions;

    (f) Use of maintenance publications;

    (g) Identification of special tools and equipment required for servicing and maintaining the aircraft;

    (h) Maintenance Practices;

    (i) Routine inspections, functional or operational tests, rigging/adjustment, etc.

- Describe the following:

  - The instructional methods and equipment, teaching methods and blending of the teaching methods in order to ensure the effectiveness of the training;

  - The maintenance training documentation/material to be delivered to the student;

  - Facilitated discussions, questioning session, additional practiced-oriented training, etc.;

  - The homework, if developed;

  - The training provider's resources available to the learner.

(h) It is acceptable to differentiate between issues which have to be led by an instructor and issues which may be delivered through interactive simulation training devices and/or covered by web based elements. Overall time of the course will be allocated accordingly.

(i) The maximum number of training hours per day for the theoretical element of type training should not be more than 6 hours. A training hour means 60 minutes of tuition excluding any breaks, examination, revision, preparation and aircraft visit. In exceptional cases, the BCAA may allow deviation from this standard when it is properly justified that the proposed number of hours follows pedagogical and human factors principles. These principles are especially important in those cases where:

- Theoretical and practical training are performed at the same time;

- Training and normal maintenance duty/apprenticeship are performed at the same time.

(j) The minimum participation time for the trainee in order to meet the objectives of the course should not be less than 90% of the tuition hours of the theoretical training course. Additional training may be provided by the training organisation in order to meet the minimum participation time. If the minimum participation defined for the course is not met, a certificate of recognition should not be issued.

(k) The TNA is a living process and should be reviewed/updated based on operation feedback, maintenance occurrences, airworthiness directives, major service bulletins impacting maintenance activities or requiring new competencies for mechanics, alert service bulletins, feedback from trainees or customer satisfaction, evolution of the maintenance documentation such as MRBs, MPDs, MMs, etc. The frequency at which the TNA should be reviewed/updated is left to the discretion of the organisation conducting the course.

NOTE: *The examination is not part of the TNA. However, it should be prepared in accordance with the learning objectives described in the TNA.*

AMC to Section 5 of Appendix III ANTR 66 'Aircraft Type Training and Examination Standard. On-the-Job-Training'

Type Examination Standard

This Section 5 'Type Examination Standard' does not apply to the examination performed as part of type training. This Section only applies to those cases where type examination is performed as a substitute for type training.

AMC to Section 6 of Appendix III ANTR 66 'Aircraft Type Training and Examination Standard. On-the-Job-Training'

On-the-Job Training (OJT)

1. 'A maintenance organisation appropriately approved for the maintenance of the particular aircraft type' means a Part-145 approved maintenance organisation holding an A rating for such aircraft.

2. The OJT should include one to one supervision and should involve actual work task performance on aircraft/components, covering line and/or base maintenance tasks.

3. The use of simulators for OJT should not be allowed.

4. The OJT should cover at least 50% of the tasks contained in Appendix II to AMC to ANTR-66. Some tasks should be selected from each paragraph of the Appendix II list. Tasks should be selected among those applicable to the type of aircraft and licence (sub) category applied for. Other tasks than those in the Appendix II may be considered as a replacement when they are relevant. Typically, in addition to the variety and the complexity, the OJT tasks should be selected because of their frequency, safety, novelty, etc.

5. Up to 50% of the required OJT may be undertaken before the aircraft theoretical type training starts.

6. The organisation providing the on-the-job training should provide trainees a schedule or plan indicating the list of tasks to be performed under supervision. A record of the tasks completed should be entered into a logbook which should be designed such that each task or group of tasks is countersigned by the corresponding supervisor. The logbook format and its use should be clearly defined.

7. Regarding the day-to-day supervision of the OJT programme in the approved maintenance organisation and the role of the supervisor(s), the following should be considered:

- It is sufficient that the completion of individual OJT tasks is confirmed by the direct supervisor(s), without being necessary the direct evaluation of the assessor.

- During the day-to-day OJT performance, the supervision aims at overseeing the complete process, including task completion, use of manuals and procedures, observance of safety measures, warnings and recommendations and adequate behaviour in the maintenance environment.

- The supervisor(s) should personally observe the work being performed to ensure the safe completeness and should be readily available for consultation, if needed during the OJT performance.

- The supervisor(s) should countersign the tasks and release the maintenance tasks as the trainee is still not qualified to do so.

- The supervisor(s) should therefore:

  - have certifying staff or support staff privileges relevant to the OJT tasks;

  - be competent for the selected tasks;

  - be safety-orientated;

  - be capable to coach (setting objectives, giving training, performing supervision, evaluating, handling trainee's reactions and cultural issues, managing objectively and positively debriefing sessions, determining the need for extra training or reorientate the training, reporting, etc.);

  - be designated by the approved maintenance organisation to carry out the supervision.

8. Regarding the assessor, the following should be considered:

   - The function of the assessor, as described in Section 6 of Appendix III to ANTR-66, is to conduct the final assessment of the completed OJT. This assessment should include confirmation of the completion of the required diversity and quantity of OJT and should be based on the supervisor(s) reports and feedback.

   - In Section 6 of Appendix III to ANTR-66, the term 'designated assessor appropriately qualified' means that the assessor should demonstrate training and experience on the assessment process being undertaken and should be authorised to do so by the organisation. Further guidance about the assessment and the designated assessors is provided in Appendix III to AMC to ANTR-66.

9. The procedures for OJT should be included into the Exposition Manual of the approved maintenance organisation (chapter 3.15, as indicated in AMC 145.A.70(a)).

   The procedures in Exposition Manual are approved by the BCAA or the Exposition Manual as approved by competent authority of Contracting State are acceptable to BCAA, and providing training is not one of the privileges of a maintenance organisation. However, these procedures in the Exposition Manual can only be used for the purpose of OJT when the licensing authority is BCAA. In other cases, it is up to the licensing authority to decide whether it accepts such procedures for the purpose of approving the OJT.

APPENDICES TO ACCEPTABLE MEANS OF COMPLIANCE

APPENDIX I

AIRCRAFT TYPE RATINGS FOR ANTR 66 AIRCRAFT MAINTENANCE LICENCE

EASA Annex III (Part-66) Appendix 1 may be used as a guidance material for aircraft type ratings for ANTR 66 aircraft maintenance licence.

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APPENDIX II

AIRCRAFT TYPE PRACTICAL EXPERIENCE AND ON-THE-JOB TRAINING - LIST OF TASKS

Time limits/Maintenance checks

100 hour check (general aviation aircraft).
'B' or 'C' check (transport category aircraft).
Assist carrying out a scheduled maintenance check i.a.w. AMM.
Review Aircraft maintenance log for correct completion.
Review records for compliance with Airworthiness Directives.
Review records for compliance with component life limits.
Procedure for inspection following heavy landing.
Procedure for inspection following lightning strike.

Dimensions/Areas

Locate component(s) by zone/station number.
Perform symmetry check.

Lifting and Shoring

Assist in:
Jack aircraft nose or tail wheel.
Jack complete aircraft.
Sling or trestle major component.

