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Australian Government
Civil Aviation Safety Authority

ANNEX A TO AMC/GM PART 147 V3.3

Mapping — CASA basics exam syllabus to Part 66 basic knowledge syllabus

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Acknowledgement of Country

The Civil Aviation Safety Authority (CASA) respectfully acknowledges the Traditional Custodians of the lands on which our offices are located and their continuing connection to land, water and community, and pays respect to Elders past, present and emerging.

Artwork: James Baban.

Module 1 Mathematics (B1 & B2)

CASA module Examinations subjects	CASA mech basics exams equivalent	CASA avionic basics exams equivalent
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.	Nil	Nil
1.2 Algebra		
(a)		
Evaluating simple algebraic expressions, addition, subtraction, multiplication and division, use of brackets, simple algebraic fractions;	Nil	Nil
(b)		
Linear equations and their solutions;	Nil	Nil
Indices and powers, negative and fractional indices;	Nil	Nil
Binary and other applicable numbering systems;	Nil	Nil
Simultaneous equations and second degree equations with one unknown;	Nil	Nil
Logarithms.	Nil	Nil
1.3 Geometry		
(a)		
Simple geometrical constructions;	Nil	Nil
(b)		
Graphical representation, nature and uses of graphs, graphs of equations and functions;	Nil	Nil
(c)		
Simple trigonometry, trigonometrical relationships, use of tables and rectangular and polar coordinates.	Nil	Nil

Module 2 Physics (B1 & B2)

CASA module Examinations subjects	CASA mech basics exams equivalent	CASA avionic basics exams equivalent
2.1 Matter		
Nature of matter: the chemical elements, structure of atoms, molecules;	Nil	Nil
Chemical compounds;	Nil	Nil
States: solid, liquid and gaseous;	Nil	Nil
Changes between states.	Nil	Nil
2.2 Mechanics		
2.2.1 Statics		
Forces, moments and couples, representation as vectors;	Nil	Nil
Centre of gravity;	Nil	Nil
Elements of theory of stress, strain and elasticity: tension, compression, shear and torsion;	Nil	Nil
Nature and properties of solid, fluid and gas;	Nil	Nil
Pressure and buoyancy in liquids (barometers).	Nil	Nil
2.2.2 Kinetics		
Linear movement: uniform motion in a straight line, motion under constant acceleration (motion under gravity);	Nil	Nil
Rotational movement: uniform circular motion (centrifugal and centripetal forces);	Nil	Nil
Periodic motion: pendular movement;	Nil	Nil
Simple theory of vibration, harmonics and resonance;	Nil	Nil
Velocity ratio, mechanical advantage and efficiency.	Nil	Nil
2.2.3 Dynamics		
(a)		
Mass;	Nil	Nil
Force, inertia, work, power, energy (potential, kinetic and total energy), heat, efficiency;	Nil	Nil

CASA module Examinations subjects	CASA mech basics exams equivalent	CASA avionic basics exams equivalent
(b)		
Momentum, conservation of momentum;	Nil	Nil
Impulse;	Nil	Nil
Gyroscopic principles;	Nil	Nil
Friction: nature and effects, coefficient of friction (rolling resistance).	Nil	Nil
2.2.4 Fluid dynamics		
(a)		
Specific gravity and density;	Nil	Nil
(b)		
Viscosity, fluid resistance, effects of streamlining;	Nil	Nil
Effects of compressibility on fluids;	Nil	Nil
Static, dynamic and total pressure: Bernoulli's Theorem, venturi.	Nil	Nil
2.3 Thermodynamics		
(a)		
Temperature: thermometers and temperature scales: Celsius, Fahrenheit and Kelvin, heat definition;	Nil	Nil
(b)		
Heat capacity, specific heat;	Nil	Nil
Heat transfer: convection, radiation and conduction;	Nil	Nil
Volumetric expansion;	Nil	Nil
First and second law of thermodynamics;	Nil	Nil
Gases: ideal gases laws, specific heat at constant volume and constant pressure, work done by expanding gas;	Nil	Nil
Isothermal, adiabatic expansion and compression, engine cycles, constant volume and constant pressure, refrigerators and heat pumps;	Nil	Nil
Latent heats of fusion and evaporation, thermal energy, heat of combustion.	Nil	Nil

CASA module Examinations subjects	CASA mech basics exams equivalent	CASA avionic basics exams equivalent
2.4 Optics (light)		
Nature of light, speed of light;	Nil	Nil
Laws of reflection and refraction: reflection at plane surfaces, reflection by spherical mirrors, refraction, lenses;	Nil	Nil
Fiberoptics.	Nil	Nil
2.5 Wave motion and sound		
Wave motion: mechanical waves, sinusoidal wave motion, interference phenomena, standing waves;	Nil	Nil
Sound: speed of sound, production of sound, intensity, pitch and quality, Doppler effect.	Nil	Nil

Module 3 Electrical Fundamentals (B1 & B2)

