Australian Government
Civil Aviation Safety Authority

I, SHANE PATRICK CARMODY, Director of Aviation Safety, on behalf of CASA, make this instrument under regulation 66.015 of the *Civil Aviation Safety Regulations 1998*.

[CONSULTATION DRAFT – NOT FOR SIGNATURE]
Shane Carmody
Director of Aviation Safety

[DATE]

Part 66 Manual of Standards Amendment Instrument 2019 (No. 1)

1 Name

This instrument is the *Part 66 Manual of Standards Amendment Instrument 2019 (No. 1)*.

2 Commencement

This instrument commences on the day after it is registered.

3 Amendment of Part 66 Manual of Standards

Schedule 1 amends the Part 66 Manual of Standards.

Schedule 1 Amendments

[1] Paragraph 66.5 (b), definition *avionics system*

substitute

avionic system means an aircraft system stated in Table 1. An avionic system transfers, processes, displays or stores analogue or digital data using data lines, data buses, coaxial cables, or wireless or other data transmission media, and includes the system's components and connectors. Examples of avionic systems include the following:

1. auto flight;
2. communication, radar and navigation;
3. instruments;
4. in-flight entertainment systems;
5. integrated modular avionics (IMA);
6. cabin systems;
7. on-board maintenance systems;
8. information systems;
9. fly-by-wire systems (related to ATA 27 (Flight controls));
10. fibre optic control systems.

[2] Paragraph 66.5 (b)

insert

AMC/GM for CASR Part 66: see paragraph 66.A.25 (d).

[3] Sub-sub-subparagraph 66A.20 (a) 4. (ii) (E)

omit

avionics

insert

avionic

[4] Paragraphs 66.A.25 (b) to (e)

substitute

(b) If the application is for a category A, B1 or B2 licence, the applicant must demonstrate by examination, conducted in accordance with Appendix II:

1. knowledge of each module that is marked as applicable, for the licence category or subcategory, in accordance with Part 2 of Appendix I; and
2. the level of knowledge of each subject of a module, applicable for the category or subcategory, stated in Part 3 of Appendix I.

(c) If the application is for a category C licence, the applicant must demonstrate the same matters mentioned in paragraph (b) as if the application is for a category B1 or B2 licence.

(d) The knowledge mentioned in paragraph (b) may be gained through:

1. training, of the applicant, conducted by an MTO; or
2. self-study by the applicant of CASA-recognised EASA textbooks (the ***self-study option***).

Note See the CASA publication entitled *Acceptable Means of Compliance and Guidance Material CASR Part 66* (***AMC/GM for CASR Part 66***), which is amended from time to time, for information about the CASA-recognised EASA textbooks for this subparagraph.

(e) If the applicant has gained the knowledge mentioned in paragraph (b) through training conducted by an MTO, an examination mentioned in paragraph (b) must be conducted by the MTO.

(ea) If the applicant has gained the knowledge mentioned in paragraph (b) through the self-study option, an examination mentioned in paragraph (b) must be conducted by CASA.

(eb) The applicant must have undertaken the requisite training courses, and passed the examinations for the relevant modules, during the 10-year period before the date of the application.

(ec) If an applicant has undergone training, conducted by an MTO, for a category, or subcategory, of aircraft engineer licence, the applicant must hold each unit of competency listed and coded in Appendix IV that is marked "X", or stated to be its alternative, for the category or subcategory.

[5] Paragraph 66.A.25 (f)

omit

an applicant

insert

an applicant who has undergone training, conducted by an MTO, for the subcategory of licence, and applied

[6] Paragraph 66.A.25 (h)

omit

[7] Paragraph 66.A.25 (ha)

renumber as paragraph 66.A.25 (h)

[8] Paragraph 66.A.25 (i)

omit (wherever occurring)

to (h)

insert

to (g)

[9] Subparagraphs 66.A.30 (a) 1. and 2.

substitute

1. for a category A, or subcategory B1.2 or B1.4, licence:

   (i) 3 years' practical maintenance experience in carrying out maintenance on operating aircraft, if the applicant has not completed technical training considered relevant by CASA; or

   Note See AMC/GM for CASR Part 66 for information about what CASA considers to be relevant technical training for this sub-subparagraph.