Levelling/Weighing

Level aircraft.
Weigh aircraft.
Prepare weight and balance amendment.
Check aircraft against equipment list.

Towing and Taxiing

Prepare for aircraft towing.
Tow aircraft.
Be part of aircraft towing team.

Parking and mooring

Tie down aircraft.
Park, secure and cover aircraft.
Position aircraft in dock.
Secure rotor blades.

Placards and Markings

Check aircraft for correct placards.
Check aircraft for correct markings.

Servicing

Refuel aircraft.
Defuel aircraft.
Carry out tank to tank fuel transfer.
Check/adjust tire pressures.
Check/replenish oil level.
Check/replenish hydraulic fluid level.
Check/replenish accumulator pressure.
Charge pneumatic system.
Grease aircraft.
Connect ground power.
Service toilet/water system
Perform pre-flight/daily check.

Vibration and Noise Analysis

Analyse helicopter vibration problem.
Analyse noise spectrum.
Analyse engine vibration.

Air Conditioning

Replace combustion heater.
Replace flow control valve.
Replace outflow valve.
Replace safety valve.
Replace vapour cycle unit.
Replace air cycle unit.
Replace cabin blower.
Replace heat exchanger.
Replace pressurisation controller.
Clean outflow valves.
Deactivate/reactivate cargo isolation valve.
Deactivate/reactivate avionics ventilation components.
Check operation of air conditioning/heating system.
Check operation of pressurisation system.
Troubleshoot faulty system.

Auto flight

Install servos.
Rig bridle cables Replace controller.
Replace amplifier.
Replacement of the auto flight system LRUs in case of fly-by-wire aircraft.
Check operation of auto-pilot.
Check operation of auto-throttle/auto-thrust.
Check operation of yaw damper.
Check and adjust servo clutch.
Perform autopilot gain adjustments.
Perform mach trim functional check.
Troubleshoot faulty system.
Check autoland system.
Check flight management systems.
Check stability augmentation system.

Communications

Replace VHF com unit.
Replace HF com unit.
Replace existing antenna.
Replace static discharge wicks.
Check operation of radios.
Perform antenna VSWR check.
Perform Selcal operational check.
Perform operational check of passenger address system.
Functionally check audio integrating system.
Repair co-axial cable.
Troubleshoot faulty system.

Electrical Power

Charge lead/acid battery.
Charge Ni-Cad battery.
Check battery capacity.
Deep-cycle Ni-Cad battery.
Replace integrated drive/generator/alternator.
Replace switches.
Replace circuit breakers.
Adjust voltage regulator.
Change voltage regulator.
Amend electrical load analysis report.
Repair/replace electrical feeder cable.
Troubleshoot faulty system.
Perform functional check of integrated drive/generator/alternator.
Perform functional check of voltage regulator.
Perform functional check of emergency generation system.

Equipment/Furnishings

Replace carpets
Replace crew seats.
Replace passenger seats.
Check inertia reels.
Check seats/belts for security.
Check emergency equipment.
Check ELT for compliance with regulations.
Repair toilet waste container.
Remove and install ceiling and sidewall panels.
Repair upholstery.
Change cabin configuration.
Replace cargo loading system actuator.
Test cargo loading system.
Replace escape slides/ropes.

Fire protection

Check fire bottle contents.
Check/test operation of fire/smoke detection and warning system.
Check cabin fire extinguisher contents.
Check lavatory smoke detector system.
Check cargo panel sealing.
Install new fire bottle.
Replace fire bottle squib.
Troubleshoot faulty system.
Inspect engine fire wire detection systems.

Flight Controls

Inspect primary flight controls and related components i.a.w. AMM.
Extending/retracting flaps & slats.
Replace horizontal stabiliser.
Replace spoiler/lift damper.
Replace elevator.
Deactivation/reactivation of aileron servo control.
Replace aileron.

Replace rudder.
Replace trim tabs.
Install control cable and fittings.
Replace slats.
Replace flaps.
Replace powered flying control unit.
Replace flat actuator.
Rig primary flight controls.
Adjust trim tab.
Adjust control cable tension.
Check control range and direction of movement.
Check for correct assembly and locking.
Troubleshoot faulty system.
Functional test of primary flight controls.
Functional test of flap system.
Operational test of the side stick assembly.
Operational test of the THS.
THS system wear check.

Fuel

Water drain system (operation).
Replace booster pump.
Replace fuel selector.
Replace fuel tank cells.
Replace/test fuel control valves.
Replace magnetic fuel level indicators.
Replace water drain valve.
Check/calculate fuel contents manually.
Check filters.
Flow check system.
Check calibration of fuel quantity gauges.
Check operation feed/selectors.
Check operation of fuel dump/jettison system.
Fuel transfer between tanks.
Pressure defuel.
Pressure refuel (manual control).
Deactivation/reactivation of the fuel valves (transfer defuel, X-feed, refuel).
Troubleshoot faulty system.

Hydraulics

Replace engine driven pump.
Check/replace case drain filter.
Replace standby pump.
Replace hydraulic motor pump/generator.
Replace accumulator.
Check operation of shut off valve.
Check filters/clog indicators.
Check indicating systems.
Troubleshoot faulty system.

Ice and rain protection

Replace pump.
Replace timer.
Inspect repair propeller deice boot.
Test propeller de-icing system.
Inspect/test wing leading edge de-icer boot.
Replace anti-ice/deice valve.
Install wiper motor.
Check operation of systems.
Operational test of the pitot-probe ice protection.
Operational test of the TAT ice protection.
Operational test of the wing ice protection system.
Assistance to the operational test of the engine air-intake ice protection (with engines operating).
Troubleshoot faulty system.

Indicating/recording systems

Replace flight data recorder.
Replace cockpit voice recorder.
Replace clock.
Replace master caution unit.
Replace FDR.
Perform FDR data retrieval.
Troubleshoot faulty system.
Implement ESDS procedures.
Inspect for HIRF requirements.
Start/stop EIS procedure.
Bite test of the CFDIU.
Ground scanning of the central warning system.

Landing Gear

Build up wheel.
Replace main wheel.
Replace nose wheel.
Replace steering actuator.
Replace truck tilt actuator.
Replace gear retraction actuator.
Replace uplock/downlock assembly.
Replace shimmy damper.
Rig nose wheel steering.
Functional test of the nose wheel steering system.
Replace shock strut seals.
Replace brake unit.
Replace brake control valve.
Bleed brakes.
Replace brake fan.
Test anti-skid unit.
Test gear retraction.
Change bungees.
Adjust micro switches/sensors.
Charge struts with oil and air.
Troubleshoot faulty system.
Test auto-brake system.
Replace rotorcraft skids.
Replace rotorcraft skid shoes.
Pack and check floats.
Flotation equipment.

Check/test emergency blowdown (emergency landing gear extension).
Operational test of the landing gear doors.