CASA module Examinations subjects	CASA mech basics exams equivalent	CASA avionic basics exams equivalent
3.1 Electron theory		
Structure and distribution of electrical charges within atoms, molecules, ions, compounds;	Nil	QA
Molecular structure of conductors, semiconductors and insulators.	Nil	QA
3.2 Static electricity and conduction		
Static electricity and distribution of electrostatic charges;	Nil	QA
Electrostatic laws of attraction and repulsion;	Nil	QA
Units of charge, Coulomb's Law;	Nil	QA
Conduction of electricity in solids, liquids, gases and vacuum.	Nil	QA
3.3 Electrical terminology		
The following terms, their units and factors affecting them: potential difference, electromotive force, voltage, current, resistance, conductance, charge, conventional current flow, electron flow.	Nil	QA
3.4 Generation of electricity		
Production of electricity by the following methods: light, heat, friction, pressure, chemical action, magnetism and motion.	Nil	QA
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;	BC	QA
Cells connected in series and parallel;	BC	QA
Internal resistance and its effect on a battery;	BC	QA
Construction, materials and operation of thermocouples;	Nil	QA
Operation of photo-cells.	Nil	ED
3.6 DC circuits		

CASA module Examinations subjects	CASA mech basics exams equivalent	CASA avionic basics exams equivalent
Ohms Law, Kirchoff's Voltage and Current Laws;	Nil	QA
Calculations using the above laws to find resistance, voltage and current;	Nil	QA
Significance of the internal resistance of a supply.	Nil	QA
3.7 Resistance and resistor		
(a)		
Resistance and affecting factors;	Nil	QA
Specific resistance;	Nil	QA
Resistor colour code, values and tolerances, preferred values, wattage ratings;	Nil	QA
Resistors in series and parallel;	Nil	QA
Calculation of total resistance using series parallel and series parallel combinations;	Nil	QA
Operation and use of potentiometers and rheostats;	BC	QA
Operation of Wheatstone Bridge;	Nil	QA
(b)		
Positive and negative temperature coefficient conductance;	Nil	QA
Fixed resistors, stability, tolerance and limitations, methods of construction;	Nil	QA
Variable resistors, thermistors, voltage dependent resistors;	Nil	QA
Construction of potentiometers and rheostats;	Nil	QA
Construction of Wheatstone Bridge.	Nil	QA
3.8 Power		
Power, work and energy (kinetic and potential);	Nil	QA
Dissipation of power by a resistor;	Nil	QA
Power formula;	Nil	QA
Calculations involving power, work and energy.	Nil	QA
3.9 Capacitance and capacitor		
Operation and function of a capacitor;	Nil	QA

CASA module Examinations subjects	CASA mech basics exams equivalent	CASA avionic basics exams equivalent
Factors affecting capacitance area of plates, distance between plates, number of plates, dielectric and dielectric constant, working voltage, voltage rating;	Nil	QA
Capacitor types, construction and function;	Nil	QA
Capacitor colour coding;	Nil	QA
Calculations of capacitance and voltage in series and parallel circuits;	Nil	QA
Exponential charge and discharge of a capacitor, time constants;	Nil	QA
Testing of capacitors.	Nil	QA
3.10 Magnetism		
(a)		
Theory of magnetism;	Nil	QA
Properties of a magnet;	Nil	QA
Action of a magnet suspended in the Earth's magnetic field;	Nil	QA
Magnetisation and demagnetisation;	Nil	QA
Magnetic shielding;	Nil	QA
Various types of magnetic material;	Nil	QA
Electromagnets construction and principles of operation;	Nil	QA
Hand clasp rules to determine: magnetic field around current carrying conductor.	Nil	QA
(b)		
Magneto-motive force, field strength, magnetic flux density, permeability, hysteresis loop, retentivity, reluctance, saturation point, eddy currents, coercive force;	Nil	QA
Precautions for care and storage of magnets.	Nil	QA
3.11 Inductance and inductor		
Faraday's Law;	Nil	QA
Action of inducing a voltage in a conductor moving in a magnetic field;	Nil	QA
Induction principles;	Nil	QA

CASA module Examinations subjects	CASA mech basics exams equivalent	CASA avionic basics exams equivalent
Effects of the following on the magnitude of an induced voltage: magnetic field strength, rate of change of flux, number of conductor turns;	Nil	QA
Mutual induction;	Nil	QA
The effect the rate of change of primary current and mutual inductance has on induced voltage;	Nil	QA
Factors affecting mutual inductance: number of turns in coil, physical size of coil, permeability of coil, position of coils with respect to each other;	Nil	QA
Lenz's Law and polarity determining rules;	Nil	QA
Back emf, self-induction;	Nil	QA
Saturation point;	Nil	QA
Principal uses of inductors.	Nil	QA
3.12 DC motor and generator theory		
Basic motor and generator theory;	BC	QA
Construction and purpose of components in DC generator;	BC	QA
Operation of, and factors affecting output and direction of, current flow in DC generators;	BC	QA
Operation of, and factors affecting output power, torque, speed and direction of rotation of DC motors;	BC	QA
Series wound, shunt wound and compound motors;	BC	EB
Starter generator construction.	Nil	EB
3.13 AC theory		
Sinusoidal waveform: phase, period, frequency, cycle;	Nil	QD
Instantaneous, average, root mean square, peak, peak to peak current values and calculations of these values, in relation to voltage, current and power;	Nil	QD
Triangular and square waves;	Nil	QD
Single and 3 phase principles.	Nil	QD
3.14 Resistive (R), Capacitive (C) and Inductive (L) Circuits		