   (ii) 2 years' practical maintenance experience in carrying out maintenance on operating aircraft, and completion of training considered relevant by CASA, as a skilled worker in a technical trade; or

   Note See AMC/GM for CASR Part 66 for information about what CASA considers to be relevant training for this sub-subparagraph.

   (iii) 1 year's practical maintenance experience in carrying out maintenance on operating aircraft, and completion of a category training course conducted by an MTO.

2. for a category B2, or subcategory B1.1 or B1.3, licence:

   (i) 5 years' practical maintenance experience in carrying out maintenance on operating aircraft, if the applicant has not completed technical training considered relevant by CASA; or

   Note See AMC/GM for CASR Part 66 for information about what CASA considers to be relevant technical training for this sub-subparagraph.

   (ii) 3 years' practical maintenance experience in carrying out maintenance on operating aircraft, and completion of training considered relevant by CASA, as a skilled worker in a technical trade; or

   Note See AMC/GM for CASR Part 66 for information about what CASA considers to be relevant training for this sub-subparagraph.

(iii) 2 years' practical maintenance experience in carrying out maintenance on operating aircraft, and completion of a category training course conducted by an MTO.

[10] Sub-subparagraph 66.A.30 (a) 3. (iii)

substitute

(iii) for an applicant holding an academic degree mentioned in subparagraph 66.A.25 (h) 1. — 3 years' experience working in a civil aircraft maintenance environment on a cross-section of aircraft maintenance tasks, including at least 6 months of observation of base maintenance tasks during that period.

Note See AMC/GM for CASR Part 66 for information about what CASA considers to be a cross-section of aircraft maintenance tasks for this sub-subparagraph.

[11] Paragraphs 66.A.30 (b) to (d)

substitute

(b) Subject to paragraph (ca), if a person who holds an aircraft engineer licence in a category or subcategory applies to CASA to add a category or subcategory to the licence, the person must have gained the period of practical maintenance experience, for the additional category or subcategory, in carrying out maintenance on operating civil aircraft in accordance with the following table.

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 year
B1.2	6 months	None	6 months	6 months	2 years	–	2 years	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	–

(c) The practical maintenance experience mentioned in paragraph (b) must have been gained from a cross-section of maintenance tasks relevant to the additional category or subcategory.

Note See AMC/GM for CASR Part 66 for information about what CASA considers to be a cross-section of maintenance tasks, relevant to the additional category or subcategory, for this paragraph.

(ca) The period of practical maintenance experience mentioned in paragraph (b) is reduced by 50% if the applicant has successfully completed a category training course, relevant to the additional category or subcategory, conducted by an MTO.

(d) For an application for an aircraft engineer licence, at least 1 year of the practical maintenance experience mentioned in paragraph (a) must be practical maintenance experience that CASA regards as recent practical maintenance experience, and gained on aircraft relevant to the category, or subcategory, of licence applied for.

Note See AMC/GM for CASR Part 66 for information about what CASA regards as recent practical maintenance experience for this paragraph.

(da) Subject to paragraph (ca), for an application to add a category or subcategory to an aircraft engineer licence, at least 3 months of the practical maintenance experience mentioned in paragraph (b) must be practical maintenance experience that CASA regards as recent practical maintenance experience.

Note See AMC/GM for CASR Part 66 for information about what CASA regards as recent practical maintenance experience for this paragraph.

[12] Subparagraph 66.A.30 (e) 1.

omit

experience required by this MOS

insert

maintenance experience required by this section

[13] Section 66.A.30

insert

(ea) The practical maintenance experience mentioned in paragraph (a) or (b) must have been gained during the 10 year-period before the date of the application.