Lights

Repair/replace rotating beacon.
Repair/replace landing lights.
Repair/replace navigation lights.
Repair/replace interior lights.
Replace ice inspection lights.
Repair/replace logo lights.
Repair/replace emergency lighting system.
Perform emergency lighting system checks.
Troubleshoot faulty system

Navigation

Calibrate magnetic direction indicator.
Replace airspeed indicator.
Replace altimeter.
Replace air data computer.
Replace VOR unit.
Replace ADI.
Replace HSI.
Check pitot static system for leaks.
Check operation of directional gyro.
Functional check weather radar.
Functional check doppler.
Functional check TCAS.
Functional check DME.
Functional check ATC Transponder
Functional check flight director system.
Functional check inertial nav system.
Complete quadrantal error correction of ADF system.
Update flight management system database.
Check calibration of pitot static instruments.
Check calibration of pressure altitude reporting system.
Troubleshoot faulty system.
Check marker systems.
Compass replacement direct/indirect.
Check Satcom.
Check GPS.
Test AVM.

Oxygen

Inspect on board oxygen equipment.
Purge and recharge oxygen system.
Replace regulator.
Replace oxygen generator.
Test crew oxygen system.
Perform auto oxygen system deployment check.
Troubleshoot faulty system.

Pneumatic systems

Replace filter.
Replace air shut off valve.
Replace pressure regulating valve.
Replace compressor.

Recharge dessicator.
Adjust regulator.
Check for leaks.
Troubleshoot faulty system.

Vacuum systems

Inspect the vacuum system i.a.w. AMM.
Replace vacuum pump.
Check/replace filters.
Adjust regulator.
Troubleshoot faulty system.

Water/Waste

Replace water pump.
Replace tap.
Replace toilet pump.
Perform water heater functional check.
Troubleshoot faulty system.
Inspect waste bin flap closure.

Central Maintenance System

Retrieve data from CMU.
Replace CMU.
Perform Bite check.
Troubleshoot faulty system.

Airborne Auxiliary power

Install APU.
Inspect hot section.
Troubleshoot faulty system

Structures

Assessment of damage.
Sheet metal repair.
Fibre glass repair.
Wooden repair.
Fabric repair.
Recover fabric control surface.
Treat corrosion.
Apply protective treatment.

Doors

Inspect passenger door i.a.w. AMM.
Rig/adjust locking mechanism.
Adjust air stair system.
Check operation of emergency exits.
Test door warning system.
Troubleshoot faulty system.
Remove and install passenger door i.a.w. AMM.
Remove and install emergency exit i.a.w. AMM.
Inspect cargo door i.a.w. AMM.

Windows

Replace windshield.
Replace direct vision window.
Replace cabin window.
Repair transparency.

Wings

Skin repair.
Recover fabric wing.
Replace tip.
Replace rib.
Replace integral fuel tank panel.
Check incidence/rig.

Propeller

Assemble prop after transportation.
Replace propeller.
Replace governor.
Adjust governor.
Perform static functional checks.
Check operation during ground run.
Check track.
Check setting of micro switches.
Assessment of blade damage i.a.w. AMM.
Dynamically balance prop.
Troubleshoot faulty system.

Main Rotors

Install rotor assembly.
Replace blades.
Replace damper assembly.
Check track.
Check static balance.
Check dynamic balance.
Troubleshoot.

Rotor Drive

Replace mast.
Replace drive coupling.
Replace clutch/freewheel unit
Replace drive belt.
Install main gearbox.
Overhaul main gearbox.
Check gearbox chip detectors.

Tail Rotors

Install rotor assembly.
Replace blades.
Troubleshoot.

Tail Rotor Drive

Replace bevel gearbox.
Replace universal joints.
Overhaul bevel gearbox.
Install drive assembly.
Check chip detectors.
Check/install bearings and hangers.
Check/service/assemble flexible couplings.
Check alignment of drive shafts.
Install and rig drive shafts.

Rotorcraft flight controls

Install swash plate.
Install mixing box.
Adjust pitch links.
Rig collective system.
Rig cyclic system.
Rig anti-torque system.
Check controls for assembly and locking.
Check controls for operation and sense.
Troubleshoot faulty system.

Power Plant

Build up ECU.
Replace engine.
Repair cooling baffles.
Repair cowling.
Adjust cowl flaps.
Repair faulty wiring.
Troubleshoot.
Assist in dry motoring check.
Assist in wet motoring check.
Assist in engine start (manual mode).

Piston Engines

Remove/install reduction gear.
Check crankshaft run-out.
Check tappet clearance.
Check compression.
Extract broken stud.
Install helicoil.
Perform ground run.
Establish/check reference RPM.
Troubleshoot.

Turbine Engines

Replace module.
Replace fan blade.
Hot section inspection/boroscope check.
Carry out engine/compressor wash.
Carry out engine dry cycle.
Engine ground run.
Establish reference power.
Trend monitoring/gas path analysis.
Troubleshoot.
Fuel and control, piston
Replace engine driven pump.
Adjust AMC.
Adjust ABC.
Install carburettor/injector.
Adjust carburettor/injector.
Clean injector nozzles.
Replace primer line.
Check carburettor float setting.
Troubleshoot faulty system.

Fuel and control, turbine

Replace FCU.
Replace Engine Electronic Control Unit (FADEC).
Replace Fuel Metering Unit (FADEC).
Replace engine driven pump.
Clean/test fuel nozzles.
Clean/replace filters.
Adjust FCU.
Troubleshoot faulty system.
Functional test of FADEC.

Ignition systems, piston

Change magneto.
Change ignition vibrator.
Change plugs.
Test plugs.
Check H.T. leads.
Install new leads.
Check timing.
Check system bonding.
Troubleshoot faulty system.

Ignition systems, turbine

Perform functional test of the ignition system.
Check glow plugs/ignitors.
Check H.T. leads.
Check ignition unit.
Replace ignition unit.
Troubleshoot faulty system.

Engine Controls

Rig thrust lever.
Rig RPM control.
Rig mixture HP cock lever.
Rig power lever.
Check control sync (multi-eng).
Check controls for correct assembly and locking.
Check controls for range and direction of movement.
Adjust pedestal micro-switches.
Troubleshoot faulty system.

Engine Indicating

Replace engine instruments(s).
Replace oil temperature bulb.
Replace thermocouples.
Check calibration.
Troubleshoot faulty system.

Exhaust, piston

Replace exhaust gasket.
Inspect welded repair.
Pressure check cabin heater muff.
Troubleshoot faulty system.

Exhaust, turbine

Change jet pipe.
Change shroud assembly.
Install trimmers.
Inspect/replace thrust reverser.
Replace thrust reverser component.
Deactivate/reactivate thrust reverser.
Operational test of the thrust reverser system.

Oil

Change oil.
Check filter(s).
Adjust pressure relief valve.
Replace oil tank.
Replace oil pump.
Replace oil cooler.
Replace firewall shut off valve.
Perform oil dilution test.
Troubleshoot faulty system.

Starting

Replace starter.
Replace start relay.
Replace start control valve.
Check cranking speed.
Troubleshoot faulty system.

Turbines, piston engines

Replace PRT.
Replace turbo-blower.
Replace heat shields.
Replace waste gate.
Adjust density controller.

Engine water injection

Replace water/methanol pump.
Flow check water/methanol system.
Adjust water/methanol control unit.
Check fluid for quality.
Troubleshoot faulty system

Accessory gear boxes

Replace gearbox.
Replace drive shaft.
Inspect magnetic chip detector.