CASA module Examinations subjects	CASA mech basics exams equivalent	CASA avionic basics exams equivalent
Phase relationship of voltage and current in L, C and R circuits, parallel, series and series parallel;	Nil	QD
Power dissipation in L, C and R circuits;	Nil	QD
Impedance, phase angle, power factor and current calculations;	Nil	QD
True power, apparent power and reactive power calculations.	Nil	QD
3.15 Transformers		
Transformer construction principles and operation;	Nil	QD
Transformer losses and methods for overcoming them;	Nil	QD
Transformer action under load and no-load conditions;	Nil	QD
Power transfer, efficiency, polarity markings;	Nil	QD
Calculation of line and phase voltages and currents;	Nil	QD
Calculation of power in a 3 phase system;	Nil	QD
Primary and secondary current, voltage, turns ratio, power, efficiency;	Nil	QD
Autotransformers.	Nil	QD
3.16 Filters		
Operation, application and uses of the following filters: low pass, high pass, band pass, band stop.	Nil	QD
3.17 AC generators		
Rotation of loop in a magnetic field and waveform produced;	Nil	QD
Operation and construction of revolving armature and revolving field type AC generators;	Nil	QD
Single phase, 2 phase and 3 phase alternators;	Nil	QD
Three phase star and delta connections advantages and uses;	Nil	QD
Permanent magnet generators.	Nil	QD
3.18 AC motors		
Construction, principles of operation and characteristics of:	Nil	QD

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CASA module Examinations subjects	CASA mech basics exams equivalent	CASA avionic basics exams equivalent
AC synchronous and induction motors both single and polyphase;	Nil	QD
Methods of speed control and direction of rotation;	Nil	QD
Methods of producing a rotating field: capacitor, inductor, shaded or split pole.	Nil	QD

Module 4 Electronic Fundamentals (B1 & B2)

CASA module Examinations subjects	CASA mech basics exams equivalent	CASA avionic basics exams equivalent
4.1 Semiconductors		
4.1.1 Diodes		
(a)		
Diode symbols;	BC	QC
Diode characteristics and properties;	BC	QC
Diodes in series and parallel;	Nil	QC
Main characteristics and use of silicon controlled rectifiers (thyristors), light emitting diode, photo conductive diode, varistor, rectifier diodes;	Nil	QC
Functional testing of diodes;	Nil	QC
(b)		
Materials, electron configuration, electrical properties;	Nil	QC
P and N type materials: effects of impurities on conduction, majority and minority characters;	Nil	QC
PN junction in a semiconductor, development of a potential across a PN junction in unbiased, forward biased and reverse biased conditions;	Nil	QC
Diode parameters: peak inverse voltage, maximum forward current, temperature, frequency, leakage current, power dissipation;	Nil	QC
Operation and function of diodes in the following circuits: clippers, clampers, full and half wave rectifiers, bridge rectifiers, voltage doublers and triplers;	Nil	QC
Detailed operation and characteristics of the following devices: silicon controlled rectifier (thyristor), light emitting diode, Shottky diode, photoconductive diode, varactor diode, varistor, rectifier diodes, Zener diode.	Nil	QC
4.1.2 Transistors		
(a)		
Transistor symbols;	BC	QC

CASA module Examinations subjects	CASA mech basics exams equivalent	CASA avionic basics exams equivalent
Component description and orientation;	BC	QC
Transistor characteristics and properties;	BC	QC
(b)		
Construction and operation of PNP and NPN transistors;	Nil	QC
Base, collector and emitter configurations;	Nil	QC
Testing of transistors;	Nil	QC
Basic appreciation of other transistor types and their uses;	Nil	QC
Application of transistors: classes of amplifier (A, B, C);	Nil	QC
Simple circuits including: bias, decoupling, feedback and stabilisation;	Nil	QC
Multistage circuit principles: cascades, push-pull,	Nil	QC
oscillators, multivibrators, flip-flop circuits.	Nil	QC
4.1.3 Integrated circuits		
(a)		
Description and operation of logic circuits and linear circuits and operational amplifiers;	BC	QC
(b)		
Description and operation of logic circuits and linear circuits;	Nil	QC
Introduction to operation and function of an operational amplifier used as: integrator, differentiator, voltage follower, comparator;	Nil	QC
Operation and amplifier stages connecting methods: resistive capacitive, inductive (transformer), inductive resistive (IR), direct;	Nil	QC
Advantages and disadvantages of positive and negative feedback.	Nil	QC
4.2 Printed circuit boards		
Description and use of printed circuit boards.	Nil	Nil
4.3 Servomechanisms		
(a)		