[14] Paragraph 66.A.30 (f)

omit (wherever occurring)

to (e)

insert

to (ea)

[15] Paragraph 66.A.45 (e)

omit

as specified in sub-subparagraph 66.A.30 (a) 3 (iii)

insert

mentioned in subparagraph 66.A.25 (h) 1.

[16] Paragraph 66.A.45 (i)

omit

basic practical

insert

practical maintenance

[17] Appendix I, Part 1, paragraph immediately under the subheading 'Levels of knowledge', first sentence

substitute

The level of knowledge required for a subject of a module, for a category A, B1 or B2 licence, is that mentioned, for the subject, in the table in Part 3 of this Appendix. The same level of knowledge for a subject of a module is required in relation to an application for a category C licence as if the application is for a category B1 or B2 licence.

[18] Appendix I, Part 2, paragraph immediately preceding the table

substitute

Knowledge of modules, for a category A, B1 or B2 licence, must be in accordance with the following table. Applicable modules are indicated by an "X".

[19] Appendix I, Part 2, table, heading for column 1

omit

Subject modules

insert

Modules

[20] Appendix I, Part 2, table

omit

11	Aeroplane aerodynamics, structures and systems	X	X			

insert

11A	Turbine aeroplane aerodynamics, structures and systems	X				
11B	Piston aeroplane aerodynamics, structures and systems		X			

[21] Appendix I, Part 2, table

omit

13 Aircraft structures and systems					X
14 Propulsion — avionic systems					X

insert

13 Aircraft aerodynamics, structures and systems					X
14 Propulsion					X

[22] Appendix I, Part 3, Module 3, item 3.10, paragraph (b)

omit

Magneto-motive force, field strength, magnetic flux density, permeability, hysteresis loop, retentivity, reluctance, saturation point, eddy currents, coercive force;

insert

Magneto-motive force, field strength, magnetic flux density, permeability, hysteresis loop, retentivity, coercive force reluctance, saturation point, eddy currents;

[23] Appendix I, Part 3, Module 5

substitute

Module 5 Digital techniques/electronic instrument systems

	Level of knowledge for the category			
	A	**B1.1 B1.3**	**B1.2 B1.4**	**B2**
5.1 Electronic instrument systems	1	2	2	3
Typical systems arrangements and cockpit layout of electronic instrument systems.				
5.2 Numbering systems	—	1	—	2
Numbering systems: binary, octal and hexadecimal; Demonstration of conversions between the decimal and binary, octal and hexadecimal systems, and vice versa.				

	Level of knowledge for the category			
	A	**B1.1 B1.3**	**B1.2 B1.4**	**B2**
5.3 Data conversion	—	1	—	2
Analogue data, digital data; Operation and application of analogue to digital, and digital to analogue converters, inputs and outputs, limitations of various types.				
5.4 Data buses	—	2	—	2
Operation of data buses in aircraft systems, including knowledge of ARINC and other specifications. Aircraft network/ethernet.				
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 microcomputer 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

	Level of knowledge for the category			
	A	**B1.1 B1.3**	**B1.2 B1.4**	**B2**
5.7 Microprocessors	—	—	—	2
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.				
5.8 Integrated circuits	—	—	—	2
Operation and use of encoders and decoders; Function of encoder types; Uses of medium, large and very large scale integration.				
5.9 Multiplexing	—	—	—	2
Operation, application and identification in logic diagrams of multiplexers and demultiplexers.				
5.10 Fibre-optics	—	1	1	2
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.				
5.11 Electronic displays	—	2	1	2
Principles of operation of common types of displays used in modern aircraft, including cathode ray tubes, light emitting diodes and liquid crystal display.				
5.12 Electrostatic sensitive devices	1	2	2	2
Special handling of components sensitive to electrostatic discharges; Awareness of risks and possible damage, component and personnel anti-static protection devices.				
5.13 Software management control	—	2	1	2
Awareness of restrictions, airworthiness requirements and possible catastrophic effects of unapproved changes to software programs.				