APU

Removal/installation of the APU.
Removal/installation of the inlet guide-vane actuator.
Operational test of the APU emergency shut-down test.
Operational test of the APU.

The theoretical and practical training providers, as well as the OJT provider, may contract the services of a language translator in the case where training is imparted to students not conversant in the language of the training material. Nevertheless, it remains essential that the students understand all the relevant maintenance documentation.

During the performance of examinations and assessments, the assistance of the translator should be limited to the translation of the questions, but should not provide clarifications or help in relation to those questions.

APPENDIX III

EVALUATION OF THE COMPETENCE: ASSESSMENT AND ASSESSORS

This Appendix applies to the competence assessment performed by the designated assessors (and their qualifications).

1) What does 'competence' mean and areas of focus for assessment

The assessment should aim at measuring the competence by evaluating three major factors associated to the learning objectives:

- Knowledge;
- Skills;
- Attitude;

Generally, knowledge is evaluated by examination. The purpose of this document is not to describe the examination process: this material mainly addresses the evaluation of 'skills' and 'attitude' after training containing practical elements. Nevertheless, the trainee needs to demonstrate to have sufficient knowledge to perform the required tasks.

'Attitude' is indivisible from the 'skill' as this greatly contributes to the safe performance of the tasks.

The evaluation of the competence should be based on the learning objectives of the training, in particular:

- the (observable) desired performance. This covers what the trainee is expected to be able to do and how the trainee is expected to behave at the end of the training;
- the (measurable) performance standard that must be attained to confirm the trainee's level of competence in the form of tolerances, constraints, limits, performance rates or qualitative statements; and
- the conditions under which the trainee will demonstrate competence. Conditions consist of the training methods, the environmental, situational and regulatory factors.

The assessment should focus on the competencies relevant to the aircraft type and its maintenance such as, but not limited to:

- Environment awareness (act safely, apply safety precautions and prevent dangerous situations);
- Systems integration (demonstrate understanding of aircraft systems interaction – identify, describe, explain, plan, execute);
- Knowledge and understanding of areas requiring special emphasis or novelty (areas peculiar to the aircraft type, domains not covered by Part-66 Appendix I, practical training elements that cannot be imparted through simulation devices, etc.);
- Using reports and indications (the ability to read and interpret);
- Aircraft documentation finding and handling (identify the appropriate aircraft documentation, navigate, execute and obey the prescribed maintenance procedures);

- Perform maintenance actions (demonstrate safe handling of aircraft, engines, components and tools);

- Aircraft final/close-up and report (apply close up, initiate appropriate actions/follow-up/records of testing, establish and sign maintenance records/logbooks).

2) How to assess

As far as feasible, the objectives of the assessment should be associated with the learning objectives and the passing level; it means that observable criteria should be set in order to measure the performance and should remain as objective as possible.

The general characteristics of effective assessment are: objective, flexible, acceptable, comprehensive, constructive, organised and thoughtful. At the conclusion, the trainee should have no doubt about what he/she did well, what he/she did poorly and how he/she can improve.

The following is a non-exhaustive list of questions that may be posed to assist assessment:

- What are the success factors for the job?

- What are typical characteristics of a correct behaviour for the task?

- What criteria should be observed?

- What level of expertise is expected?

- Is there any standard available?

- What is the pass mark? For example:

    - ‘Go-no go’ situation;

    - How to allocate points? Minimum amount to succeed;

    - ‘Must know or execute’ versus ‘Good to know or execute’ versus ‘Don’t expect the candidate to be an expert’.

- Minimum or maximum time to achieve? Use time effectively and efficiently.

- What if the trainee fails? How many times is the trainee allowed to fail?

- When and how should the trainee be prepared for the assessment?

- What proportion of judgment by the instructor out of collaboration with the trainee is needed during the evaluation stage?

The assessment may be:

- diagnostic (prior to a course), formative (re-orientate the course on areas where there is a need to reinforce) or summative (partial or final evaluation);

- performed task-by-task, as a group of tasks or as a final assessment;

One method might be an initial assessment to be performed by the trainee himself, then discussing areas where the perceptions of the trainee’s performance by the assessors differ in order to:

- develop the self-assessment habits;

- make the assessment more acceptable and understandable to both parties.

A ‘box-ticking’ exercise would be pointless. Experience has shown that assessment sheets have largely evolved over time into assessment of groups of ‘skills’ because in practice such things eventually detracted from the training and assessment that it was intended to serve: evaluate at a point of time, encourage and orientate the training needs, improve safety and ultimately qualify people for their duties.

In addition, many other aspects should be appropriately considered during the assessment process such as stress and environmental conditions, difficulty of the test, history of evaluation (such as tangible progresses or sudden and unexpected poor performance made by the trainee), amount of time necessary to build competence, etc.

All these reasons place more emphasis on the assessor and highlight the function of the organisation’s approval.

3) Who should assess

In order to qualify, the assessor should:

- Be proficient and have sufficient experience or knowledge in:
    - human performance and safety culture;
    - the aircraft type (necessary to have the certifying staff privileges in case of CRS issuances);
    - training/coaching/testing skills;
    - instructional tools to use;
- Understand the objective and the content of the practical elements of the training that is being assessed;
- Have interpersonal skills to manage the assessment process (professionalism, sincerity, objectivity and neutrality, analysis skills, sense of judgement, flexibility, capability of evaluating the supervisor’s or instructor’s reports, handling of trainee’s reactions to failing assessment with the cultural environment, being constructive, etc.);
- Be ultimately designated by the organisation to carry out the assessment.

The roles may be combined for:

- the assessor and the instructor for the practical elements of the Type Rating Training; or
- the assessor and the supervisor for the On-the-Job Training.

provided that the objectives associated to each role are clearly understood and that the competence and qualification criteria according to the company’s procedures are met for both functions. Whenever possible (depending on the size of the organisation), it is recommended to split the roles (two different persons) in order to avoid any conflicts of interests.

When the functions are not combined, the role of each function should be clearly understood.

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SECTION A – TECHNICAL REQUIREMENTS

GUIDANCE MATERIAL

GM 66.A.3 Licence categories

Individual aircraft maintenance licence holders need not be restricted to a single category. Provided that each qualification requirement is satisfied, any combination of categories may be granted.

GM 66.A.20(a) Privileges

1. The following definitions apply:

Electrical system means the aircraft electrical power supply source, plus the distribution system to the different components contained in the aircraft and relevant connectors. Lighting systems are also included in this definition. When working on cables and connectors which are part of these electrical systems, the following typical practices are included in the privileges:

- Continuity, insulation and bonding techniques and testing;
- Crimping and testing of crimped joints;
- Connector pin removal and insertion;
- Wiring protection techniques.