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CASA module Examinations subjects	CASA mech basics exams equivalent	CASA avionic basics exams equivalent
Understanding of the following terms: open and closed loop systems, feedback, follow up, analogue transducers;	Nil	QD
Principles of operation and use of the following synchro system components and features: resolvers, differential, control and torque, transformers, inductance and capacitance transmitters;	Nil	QD
(b)		
Understanding of the following terms: open and closed loop, follow up, servomechanism, analogue, transducer, null, damping, feedback, dead band;	Nil	QD
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;	Nil	QD
Servo mechanism defects, reversal of synchro leads, hunting.	Nil	QD

Module 5 Digital techniques electronic instrument systems (B1 & B2)

CASA module Examinations subjects	CASA mech basics exams equivalent	CASA avionic basics exams equivalent
5.1 Electronic instrument systems		
Typical systems arrangements and cockpit layout of electronic instrument systems.	Nil	IZ
5.2 Numbering systems		
Numbering systems: binary, octal and hexadecimal;	Nil	QE
Demonstration of conversions between the decimal and binary, octal and hexadecimal systems and vice versa.	Nil	QE
5.3 Data conversion		
Analogue data, digital data;	Nil	QE
Operation and application of analogue to digital, and digital to analogue converters, inputs and outputs, limitations of various types.	Nil	QE
5.4 Data buses		
Operation of data buses in aircraft systems, including knowledge of ARINC and other specifications.	Nil	Nil
5.5 Logic circuits		
(a)		
Identification of common logic gate symbols, tables and equivalent circuits;	BC	QC
Applications used for aircraft systems, schematic diagrams.	Nil	Nil
(b)		
Interpretation of logic diagrams.	Nil	QC
5.6 Basic computer structure		
(a)		
Computer terminology (including bit, byte, software, hardware, CPU, IC and various memory devices such as RAM, ROM, PROM);	Nil	QE
Computer technology (as applied in aircraft systems);	Nil	Nil

CASA module Examinations subjects	CASA mech basics exams equivalent	CASA avionic basics exams equivalent
(b)		
Computer related terminology;	Nil	QE
Operation, layout and interface of the major components in a microcomputer including their associated bus systems;	Nil	QE
Information contained in single and multi address instruction words;	Nil	QE
Memory associated terms;	Nil	QE
Operation of typical memory devices;	Nil	QE
Operation, advantages and disadvantages of the various data storage systems.	Nil	QE
5.7 Microprocessors		
Functions performed and overall operation of a microprocessor;	Nil	QE
Basic operation of each of the following microprocessor elements: control and processing unit, clock, register, arithmetic logic unit.	Nil	QE
5.8 Integrated circuits		
Operation and use of encoders and decoders;	Nil	QE
Function of encoder types;	Nil	QE
Uses of medium,	Nil	QE
large and very large scale integration.	Nil	Nil
5.9 Multiplexing		
Operation, application and identification in logic diagrams of multiplexers and demultiplexers.	Nil	QE
5.10 Fibre optics		
Advantages and disadvantages of fibre optic data transmission over electrical wire propagation;	Nil	Nil
Fibre optic data bus;	Nil	Nil
Fibre optic related terms, terminations;	Nil	Nil
Couplers, control terminals, remote terminals;	Nil	Nil
Application of fibre optics in aircraft systems.	Nil	Nil

CASA module Examinations subjects	CASA mech basics exams equivalent	CASA avionic basics exams equivalent
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.	Nil	QE
5.12 Electrostatic sensitive devices		
Special handling of components sensitive to electrostatic discharges;	BC	QE
Awareness of risks and possible damage, component and personnel anti-static protection devices.	BC	QE
5.13 Software management control		
Awareness of restrictions, airworthiness requirements and possible catastrophic effects of unapproved changes to software programs.	Nil	Nil
5.14 Electromagnetic environment		
Influence of the following phenomena on maintenance practices for electronic system:	Nil	Nil
<ul style="list-style-type: none"> • EMC-electromagnetic compatibility; 	Nil	Nil
<ul style="list-style-type: none"> • EMI-electromagnetic interference; 	Nil	Nil
<ul style="list-style-type: none"> • HIRF-high intensity radiated field; 	Nil	Nil
<ul style="list-style-type: none"> • Lightning and lightning protection. 	Nil	Nil
5.15 Typical electronic and digital aircraft systems		
General arrangement of typical electronic and digital aircraft systems and associated BITE testing such as:	Nil	Nil
<ul style="list-style-type: none"> • ACARS-ARINC communication and addressing and reporting system 	Nil	Nil
<ul style="list-style-type: none"> • ECAM-electronic centralised aircraft monitoring 	Nil	IZ
<ul style="list-style-type: none"> • EFIS-electronic flight instrument system 	Nil	Nil
<ul style="list-style-type: none"> • EICAS-engine indication and crew alerting system 	Nil	IZ
<ul style="list-style-type: none"> • FBW-fly-by-wire 	Nil	Nil
<ul style="list-style-type: none"> • FMS-flight management system 	Nil	IZ