	Level of knowledge for the category			
	A	**B1.1 B1.3**	**B1.2 B1.4**	**B2**
5.14 Electromagnetic environment	—	2	2	2
Influence of the following phenomena on maintenance practices for electronic system: • EMC-electromagnetic compatibility; • EMI-electromagnetic interference; • HIRF-high intensity radiated field; • Lightning and lightning protection.				
5.15 Typical electronic/digital aircraft systems	—	2	2	2
General arrangement of typical electronic/digital aircraft systems and associated built-in test equipment (BITE), such as the following: • ACARS-ARINC communication and addressing and reporting system; • ECAM-electronic centralised aircraft monitoring; • EFIS-electronic flight instrument system; • EICAS-engine indication and crew alerting system; • FBW-fly-by-wire; • FMS-flight management system; • GPS-global positioning system; • IRS-inertial reference system; • TCAS-traffic alert collision avoidance system.				

[24] Appendix I, Part 3, Module 7, item 7.5

omit

of America

[25] Appendix I, Part 3, Module 7, item 7.7

substitute

7.7 Electrical wiring interconnection system (*EWIS*)	1	3	3
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.			

[26] Appendix I, Part 3, Module 10, item 10.6, heading

omit

Parts 21 and 42

insert

Continuing airworthiness

[27] Appendix I, Part 3, Module 10, item 10.7, paragraph (b)

substitute

(b) Continuing airworthiness; Minimum equipment requirements — Test flights; ETOPS, maintenance and dispatch requirements; All weather operations: category 2 and 3 operations.	—	1	1

[28] Appendix I, Part 3, Module 11

substitute

Module 11A Turbine aeroplane aerodynamics, structures and systems

	Level of knowledge for the category		
	A1	**B1.1**	**B2**
11.1 Theory of flight			—
11.1.1 Aeroplane aerodynamics and flight controls	1	2	
Operation, and effect, of the following: • 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, sawtooth leading edges; Boundary layer control using, vortex generators, stall wedges or leading edge devices; Operation and effect of trim tabs, balance and anti-balance (leading) tabs, servo tabs, spring tabs, mass balance, control surface bias, aerodynamic balance panels.			
11.1.2 High speed flight	1	2	—
Speed of sound, subsonic flight, transonic flight, supersonic flight; Mach number, critical Mach number, compressibility buffet, shockwave, aerodynamic heating, area rule; Factors affecting airflow in engine intakes of highspeed aircraft; Effects of sweepback on critical Mach number.			

	Level of knowledge for the category		
	A1	**B1.1**	**B2**
11.2 Airframe structures — general concepts			
(a)	2	2	—
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;			
(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 (ATA52/53/56)	1	2	—
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.			

	Level of knowledge for the category		
	A1	**B1.1**	**B2**
11.3.2 Wings (ATA57)	1	2	—
Construction; Fuel storage; Landing gear, pylon, control surface and high lift/drag attachments.			
11.3.3 Stabilisers (ATA55)	1	2	—
Construction; Control surface attachment.			
11.3.4 Flight control surfaces (ATA55/57)	1	2	—
Construction and attachment; Balancing — mass and aerodynamic.			
11.3.5 Nacelles and pylons (ATA54)	1	2	—
Construction; Firewalls; Engine mounts.			
11.4 Air-conditioning and cabin pressurisation (ATA21)			
11.4.1 Air supply	1	2	—
Sources of air supply including engine bleed, APU and ground cart.			
11.4.2 Air-conditioning	1	3	—
Air-conditioning systems; Air cycle and vapour cycle machines; Distribution systems; Flow, temperature and humidity control system.			
11.4.3 Pressurisation	1	3	—
Pressurisation systems; Control and indication including control and safety valves; Cabin pressure controllers.			
11.4.4 Safety and warning devices	1	3	—
Protection and warning devices.			