Avionics system means an aircraft system that transfers, processes, displays or stores analogue or digital data using data lines, data buses, coaxial cables, wireless or other data transmission medium, and includes the system's components and connectors. Examples of avionics systems include the following:

- Autoflight;
- Communication, Radar and Navigation;
- Instruments (see NOTE below);
- In Flight Entertainment Systems;
- Integrated Modular Avionics (IMA);
- On-Board Maintenance Systems;
- Information Systems;
- Fly by Wire Systems (related to ATA27 'Flight Controls');
- Fibre Optic Control Systems

NOTE: *Instruments are formally included within the privileges of the B2 licence holders. However, maintenance on electromechanical and pitot-static components may also be released by a B1 license holder.*

Simple test means a test described in approved maintenance data and meeting all the following criteria:

- The serviceability of the system can be verified using aircraft controls, switches, Built-in Test Equipment (BITE), Central Maintenance Computer (CMC) or external test equipment not involving special training.

- The outcome of the test is a unique go – no go indication or parameter, which can be a single value or a value within an interval tolerance. No interpretation of the test result or interdependence of different values is allowed.

- The test does not involve more than 10 actions as described in the approved maintenance data (not including those required to configure the aircraft prior to the test, i.e. jacking, flaps down, etc, or to return the aircraft to its initial configuration). Pushing a control, switch or button, and reading the corresponding outcome may be considered as a single step even if the maintenance data shows them separated.

Troubleshooting means the procedures and actions necessary, using approved maintenance data, in order to identify the root cause of a defect or malfunction. It may include the use of BITE or external test equipment.

Line maintenance means any maintenance that is carried out before flight to ensure that the aircraft is fit for the intended flight. It may include:

- trouble shooting;

- defect rectification;

- component replacement with use of external test equipment, if required. Component replacement may include components such as engines and propellers;

- scheduled maintenance and/or checks including visual inspections that will detect obvious unsatisfactory conditions/discrepancies but do not require extensive in depth inspection. It may also include internal structure, systems and powerplant items which are visible through quick opening access panels/doors;

- minor repairs and modifications which do not require extensive disassembly and can be accomplished by simple means;

- for temporary or occasional cases (Airworthiness Directives, hereinafter AD; service bulletins, hereinafter SB) the quality manager may accept base maintenance tasks to be performed by a line maintenance organisation provided all requirements are fulfilled. The BCAA will prescribe the conditions under which these tasks may be performed.

Base Maintenance means any task falling outside the criteria that are given above for *Line Maintenance*.

NOTE: *Aircraft maintained in accordance with 'progressive' type programmes need to be individually assessed in relation to this paragraph. In principle, the decision to allow some 'progressive' checks to be carried out is determined by the assessment that all tasks within the particular check can be carried out safely to the required standards at the designated line maintenance station.*

2. The category C licence permits certification of scheduled base maintenance by the issue of a single certificate of release to service for the complete aircraft after the completion of all such maintenance. The basis for this certification is that the maintenance has been carried out by competent mechanics and category B1 and, B2 support staff, as appropriate, have signed for the maintenance tasks under their respective specialisation. The principal function of the category C certifying staff is to ensure that all required maintenance has been called up and signed off by the category B1, B2 and support staff, as appropriate, before issue of the certificate of release to

service. Only category C personnel who also hold category B1, or B2 qualifications may perform both roles in base maintenance.

GM 66.A.20(b)2 Privileges

The sentence *'met the provision for the issue of the appropriate privileges'* included in ANTR 66.A.20(b)2 means that during the previous 2 years the person has met all the requirements for the endorsement of the corresponding aircraft rating (for example, in the case of aircraft in Group 1, theoretical plus practical element plus, if applicable, on-the-job training). This supersedes the need for 6 months of experience for the first 2 years. However, the requirement of 6 months of experience in the preceding 2 years will need to be met after the second year.

GM 66.A.20(b)4 Privileges

1. Holders of an ANTR 66 aircraft maintenance licence may not exercise certification privileges unless they have a general knowledge of the language used within the maintenance environment including knowledge of common aeronautical terms in the language. The level of knowledge should be such that the licence holder is able to:

- read and understand the instructions and technical manuals in use within the organisation;
- make written technical entries and any maintenance documentation entries, which can be understood by those with whom they are normally required to communicate;
- read and understand the maintenance organisation procedures;
- communicate at such a level as to prevent any misunderstanding when exercising certification privileges.

2. In all cases, the level of understanding should be compatible with the level of certification privileges exercised.

GM 66.A.25(a) Basic knowledge requirements

The levels of knowledge are directly related to the complexity of certifications appropriate to the particular ANTR 66.1 category, which means that category A must demonstrate a limited but adequate level of knowledge, whereas category B1, and B2 must demonstrate a complete level of knowledge in the appropriate subject modules.

GM 66.A.40 Continued validity of the aircraft maintenance licence

Validity of the ANTR 66 aircraft maintenance licence is not affected by recency of maintenance experience whereas the validity of the ANTR 66.A.20 privileges is affected by maintenance experience as specified in ANTR 66.A.20(a)

GM 66.A.45 Endorsement with aircraft ratings

The following table shows a summary of the aircraft rating requirements contained in ANTR 66.A.45, 66.A.50 and Appendix III to ANTR 66.

The table contains the following:

- The different aircraft groups.
- For each licence (sub)category, which ratings are possible (at the choice of the applicant):
- Individual type ratings.

- Full and/or Manufacturer (sub)group ratings
- For each rating option, which are the qualification options.
- For the B1.2 licence (Group 3 aircraft) which are the possible limitations to be included in the licence if not sufficient experience can be demonstrated in those areas.

Note: *OJT means 'On-the-Job Training'* (Appendix III to ANTR 66*, Section 6) and is only required for the first aircraft rating in the licence (sub)category.*

Aircraft rating requirements			
Aircraft Groups	B1/B3 licence	B2 licence	C licence
<u>Group1</u> - Complex motor-powered aircraft. - Multiple engine helicopters. - Aeroplanes certified above FL290. - Aircraft equipped with fly-by-wire. - Other aircraft when defined by the BCAA.	(For B1) **Individual TYPE RATING** Type training: - Theory + examination - Practical + assessment **PLUS** OJT (for first aircraft in licence subcategory)	**Individual TYPE RATING** Type training: - Theory + examination - Practical + assessment **PLUS** OJT (for first aircraft in licence subcategory)	**Individual TYPE RATING** Type training: - Theory + examination
<u>Group 2</u> Subgroups: 2a: single turboprop aeroplanes (*) 2b: single turbine engine helicopters (*) 2c: single piston engine helicopters (*) (*) Except those classified in Group 1.	(For B1.1, B1.3, B1.4) **Individual TYPE RATING** (type training + OJT) **or** (type examination + practical experience) **Full SUBGROUP RATING** (type training + OJT) **or** (type examination + practical experience) on at least 3 aircraft representative of that subgroup **Manufacturer SUBGROUP RATING** (type training + OJT) **or** (type examination + practical experience) on at least 2 aircraft representative of that manufacturer subgroup	**Individual TYPE RATING** (type training + OJT) **or** (type examination + practical experience) **Full SUBGROUP RATING** based on demonstration of practical experience **Manufacturer SUBGROUP RATING** based on demonstration of practical experience	**Individual TYPE RATING** type training **or** type examination **Full SUBGROUP RATING** type training **or** type examination on at least 3 aircraft representative of that subgroup **Manufacturer SUBGROUP RATING** type training **or** type examination on at least 2 aircraft representative of that manufacturer subgroup
<u>Group3</u> Piston engine aeroplanes (except those classified in Group 1)	(For B1.2) **Individual TYPE RATING** (type training + OJT) **or** (type examination + practical experience) **Full GROUP 3 RATING** based on demonstration of practical experience **Limitations:** - Pressurized aeroplanes - Metal aeroplanes - Composite aeroplanes - Wooden aeroplanes - Metal tubing & fabric Aeroplanes	**Individual TYPE RATING** (type training + OJT) **or** (type examination + practical experience) **Full GROUP 3 RATING** based on demonstration of appropriate experience	**Individual TYPE RATING** type training **or** type examination **Full GROUP 3 RATING** based on demonstration of practical experience

GM 66.A.45(b) Endorsement with aircraft ratings

An aircraft type rating includes all the aircraft models/variants listed as per EASA Annex III (Part-66) Appendix 1.