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CASA module Examinations subjects	CASA mech basics exams equivalent	CASA avionic basics exams equivalent
<ul style="list-style-type: none">GPS-global positioning system	Nil	WL
<ul style="list-style-type: none">IRS-inertial reference system	Nil	IK
<ul style="list-style-type: none">TCAS-traffic alert collision avoidance system.	Nil	Nil

Module 6 Materials and hardware (B1 & B2)

CASA module Examinations subjects	CASA mech basics exams equivalent	CASA avionic basics exams equivalent
6.1 Aircraft materials ferrous		
(a)		
Characteristics, properties and identification of common alloy steels used in aircraft;	BA	Nil
Heat treatment and application of alloy steels;	BA	Nil
(b)		
Testing of ferrous materials for hardness, tensile strength, fatigue strength and impact resistance.	BA	Nil
6.2 Aircraft materials — non-ferrous		
(a)		
Characteristics, properties and identification of common non-ferrous materials used in aircraft;	BA	Nil
Heat treatment and application of non-ferrous materials;	BA	Nil
(b)		
Testing of non-ferrous material for hardness, tensile strength, fatigue strength and impact resistance.	BA	Nil
6.3 Aircraft materials — composite and non-metallic		
6.3.1 Composite and non-metallic other than wood and fabric	BA or FP	Nil
(a)		
Characteristics, properties and identification of common composite and non-metallic materials, other than wood, used in aircraft;	BA or FP	Nil
Sealant and bonding agents;	BA or FP	Nil
(b)		
The detection of defects and deterioration in composite and non-metallic material;	BA, FG, FI, or FP	Nil
Repair of composite and non-metallic material.	BA, FG, FI, or FP	Nil

CASA module Examinations subjects	CASA mech basics exams equivalent	CASA avionic basics exams equivalent
6.3.2 Wooden structures		
Construction methods of wooden airframe structures;	FD	Nil
Characteristics, properties and types of wood	FD	Nil
and glue used in aeroplanes;	FD	Nil
Preservation and maintenance of wooden structure;	FD	Nil
Types of defects in wood material and wooden structures;	FD	Nil
The detection of defects in wooden structure;	FD	Nil
Repair of wooden structure.	FD	Nil
Repair of wooden structure.	FD	Nil
6.3.3 Fabric covering		
Characteristics, properties and types of fabrics used in aeroplanes;	FE	Nil
Inspections methods for fabric;	FE	Nil
Types of defects in fabric;	FE	Nil
Repair of fabric covering.	FE	Nil
6.4 Corrosion		
(a)		
Chemical fundamentals;	BA	QB
Formation by galvanic action process, microbiological, stress;	BA	QB
(b)		
Types of corrosion and their identification;	BA	QB
Causes of corrosion;	BA	QB
Material types, susceptibility to corrosion.	BA	QB
6.5 Fasteners		
6.5.1 Screw threads		
Screw nomenclature;	BA	QB

CASA module Examinations subjects	CASA mech basics exams equivalent	CASA avionic basics exams equivalent
Thread forms, dimensions and tolerances for standard threads used in aircraft;	BA	Nil
Measuring screw threads;	BA	Nil
6.5.2 Bolts, studs and screws		
Bolt types: specification, identification and marking of aircraft bolts, international standards;	BA	QB
Nuts: self-locking, anchor, standard types;	BA	QB
Machine screws: aircraft specifications;	BA	QB
Studs: types and uses, insertion and removal;	BA	Nil
Self tapping screws, dowels.	BA	Nil
6.5.3 Locking devices		
Tab and spring washers, locking plates, split pins, pal-nuts, wire locking, quick release fasteners, keys, circlips, cotter pins.	BA	QB
6.5.4 Aircraft rivets		
Types of solid and blind rivets: specifications and identification, heat treatment.	FG or FI	Nil
6.6 Pipes and unions		
(a)		
Identification of, and types of, rigid and flexible pipes and their connectors used in aircraft;	FA	Nil
(b)		
Standard unions for aircraft hydraulic, fuel, oil, pneumatic and air system pipes.	FA	Nil
6.7 Springs		
Types of springs, materials, characteristics and applications.	BA	Nil
6.8 Bearings		
Purpose of bearings, loads, material, construction;	BA	Nil
Types of bearings and their application.	BA	Nil