	Level of knowledge for the category		
	A1	**B1.1**	**B2**
11.5 Instruments and avionic systems			
11.5.1 Instrument systems (ATA31)	1	2	—
Pitot static: altimeter, airspeed 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.			
11.5.2 Avionic systems	1	1	—
Fundamentals of system layouts, and operation of the following: • Auto flight (ATA22); • Communications (ATA23); • Navigation systems (ATA34).			
11.6 Electrical power (ATA24)	1	3	—
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.			
11.7 Equipment and furnishings (ATA25)			
(a) Emergency equipment requirements; Seats, harnesses and belts;	2	2	—

	Level of knowledge for the category		
	A1	**B1.1**	**B2**
(b) Cabin layout; Equipment layout; Cabin furnishing installation; Cabin entertainment equipment; Galley installation; Cargo handling and retention equipment; Airstairs.	1	1	—
11.8 Fire protection (ATA26)			
(a) Fire and smoke detection and warning systems; Fire extinguishing systems; System tests;	1	3	—
(b) Portable fire extinguisher.	1	2	—
11.9 Flight controls (ATA27)	1	3	—
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 locks systems; Balancing and rigging; Stall protection/warning system.			

	Level of knowledge for the category		
	A1	**B1.1**	**B2**
11.10 Fuel systems (ATA28)	1	3	—
System layout; Fuel tanks; Supply systems; Dumping, venting and draining; Cross-feed and transfer; Indications and warnings; Refuelling and defuelling; Longitudinal balance fuel systems.			
11.11 Hydraulic power (ATA29)	1	3	—
System layout; 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.			
11.12 Ice and rain protection (ATA30)	1	3	—
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.			
11.13 Landing gear (ATA32)	2	3	—
Construction, shock absorbing; Extension and retraction systems: normal and emergency; Indications and warning; Wheels, brakes, antiskid and autobraking; Tyres; Steering; Air-ground sensing.			

	Level of knowledge for the category		
	A1	**B1.1**	**B2**
11.14 Lights (ATA33)	2	3	—
External: navigation, anti-collision, landing, taxiing, ice; Internal: cabin, cockpit, cargo; Emergency.			
11.15 Oxygen (ATA35)	1	3	—
System layout: cockpit, cabin; Sources, storage, charging and distribution; Supply regulation; Indications and warnings.			
11.16 Pneumatic/vacuum (ATA36)	1	3	—
System layout; Sources: engine/APU, compressors, reservoirs, ground supply; Pressure and vacuum pumps; Pressure control; Distribution; Indications and warnings; Interfaces with other systems.			
11.17 Water/waste (ATA38)	2	3	—
Water system layout, supply, distribution, servicing and draining; Toilet system layout, flushing and servicing; Corrosion aspects.			
11.18 On-board maintenance systems (ATA45)	1	2	—
Central maintenance computers; Data loading system; Electronic library system; Printing; Structure monitoring (damage tolerance monitoring).			

	Level of knowledge for the category		
	A1	**B1.1**	**B2**
11.19 Integrated modular avionics (ATA42)	1	2	—
Functions that may be typically integrated in the Integrated modular avionics (IMA) modules include: 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 built-in test equipment (BITE), fuel management, braking control, steering control, landing gear extension and retraction, tyre pressure indication, oleo pressure indication, brake temperature monitoring; Core system; Network components.			
11.20 Cabin systems (ATA44)	1	2	—
The units and components which furnish a means of entertaining the passengers and providing communication within the aircraft (cabin intercommunication data system (***CIDS***)), and between the aircraft cabin and ground stations (cabin network service (***CNS***)). These include voice, data, music and video transmissions. The CIDS provides an interface between cockpit/cabin crew and cabin systems. These systems support data exchange of the different related Line Replaceable Units (LRUs) and they are typically operated via Flight Attendant Panels (FAPs). The CNS is typically on a server, interfacing with systems, including the following: • data/radio communication; • cabin core system (CCS); • in-flight entertainment system (IFES); • external communication system (ECS); • cabin mass memory system (CMMS); • cabin monitoring system (CMS); • miscellaneous cabin systems (MCSs). The CNS may host functions such as the following: • access to pre-departure/departure reports; • email/intranet/internet access; • passenger database.			