When a person already holds a type rating on the licence and such type rating is amended in the EASA Annex III (Part-66) Appendix 1 in order to include additional models/variants, there is no need for additional type training for the purpose of amending the type rating in the licence. The rating should be amended to include the new variants, upon request by the applicant, without additional requirements. However, it is the responsibility of the licence holder and, if applicable, the maintenance organisation where he/she is employed to comply with ANTR 66.A.20(b)3, and ANTR 145.A.35(a) as applicable, before he/she exercises certification privileges.

Similarly, type training courses covering certain, but not all the models/variants included in a type rating, are valid for the purpose of endorsing the full type rating.

GM 66.A.70 Conversion provisions

For example a technical limitation could be where a person holds a pre ANTR 66 national licence or authorisation limited to the release of the airframe and engine but not the electrical power system. This person would be issued with an ANTR 66 aircraft maintenance licence in the B1 category with a limitation excluding electrical power systems.

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SECTION B

PROCEDURE FOR THE AUTHORITY

SUBPART A

GENERAL

ANTR 66.B.05 Scope

This section establishes the administrative requirements to be followed by the BCAA.

ANTR 66.B.10 Authority

(a) General

The BCAA has responsibilities for the issuance, continuation, change, suspension or revocation of licences. The Authority shall establish an organisational structure and documented procedures for ensuring compliance with ANTR 66.

(b) Resources

The BCAA shall be appropriately staffed to carry out the requirements of this Part.

(c) Procedures

The BCAA shall establish procedures detailing how compliance with this Part is accomplished.

The procedures shall be reviewed and amended to ensure continued compliance.

ANTR 66.B.20 Record-keeping

(See AMC 66.B.20)

(a) The BCAA shall establish a system of record-keeping that allows adequate traceability of the process to issue, revalidate, change, suspend or revoke each aircraft maintenance licence.

(b) The records for the oversight of the Part shall include:

1. the application for an aircraft maintenance licence or change to that licence, including all supporting documentation;

2. a copy of the aircraft maintenance licence including any changes;

3. copies of all relevant correspondence;

4. details of any exemption and enforcement actions;

5. any report from other Authorities relating to the aircraft maintenance licence holder;

6. records of examinations conducted by the BCAA;

7. aircraft maintenance licence conversion reports;

8. examination credit reports.

(c) Records referred to in paragraph (b), 1. to 5. shall be kept at least five years after the end of the licence validity.

(d) Records referred to in paragraph (b), 6, 7, and 8 shall be kept for an unlimited period.

ANTR 66.B.30 Exemptions

All exemptions granted shall be recorded and retained by the BCAA.

SUBPART B

ISSUE OF AN AIRCRAFT MAINTENANCE LICENCE

This Subpart provides the procedures to be followed by the BCAA to issue or vary or to permit continuity of the aircraft maintenance licence.

ANTR 66.B.100 Procedure for the issue of an aircraft maintenance licence by the Authority
(See AMC 66.B.100)

(a) On receipt of application form ALD/LIC/F037 and any supporting documentation, the BCAA shall verify application form ALD/LIC/F037 for completeness and ensure that the experience claimed meets the requirement of this Part.

(b) The BCAA shall verify an applicant's examination status and/or confirm the validity of any credits to ensure that all required modules of ANTR 66 Appendix I have been met as required by this Part.

(c) When satisfied that the applicant meets the standards of knowledge and experience required by this Part, the BCAA shall issue the relevant aircraft maintenance licence to the applicant. The same information shall be kept on BCAA file.

ANTR 66.B.110 Procedure for the change of an aircraft maintenance licence to include an additional basic category or subcategory
(See AMC 66.B.110)

(a) In addition to the documents required under ANTR 66.B.100, the applicant for additional basic categories or subcategories to an aircraft maintenance licence shall submit his/her current original aircraft maintenance licence to the BCAA together with application form ALD/LIC/F037

(b) At the completion of the procedure as specified in ANTR 66.B.100, the BCAA shall endorse the additional basic category or subcategory on the aircraft maintenance licence by stamp and signature or reissue the licence.

(c) The BCAA record system shall be changed accordingly.

ANTR 66.B.115 Procedure for the change of an aircraft maintenance licence to include an aircraft type rating or to remove limitations
(See AMC 66.B.115)

On receipt of a satisfactory application form ALD/LIC/F037 and any supporting documentation demonstrating compliance with the applicable type requirements and the accompanying aircraft maintenance licence, the BCAA shall either:

1. endorse the applicant's aircraft maintenance licence with the applicable aircraft type; or

2. reissue the said licence to include the applicable aircraft type; or

3. Remove the applicable limitations in accordance with ANTR 66.A.50.

The BCAA record shall be changed accordingly.

ANTR 66.B.120 Procedure for the renewal of an aircraft maintenance licence validity
(See AMC 66.B.120)

(a) The holder of an aircraft maintenance licence shall complete the relevant parts of application form ALD/LIC/F037 and submit it with the holder's copy of the licence to the BCAA, unless the ANTR 145 approved maintenance organisation has a procedure in its exposition whereby such organisation may submit the necessary documentation on behalf of the aircraft maintenance licence holder.

(b) The BCAA shall compare the holder's aircraft maintenance licence with the BCAA file and verify any pending revocation, suspension or variation action pursuant to ANTR 66.B.500. If the documents are identical and no action is pending pursuant to 66.B.500, the holder's copy shall be renewed for five years and the file endorsed accordingly.

(c) If the BCAA records are different from the aircraft maintenance licence held by the licence holder:

1. the BCAA shall investigate the reasons for such differences and may choose not to renew the aircraft maintenance licence.

2. the BCAA shall inform both the licence holder and any known ANTR 145 approved maintenance organisation affected of such fact; and

3. the BCAA shall, if necessary, take action in accordance with ANTR 66.B.500 to revoke, suspend or amend the licence in question.

SUBPART C

EXAMINATIONS

This Subpart provides the procedure for examinations conducted on behalf of the Authority.

ANTR 66.B.200 Examinations on behalf of the Authority

All examination for basic knowledge shall be conducted by an approved ANTR 147 maintenance training organisation.

Examinations which are part of type training course shall be performed either by an approved ANTR 147 organisation or as otherwise approved by the BCAA as part of the approval of the type training course.