CASA module Examinations subjects	CASA mech basics exams equivalent	CASA avionic basics exams equivalent
6.9 Transmissions		
Gear types and their application;	BA, FI, or FR	Nil
Gear ratios, reduction and multiplication gear systems, driven and driving gears, idler gears, mesh patterns;	BA, FI, or FR	Nil
Belts and pulleys, chains and sprockets.	Nil	Nil
6.10 Control cables		
Types of cables;	BB	Nil
End fittings, turn buckles and compensation devices;	BB	Nil
Pulleys and cable system components;	BB	Nil
Bowden cables;	BB	Nil
Aircraft flexible control systems.	BB	Nil
6.11 Electrical cables and connectors		
Cable types, construction and characteristics;	BA	QB
High tension and co-axial cables;	BA	QB
Crimping;	BA	QB
Connector types, pins, plugs, sockets, insulators, current and voltage rating, coupling, identification codes.	BA	QB

Module 7 Maintenance practises (B1 & B2)

CASA module Examinations subjects	CASA mech basics exams equivalent	CASA avionic basics exams equivalent
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;	BA, FF, or FG	Nil
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.	BC	Nil
7.2 Workshop practices		
Care of tools, control of tools, use of workshop materials;	BA	QB
Dimensions, allowances and tolerances, standards of workmanship;	BA	Nil
Calibration of tools and equipment, calibration standards.	BA	Nil
7.3 Tools		
Common hand tool types;	BA	QB
Common power tool types;	BA	Nil
Operation and use of precision measuring tools;	BA	QB
Lubrication equipment and methods;	Nil	Nil
Operation, function and use of electrical general test equipment.	BA	QB
7.4 Avionic general test equipment		
Operation, function and use of avionic general test equipment.	BA	QB
7.5 Engineering drawings, diagrams and standards		
Drawing types and diagrams, their symbols, dimensions, tolerances and projections;	BA	QB
Identifying title block information;	BA	QB
Microfilm, microfiche and computerised presentations;	BA	QB
Specification 100 of the ATA of America;	BA	Nil

CASA module Examinations subjects	CASA mech basics exams equivalent	CASA avionic basics exams equivalent
Aeronautical and other applicable standards including ISO, AN, MS, NAS and MIL;	BA	QB
Wiring diagrams and schematic diagrams.	BA	QB
7.6 Fits and clearances		
Drill sizes for bolt holes, classes of fits;	Nil	Nil
Common system of fits and clearances;	Nil	Nil
Schedule of fits and clearances for aircraft and engines;	Nil	Nil
Limits for bow, twist and wear;	Nil	Nil
Standard methods for checking shafts, bearings and other parts.	Nil	Nil
7.7 Electrical cables and connectors		
Continuity, insulation and bonding techniques and testing;	BA	QB
Use of crimp tools: hand and hydraulic operated;	BA	QB
Testing of crimp joints;	BA	QB
Connector pin removal and insertion;	BA	QB
Co-axial cables: testing and installation precautions;	BA	QB
Wiring protection techniques: cable looming and loom support, cable clamps, protective sleeving techniques including heat shrink wrapping, shielding.	Nil	Nil
7.8 Riveting		
Riveted joints, rivet spacing and pitch;	FG or FI	Nil
Tools used for riveting and dimpling;	FG or FI	Nil
Inspection of riveted joints.	FG or FI	Nil
7.9 Pipes and hoses		
Bending and belling and flaring aircraft pipes;	FA	Nil
Inspection and testing of aircraft pipes and hoses;	FA	Nil
Installation and clamping of pipes.	FA	Nil
7.10 Springs		

CASA module Examinations subjects	CASA mech basics exams equivalent	CASA avionic basics exams equivalent
Inspection and testing of springs.	BA	Nil
7.11 Bearings		
Testing, cleaning and inspection of bearings;	BA	Nil
Lubrication requirements of bearings;	BA	Nil
Defects in bearings and their causes.	BA	Nil
7.12 Transmissions		
Inspection of gears, backlash;	BA	Nil
Inspection of belts and pulleys, chains and sprockets;	BA	Nil
Inspection of screw jacks, lever devices, push-pull rod systems.	BA	Nil
7.13 Control cables		
Swaging of end fittings;	BB	Nil
Inspection and testing of control cables;	BB	Nil
Bowden cables;	BB	Nil
Aircraft flexible control systems.	BB	Nil
7.14 Material handling		
7.14.1 Sheet Metal		
Marking out, and calculation of, bend allowance;	FG	Nil
Sheet metal working including bending and forming;	FG	Nil
Inspection of sheet metal work.	FG	Nil
7.14.2 Composite and non-metallic		
Bonding practices;	FG, FI, or FP	Nil
Environmental conditions;	FP	Nil
Inspection methods.	FP	Nil
7.15 Welding, brazing, soldering and bonding		
(a)		
Soldering methods, inspection of soldered joints;	BA	QB