	Level of knowledge for the category		
	A1	**B1.1**	**B2**
11.21 Information systems (ATA46)	1	2	—
The units and components which furnish a means of storing, updating and retrieving digital information, traditionally provided on paper, microfilm or microfiche. These include units that are dedicated to the information storage and retrieval function, such as the electronic library mass storage and controller. But they do 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 the following: • air traffic and information management systems; • network server systems; • aircraft general information system; • flight deck information system; • maintenance information system; • passenger cabin information system; • miscellaneous information system.			

Module 11B Piston aeroplane aerodynamics, structures and systems

Note The scope of this module must reflect the technology of aeroplanes relevant to a subcategory A2 or B1.2 aircraft engineer licence.

	Level of knowledge for the category		
	A2	**B1.2**	**B2**
11.1 Theory of flight			—
11.1.1 Aeroplane aerodynamics and flight controls	1	2	
Operation and effect of the following: • 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, sawtooth leading edges; Boundary layer control using, vortex generators, stall wedges or leading edge devices; Operation and effect of trim tabs, balance and anti-balance (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)	2	2	—
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;			

	Level of knowledge for the category		
	A2	**B1.2**	**B2**
(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 (ATA52/53/56)	1	2	—
Construction and pressurisation sealing; Wing, tail-plane, pylon and undercarriage attachments; Seat installation; Doors and emergency exits: construction and operation; Windows and windscreen attachment.			
11.3.2 Wings (ATA57)	1	2	—
Construction; Fuel storage; Landing gear, pylon, control surface and high lift/drag attachments.			
11.3.3 Stabilisers (ATA55)	1	2	—
Construction; Control surface attachment.			
11.3.4 Flight control surfaces (ATA55/57)	1	2	—
Construction and attachment; Balancing — mass and aerodynamic.			
11.3.5 Nacelles and pylons (ATA54)	1	2	—
Construction; Firewalls Engine mounts.			

	Level of knowledge for the category		
	A2	**B1.2**	**B2**
11.4 Air-conditioning and cabin pressurisation (ATA21)	1	3	—
Pressurisation and air-conditioning systems; Cabin pressure controllers; Protection and warning devices; Heating systems.			
11.5 Instruments and avionic systems			
11.5.1 Instrument systems (ATA31)	1	2	—
Pitot static: altimeter, airspeed 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.			
11.5.2 Avionic systems	1	1	—
Fundamentals of system layouts, and operation of the following: • auto flight (ATA22); • communications (ATA23); • navigation systems (ATA34).			
11.6 Electrical power (ATA24)	1	3	—
Batteries installation and operation; DC power generation; Voltage regulation; Power distribution; Circuit protection; Inverters, transformers.			
11.7 Equipment and furnishings (ATA25)			
(a) Emergency equipment requirements; Seats, harnesses and belts;	2	2	—

	Level of knowledge for the category		
	A2	**B1.2**	**B2**
(b) Cabin layout; Equipment layout; Cabin furnishing installation; Cabin entertainment equipment; Galley installation; Cargo handling and retention equipment; Airstairs.	1	1	—
11.8 Fire protection (ATA26)			
(a) Fire and smoke detection and warning systems; Fire extinguishing systems; System tests;	1	3	—
(b) Portable fire extinguisher.	1	2	—
11.9 Flight controls (ATA27)	1	3	—
Primary controls: aileron, elevator, rudder; Trim tabs; High lift devices; System operation: manual; Gust locks; Balancing and rigging; Stall warning system.			
11.10 Fuel systems (ATA28)	1	3	—
System layout; Fuel tanks; Supply systems; Cross-feed and transfer; Indications and warnings; Refuelling and defuelling.			