Once an ANTR 147 organisation is acceptable, an approval letter must be sent indicating the following;

(a) All examination questions shall be kept in a secure manner prior to an examination, to ensure that candidates will not know which particular questions will form the basis of the examination. The organisation shall nominate, in writing, those persons who control the questions to be used for each examination.

(b) The organisation shall appoint examiners who shall be present during all examinations to ensure the integrity of the examination.

(c) Basic examinations shall follow the standard specified in Appendix I and Appendix II to this Part.

(d) Type training examinations must follow the standard specified in Appendix III to this Part.

(e) New essay questions shall be raised at least every six months and used questions withdrawn or rested from use. A record of the questions used shall be retained in the records for reference.

(f) All examination papers shall be handed out at the start of the examination to the candidate and handed back to the examiner at the end of the allotted examination time period. No examination paper may be removed from the examination room during the allotted examination time period.

(g) Apart from specific documentation needed for type examinations, only the examination paper may be available to the candidate during the examination.

(h) Examination candidates shall be separated from each other so that they cannot read each other's examination papers. They may not speak to any person other than the examiner.

(i) Candidates who are proven to be cheating shall be banned from taking any further examination within 12 months of the date of the examination in which they were found cheating. The BCAA shall be notified of all instances.

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SUBPART E

EXAMINATION CREDITS

This Subpart provides the requirements for granting examination credits in accordance with ANTR 66.A.25(c).

ANTR 66.B.400 General

(a) The BCAA may only grant examination credit on the basis of an examination credit report prepared in accordance with ANTR 66.B.405.

(b) The examination credit report must be developed by an ANTR 147 organisation and approved by the BCAA.

(c) Credit report together with any change of these shall be dated kept on record by the BCAA in accordance with ANTR 66.B.20.

ANTR 66.B.405 Examination credit report

(a) For each technical qualification concerned the report shall identify the subject matter and knowledge levels contained in Appendix I to this Part relevant to the particular category being compared.

(b) The report shall include a statement of compliance against each subject stating where, in the technical qualification, the equivalent standard can be found. If there is no equivalent standard for the particular subject, the report shall state such facts.

(c) Based upon paragraph (b) comparison, the report shall indicate for each technical qualification concerned the Appendix I subject matters subject to examination credits.

(d) Where the qualification standard is changed, the report shall be amended as necessary.

ANTR 66.B.410 Examination credit validity

(See GM 66.B.410)

(a) The competent BCAA shall notify to the applicant in writing any credits granted together with the reference to the credit report used.

(b) Credits shall expire 10 years after they are granted.

(c) Upon expiration of the credits, the applicant may apply for new credits. The competent BCAA shall continue the validity of the credits for an additional period of 10 years without further consideration if basic knowledge requirements defined in Appendix I to ANTR 66 have not been changed.

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SUBPART F

REVOCATION, SUSPENSION OR LIMITATION OF THE AIRCRAFT MAINTENANCE LICENCE

ANTR 66.B.500 Revocation, suspension or limitation of the aircraft maintenance licence

The BCAA shall suspend, limit or revoke the aircraft maintenance licence where it has identified a safety issue or if it has clear evidence that the person has carried out or been involved in one or more of the following activities:

1. obtaining the aircraft maintenance licence and/or the certification privileges by falsification of submitted documentary evidence.

2. failing to carry out requested maintenance combined with failure to report such fact to the organisation or person who requested the maintenance.

3. failing to carry out required maintenance resulting from own inspection combined with failure to report such fact to the organisation or person for whom the maintenance was intended to be carried out.

4. negligent maintenance.

5. falsification of the maintenance record.

6. issuing a certificate of release to service knowing that the maintenance specified on the certificate of release to service has not been carried out or without verifying that such maintenance has been carried out.

7. carrying out maintenance or issuing a certificate of release to service when adversely affected by alcohol or drugs.

8. issuing certificate of release to service while not in compliance with ANTR M, ANTR 145 or this Part.

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SECTION B

ACCEPTABLE MEANS OF COMPLIANCE (AMC) TO PROCEDURES FOR AUTHORITY

AMC 66.B.20 Record-Keeping

1. The record-keeping system should ensure that all records are accessible whenever needed within a reasonable time. These records should be organized in a consistent way throughout the BCAA (chronological, alphabetical order, etc.).

2. All records containing sensitive data regarding applicants or organisations should be stored in a secure manner with controlled access to ensure confidentiality of this kind of data.

3. All computer hardware used to ensure data backup should be stored in a different location from that containing the working data in an environment that ensures they remain in good condition. When hardware or software changes take place special care should be taken that all necessary data continues to be accessible at least through the full period specified in ANTR 66.B.20.

AMC 66.B.100 Procedure for the issue of an aircraft maintenance licence by the Authority

1. Applicants claiming credit against the ANTR 66.A.30(a) total experience requirement by virtue of ANTR 66.A.30(a) non-civil aircraft maintenance experience, may only be granted such credit where the BCAA has recognised such non-civil aircraft maintenance experience. The BCAA in recognising non-civil aircraft maintenance experience will have specified who within the non-civil environment may make a statement that the applicant has met relevant maintenance experience. The applicant should include a detailed statement of such maintenance experience signed by the non-civil maintenance authority in accordance with the conditions specified in the Authority's letter of recognition.

2. The BCAA should check that the experience record satisfies above paragraphs in terms of content and the countersigning signature.

AMC 66.B.110 Procedure for the amendment of an aircraft maintenance licence to include an additional basic category or subcategory

In the case of computer generated licences, the licence should be reissued.

AMC 66.B.115 Procedure for the change of an aircraft maintenance licence to include an aircraft rating or to remove limitations

(a) Where the type training has not been conducted by a Part-147 organisation, there should be supporting documents confirming to the BCAA that:

The type training has been approved by the BCAA in accordance with 66.B.130,

- the applicant has completed the elements of the approved type training; and

- the trainee has been successfully examined/assessed.

(b) Aircraft type training may be subdivided in airframe and/or powerplant and/or avionics/electrical systems type training courses.

1. Airframe type training course means a type training course including all relevant aircraft structure and electrical and mechanical systems excluding the powerplant.

2. Powerplant type training course means a type training course on the bare engine, including the build-up to a quick engine change unit.

3. The interface of the engine/airframe systems should be addressed by either airframe or powerplant type training course.

4. Avionics/electrical systems type training course means type training on avionics and electrical systems covered by but not necessarily limited to ATA Chapters 22, 23, 24, 25, 27, 31, 33, 34, 42, 44, 45, 46, 73 and 77 or equivalent.

(c) For the acceptance of the OJT programme described in Section 6 of Appendix III to Part-66, the BCAA should develop adequate procedures which may be similar to the procedure described in AMC 66.B.130 for the 'direct approval of aircraft type training'.

In the case where the competent authority of the maintenance organisation which provides the OJT is not the BCAA, the BCAA may take into consideration the fact that the maintenance organisation may already have the OJT programme approved by competent authority of the Contracting State and which are acceptable to BCAA (through chapter 3.15 of the MOE, as described in AMC 145.A.70(a)).