CASA module Examinations subjects	CASA mech basics exams equivalent	CASA avionic basics exams equivalent
(b)		
Welding and brazing methods;	BA	Nil
Inspection of welded and brazed joints;	BA	Nil
Bonding methods and inspection of bonded joints.	FG	Nil
7.16 Aircraft weight and balance		
(a)		
Centre of gravity and balance limits calculation: use of relevant documents;	BB	Nil
(b)		
Preparation of aircraft for weighing;	Nil	Nil
Aircraft weighing.	Nil	Nil
7.17 Aircraft handling and storage		
Aircraft taxiing and towing and associated safety precautions;	BA	Nil
Aircraft jacking, chocking, securing and associated safety precautions;	BA	Nil
Aircraft storage methods;	Nil	Nil
Refuelling and defuelling procedures;	BA	Nil
De-icing and anti-icing procedures;	BA	Nil
Electrical, hydraulic and pneumatic ground supplies;	Nil	Nil
Effects of environmental conditions on aircraft handling and operation.	Nil	Nil
7.18 Disassembly, inspection, repair and assembly techniques		
(a)		
Types of defects and visual inspection techniques;	FG	Nil
Corrosion	BA	Nil
Corrosion removal, assessment and reprotection;	BA	Nil
(b)		

CASA module Examinations subjects	CASA mech basics exams equivalent	CASA avionic basics exams equivalent
General repair methods, Structural Repair Manual;	FG or FI	Nil
Ageing, fatigue and corrosion control programs;	FG or FI	Nil
(c)		
Non-destructive inspection techniques including: penetrant,	BA	Nil
radiographic, eddy current, ultrasonic and boroscope methods	BA	Nil
(d)		
Disassembly and re-assembly techniques;	Nil	Nil
(e)		
Trouble shooting techniques.	Nil	Nil
7.19 Abnormal events		
(a)		
Inspections following lightning strikes and HIRF penetration.	FG or FI	Nil
(b)		
Inspections following abnormal events such as heavy landings and flight through turbulence.	FG or FI	Nil
7.20 Maintenance procedures		
Maintenance planning;	Nil	Nil
Modification procedures;	Nil	Nil
Stores procedures;	Nil	Nil
Certification and release procedures;	Nil	Nil
Interface with aircraft operation;	Nil	Nil
Maintenance inspection, quality control and quality assurance;	Nil	Nil
Additional maintenance procedures;	Nil	Nil
Control of life limited components.	Nil	Nil

Module 8 Basic Aerodynamics (B1 & B2)

CASA module Examinations subjects	CASA mech basics exams equivalent	CASA avionic basics exams equivalent
8.1 Physics of the atmosphere		
International Standard Atmosphere (ISA), application aerodynamics.	BB	IA or QB
8.2 Aerodynamics		
Air flow around a body;	BB	QB
Boundary layer, laminar and turbulent flow, free stream flow, relative airflow, up wash and downwash, vortices, stagnation;	BB	QB
The terms: camber, chord, mean aerodynamic chord, profile (parasite) drag, induced drag, centre of pressure, angle of attack, wash in and washout, fineness ratio, wing shape and aspect ratio;	BB	QB
Thrust, weight, aerodynamic resultant;	BB	QB
Generation of lift and drag: angle of attack, lift coefficient, drag coefficient, polar curve, stall;	BB	QB
Aerofoil contamination including ice, snow, frost.	BB	Nil
8.3 Theory of flight		
Relationship between lift, weight, thrust and drag;	BB	QB
Glide ratio;	BB	QB
Steady state flights, performance;	BB	QB
Theory of the turn;	BB	QB
Influence of load factor: stall, flight envelope and structural limitations;	BB	QB
Lift augmentation.	BB	QB
8.4 Flight stability and dynamics		
Longitudinal, lateral and directional stability (active and passive).	BB	QB

Module 9 Human factors (B1 & B2)

CASA module Examinations subjects	CASA mech basics exams equivalent	CASA avionic basics exams equivalent
9.1 General		
The need to take human factors into account;	Nil	Nil
Incidents attributable to human factors and human error;	Nil	Nil
“Murphy’s” law.	Nil	Nil
9.2 Human performance and limitations		
Vision;	Nil	Nil
Hearing;	Nil	Nil
Information processing;	Nil	Nil
Attention and perception;	Nil	Nil
Memory;	Nil	Nil
Claustrophobia and physical access.	Nil	Nil
9.3 Social psychology		
Responsibility: individual and group;	Nil	Nil
Motivation and de-motivation;	Nil	Nil
Peer pressure;	Nil	Nil
Culture issues;	Nil	Nil
Team working;	Nil	Nil
Management, supervision and leadership.	Nil	Nil
9.4 Factors affecting performance		
Fitness and health;	Nil	Nil
Stress: domestic and work related;	Nil	Nil
Time pressure and deadlines;	Nil	Nil
Workload: overload and underload;	Nil	Nil
Sleep and fatigue, shiftwork;	Nil	Nil
Alcohol, medication, drug abuse.	Nil	Nil