	Level of knowledge for the category		
	A2	**B1.2**	**B2**
11.11 Hydraulic power (ATA29)	1	3	—
System layout; Hydraulic fluids; Hydraulic reservoirs and accumulators; Pressure generation: electric, mechanical; Filters; Pressure control; Power distribution; Indication and warning systems.			
11.12 Ice and rain protection (ATA30)	1	3	—
Ice formation, classification and detection; De-icing systems: electrical, hot air, pneumatic and chemical; Probe and drain heating; Wiper systems.			
11.13 Landing gear (ATA32)	2	3	—
Construction, shock absorbing; Extension and retraction systems: normal and emergency; Indications and warning; Wheels, brakes, antiskid and autobraking; Tyres; Steering; Air-ground sensing.			
11.14 Lights (ATA33)	2	3	—
External: navigation, anti-collision, landing, taxiing, ice; Internal: cabin, cockpit, cargo; Emergency.			
11.15 Oxygen (ATA35)	1	3	—
System layout: cockpit, cabin; Sources, storage, charging and distribution; Supply regulation; Indications and warnings.			

	Level of knowledge for the category		
	A2	**B1.2**	**B2**
11.16 Pneumatic and vacuum (ATA36)	1	3	—
System layout; Sources: engine/APU, compressors, reservoirs, ground supply; Pressure and vacuum pumps; Pressure control; Distribution; Indications and warnings; Interfaces with other systems.			
11.17 Water and waste (ATA38)	2	3	—
Water system layout, supply, distribution, servicing and draining; Toilet system layout, flushing and servicing; Corrosion aspects.			

[29] Appendix I, Part 3, Module 12

omit

	A	**B1.3** **B1.4**	**B2**

insert

	A3 **A4**	**B1.3** **B1.4**	**B2**

[30] Appendix I, Part 3, Module 12, item 12.4

substitute

12.4 Transmission	1	3	—
Gearboxes, main and tail rotors; Clutches, freewheel units and rotor brake; Tail rotor drive shafts, flexible couplings, bearings, vibration dampers and bearing hangers.			

[31] Appendix I, Part 3, Module 12, item 12.12

omit

Emergency pressure generation;

insert

Emergency pressure generation;

Filters;

[32] Appendix I, Part 3, Module 12, item 12.13

omit

Probe and drain heating.

insert

Probe and drain heating;

Wiper system.

[33] Appendix I, Part 3, Module 12, item 12.14

omit

Steering;

insert

Steering;

Air-ground sensing;

[34] Appendix I, Part 3, Module 12, item 12.17

omit

avionic

insert

avionics

[35] Appendix I, Part 3, Module 13, heading

substitute

Module 13 Aircraft aerodynamics, structures and systems

[36] Appendix I, Part 3, Module 13, item 13.8, heading

substitute

13.8 Instruments (ATA31)	—	—	3

[37] Appendix I, Part 3, Module 13, item 13.8

omit

Vibration measurement and indication.

insert

Vibration measurement and indication;

Glass cockpit.

[38] Appendix I, Part 3, Module 13, item 13.20

omit

Integrated Modular Avionic

insert

integrated modular avionics

[39] Appendix I, Part 3, Module 14, heading

substitute

Module 14 Propulsion

[40] Appendix II, clause 1, heading

substitute

1 General

[41] Appendix II, subclause 1.1

omit

Unless otherwise approved within the CASA approved exposition course syllabus, all

insert

All

[42] Appendix II, subclause 1.4

omit

Part 66,

[43] Appendix II, subclause 1.7

substitute

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

[44] Appendix II, subclauses 1.11 to 1.13

substitute

1.11 A failed examination, for a module, may not be retaken for at least 90 days after the date of the examination. However, if the candidate undergoes a course of retraining, tailored to the failed subjects of the module, conducted by an MTO, the examination may be retaken after 30 days.