AMC 66.B.120 Procedure for the renewal of an aircraft maintenance licence validity

The BCAA should not carry out any investigation to ensure that the licence holder is in current maintenance practice as this is not a condition for the renewal of a licence. Ensuring the continued validity of the certification privileges is a matter for the approved ANTR 145.

For the purpose of ensuring the continued validity of the certification privileges the BCAA may, when periodically reviewing the organisations in accordance with ANTR 145.B.30, or during on the spot checks, request the licence holder for documentary evidence of compliance with ANTR 66.A.20(b) when exercising certification privileges.

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SECTION B

GUIDANCE MATERIAL (GM) TO PROCEDURES FOR AUTHORITY

GM 66.B.200 Examination on behalf of the authority

1. Questions may be prepared in the national language but the use of aviation English is recommended wherever possible.

2. The primary purpose of essay questions is to determine that the candidate can express themselves in a clear and concise manner and can prepare a concise technical report for the maintenance record, which is why only a few essay questions are required.

3. Oral type questions may not be used as the primary means of examination because of the difficulty in establishing consistency of standards between examiners or day to day. Nothing however prevents the BCAA from meeting potential certifying staff for the purpose of ensuring they understand their obligations and responsibilities in the application of maintenance Parts.

4. For pass mark purposes, the essay questions should be considered as separate from the multiple choice questions.

5. Multiple choice question (MCQ) generation. The following principles should be observed when developing multiple choice question:

   (a) The examination should measure clearly formulated goals. Therefore the field and depth of knowledge to be measured by each question must be fully identified.

   (b) All the questions should be of the multiple choice type with three alternative answers.

   (c) Questions that require specialised knowledge of specific aircraft types, should not be asked in a basic licence examination.

   (d) The use of abbreviations and acronyms should generally be avoided. However where needed, only internationally recognised abbreviations and acronyms should be used. In case of doubt use the full form, e.g. angle of attack = 12 degrees instead of a= 12°.

   (e) Questions and answers should be formulated as simply as possible: the examination is not a test of language. Complex sentences, unusual grammar and double negatives should be avoided.

   (f) A question should comprise one complete positive proposition. No more than 3 different statements should appear among the suggested responses otherwise the candidate may be able to deduce the correct answer by eliminating the unlikely combinations of statements.

   (g) Questions should have only one true answer.

   (h) The correct answer should be absolutely correct and complete or, without doubt, the most preferable. Responses that are so essentially similar that the choice is a matter of opinion rather than a matter of fact should be avoided. The main interest in MCQs is that they can be quickly performed: this is not achieved if doubt exists about the correct answer.

   (i) The incorrect alternatives must seem equally plausible to anyone ignorant of the subject. All of the alternatives should be clearly related to the question and of similar vocabulary, grammatical construction and length. In numerical questions, the incorrect answers should correspond to procedural errors such as corrections applied in the wrong sense or incorrect unit conversions: they must not be mere random numbers.

(j) Calculators are not allowed during examination. Therefore all calculations should be feasible without a calculator. Where a question involves calculations not feasible without a calculator, such as 10, then the question should specify the approximate value of 10 .

(k) Questions must be referred to ANTR 66 Appendix I examination syllabus.

6. Essay question generation

(a) The purpose of the essay is to allow the BCAA to determine if candidates can express themselves in a clear and concise manner in the form of a written response, in a technical report format using the technical language of the aviation industry. The essay examination also allows to assess, in part, the technical knowledge retained by the individual and with a practical application relevant to a maintenance scenario.

(b) Questions should be written so as to be broad enough to be answered by candidates for all licence category or sub-categories (Cat A, B1 & B2) and comply with the following general guidelines.

- the question topic selected should be generic, applicable to mechanical as well as avionic licence categories and have a common technical difficulty level as indicated in ANTR 66, Appendix I.

- cover technology applicable to most areas of aircraft maintenance.

- reflects common working practises.

- it is not type or manufacturer specific and avoids subjects which are rarely found in practice.

- when drafting a question there is need to ensure consideration is given to the limited practical experience that most candidates will have.

(c) In order that the questions and the marking procedures are as consistent as possible, each question and model answer, with the required key areas required (see below) should be reviewed independently by at least 2 technical staff.

(d) When raising questions the following must be considered:

- each essay question will have a time allowance of 20 minutes.

- a complete A4 side is provided for each question and answer, if required the answer can be extended onto the reverse side of the page.

- the question should be such that the answer expected will be at the level shown for that subject in the module syllabus.

- the question should not be ambiguous but should seek a broad reply rather than be limited in scope for answer.

- the question should lend itself to be written in a technical report style, in a logical sequence (beginning, middle and end), containing the applicable and relevant technical words needed in the answer.

- do not ask for drawings/sketches to support the essay.

- The question must be relevant to the category and level of difficulty listed in the syllabus, e.g. a description of a typical general aviation system may not be acceptable for a typical commercial aeroplane.

- subject to obvious constraints in relation to the topic being addressed the question should have a strong bias towards the practical maintenance of a system/component and the answer should show an understanding of normal and deteriorated conditions of an aircraft and its systems.

Variations on alternative possible answers which have not been thought of, may have to be taken into account to aid the examiner when marking. If considered relevant, the model answer should be amended to include these new points.

(e) Because of the difficulty in marking an essay answer using key points only, there is a need for the way in which the report was written to be assessed and taken into consideration.

(f) The total points for each question will add up to 100 and will need to reflect both the combination of the technical (key point) element and the report style element.

(g) Each key point will be graded upon its importance and have point weighting allocated to it . The total weight will represent 60% of the mark.

(h) Key points are the 'important elements' that may be knowledge or experience-based and will include other maintenance orientated factors such as relevant safety precautions or legislative practices if applicable. Excessive reference to the need for MM referral or safety checks may be considered wasteful.

(i) The question answer will be analysed for the clarity and manner in which the essay report is presented and have a weighting allocated to it which will represent 40% of the mark.

(j) The answer should show the candidate's ability to express himself in technical language. This includes readability of the language, basic grammar and use of terminology.

(k) The report starts in the beginning and has logical process to reach a conclusion.

(l) Supporting diagrams should not be encouraged but if used should supplement the answer and not replace the need for a broad text answer.

(m) The report should not be indexed, itemised or listed.

(n) Within reason the candidate should not be penalised for incorrect spelling.

(o) A zero mark should only be given in exceptional circumstances. Even if the student misunderstands the question and gives an answer to a different question, a sympathetic mark even if only for the report style should be given, this could be up to the maximum percentage allowed.

(p) The two allocated marks should be added together and written into the answer paper.

(q) If a question answer resulting in a borderline failure is principally due to "written report errors," the paper should be discussed and the mark agreed if possible with another examiner.

GM 66.B.410 Examination credit validity

In the case of credits expired in accordance with ANTR 66.A.25(d) and ANTR66.B.410(b), the new application for credits will lead to a reassessment in accordance with ANTR 66.B.405 and 66.B.410 only in those cases where the requirements contained in Appendix I to ANTR.66 have changed. This may lead to a requirement for further examinations on particular modules/sub-modules/subjects.