1.12 The period mentioned in paragraph 66.A.25 (eb), for the passing of an examination for a relevant module, does not apply to an examination, for a module, already passed by the applicant in relation to another category, or subcategory, of aircraft engineer licence held by the applicant.

1.13 The maximum number of consecutive attempts, for an examination for a module, is 3. After attempting an examination, for a module, for a third consecutive time, a person must wait 1 year before attempting the examination again. An applicant mentioned in paragraph 66.A.25 (a) must give written notice to the MTO that is to conduct an examination of the applicant in relation to a module, or CASA, as applicable, of the following:

(a) the number and dates of attempts, if any, for an examination for the module, by the applicant during the 1-year period immediately before a further attempt for the examination;

(b) for each attempt notified under this subclause, details of the MTO that conducted the examination, or whether CASA conducted the examination.

The notification must be made before the further attempt for the examination.

Note The MTO, or CASA, as applicable, is responsible for confirming the number and dates of any previous attempts, for the examination, notified by the applicant under this subclause.

[45] Appendix II, clause 2

substitute

2 Number of questions for a module

2.1 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 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 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 Module 4, Electronic fundamentals:

Category A – None.
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 Module 5, Digital techniques/electronic instrument systems:

Category A – 16 multi-choice and 0 essay questions. Time allowed 20 minutes.
Category B1.1 and B1.3 – 40 multi-choice and 0 essay questions. Time allowed 50 minutes.

Category B1.2 and 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 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 Module 7, 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 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 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 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 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.

Category B2 – None.

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.

Category B2 – None.

2.12 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.

Category B2 – None.

2.13 Module 13, Aircraft aerodynamics, structures and systems:

Category A – None.

Category B1 – None.

Category B2 – 180 multi-choice and 0 essay questions. Time allowed 225 minutes. Questions and time allowed may be split into 2 examinations, as appropriate.

2.14 Module 14, Propulsion:

Category A – None.

Category B1 – None.

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

2.15 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.

Category B2 – None.

2.16 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 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.

Category B2 – None.

[46] Appendix IV, table

insert

MEA362	Maintain aircraft vapour cycle air-conditioning systems						X		X	

[47] Appendix IX, Table 1, item dealing with Type Certificate (*TC*) holder, BOMBADIER

insert

	BD-700-2A12	Global 7500	Bombardier BD-700-2A12 (GE Passport 20)

[48] Appendix IX, Table 1, item dealing with Type Certificate (*TC*) holder, DASSAULT AVIATION

insert

	Mystère Falcon 900	Falcon 900 Falcon 900B	Falcon 900 (Honeywell TFE731)

[49] Appendix IX, Table 1, item dealing with Type Certificate (*TC*) holder, EMBRAER

insert

	ERJ 190-300	ERJ-190	Embraer ERJ-190 Series (PWC PW1900G)

[50] Appendix IX, Table 2, Part 1, item dealing with TC holder, EMBRAER

insert

	ERJ 170-100 LR	ERJ-170	Embraer ERJ-170 Series (GE CF34) Note 4

[51] Appendix IX, Table 2, Part 1

insert

CESSNA AIRCRAFT COMPANY	525	Citation Jet CJ1 Citation M2	Cessna 525/525A (Williams FJ44) Note 4
	525A	Citation Jet CJ2	Cessna 525/525A (Williams FJ44) Note 4

[52] Appendix IX, Table 2, Part 2

insert

AIRBUS HELICOPTERS	AS355 E AS355 F AS355 F1 AS355 F2		Eurocopter AS 355 (RR Corp 250) Note 7