CASA module Examinations subjects	CASA mech basics exams equivalent	CASA avionic basics exams equivalent
9.5 Physical environment		
Noise and fumes;	Nil	Nil
Illumination;	Nil	Nil
Climate and temperature;	Nil	Nil
Motion and vibration;	Nil	Nil
Working environment.	Nil	Nil
9.6 Tasks		
Physical work;	Nil	Nil
Repetitive tasks;	Nil	Nil
Visual inspection;	Nil	Nil
Complex systems.	Nil	Nil
9.7 Communication		
Within and between teams;	Nil	Nil
Work logging and recording;	Nil	Nil
Keeping up-to-date, currency;	Nil	Nil
Dissemination of information.	Nil	Nil
9.8 Human error		
Error models and theories;	Nil	Nil
Types of error in maintenance tasks;	Nil	Nil
Implications of errors (i.e. accidents);	Nil	Nil
Avoiding and managing errors.	Nil	Nil
9.9 Hazards in the workplace		
Recognising and avoiding hazards;	Nil	Nil
Dealing with emergencies.	Nil	Nil

Module 10 Aviation legislation (B1 & B2)

CASA module Examinations subjects	CASA mech basics exams equivalent	CASA avionic basics exams equivalent
10.1 Regulatory Framework		
Role of International Civil Aviation Organization;	AA	AA
Role of CASA;	AA	AA
Relationship between Parts 21, 42, 66, 145 and 147 of CASR 1998;	AA	AA
Relationship with other aviation authorities.	AA	AA
10.2 Part 66 Certifying Staff		
Detailed understanding of Part 66 of CASR 1998.	AA	AA
10.3 Part 145 – Approved maintenance organisations		
Detailed understanding of Part 145 of CASR 1998.	AA	AA
10.4 Air operations		
Air Operators' Certificates;	AA	AA
Operators' responsibilities, in particular regarding continuing airworthiness and maintenance;	AA	AA
Aircraft maintenance program;	AA	AA
MEL/CDL;	AA	AA
Documents to be carried on board;	AA	AA
Aircraft placarding (markings).	AA	AA
10.5 Certification of aircraft, parts and appliances		
(a) General		
General understanding of Parts 21, 23, 25, 27 and 29 of CASR 1998;	AA	AA
(b) Documents		
Certificates of Airworthiness;	AA	AA
Restricted Certificates of Airworthiness;	AA	AA
Special Flight Permits;	AA	AA

CASA module Examinations subjects	CASA mech basics exams equivalent	CASA avionic basics exams equivalent
Certificates of Registration;	AA	AA
Noise Certificates;	AA	AA
Weight Schedules;	AA	AA
Radio Station Licences and Approvals.	AA	AA
10.6 Parts 21 and 42		
(a)		
Detailed understanding of Part 21 of CASR 1998 provisions relating to continuing airworthiness;	AA	AA
(b)		
Detailed understanding of Part 42 of CASR 1998.	AA	AA
10.7 Applicable national and international requirements		
(a)		
Management programs, maintenance checks and inspections;	AA	AA
Master Minimum Equipment Lists, Minimum Equipment List, Dispatch Deviation Lists;	AA	AA
Airworthiness Directives;	AA	AA
Service bulletins, manufacturers' service information;	AA	AA
Modification and repairs;	AA	AA
Maintenance documentation: maintenance manuals, structural repair manuals, illustrated parts catalogue, etc.	AA	AA
(b)		
Continuing airworthiness;	AA	AA
Test flights;	AA	AA
ETOPS, maintenance and despatch requirements;	AA	AA
All weather operation: category 2 and 3 operations and minimum equipment requirements.	AA	AA

Module 11A Turbine Aeroplane aerodynamics, structures and systems (B1.1 Licence)

CASA module Examination subjects	CASA mech basics exams equivalent	CASA avionic basics exams equivalent
11.1 Theory of flight		
11.1.1 Aeroplane aerodynamics and flight controls		
Operation and effect of:		
Roll control: ailerons and spoilers;	BB	QB
Pitch control: elevators, stabilators, variable incidence stabilisers and canards;	BB	QB
Yaw control, rudder limiters;	BB	QB
Control using elevons, ruddervators;	BB	QB
High lift devices, slots, slats, flaps, flaperons;	BB	QB
Drag inducing devices, spoilers, lift dumpers, speed brakes;	BB	QB
Effects of wing fences, sawtooth leading edges;	BB	Nil
Boundary layer control using, vortex generators, stall wedges or leading edge devices;	BB	Nil
Operation and effect of trim tabs, balance and anti-balance (leading) tabs, servo tabs, spring tabs, mass balance, control surface bias, aerodynamic balance panels.	BB	Nil
11.1.2 High speed flight		
Speed of sound, subsonic flight, transonic flight, supersonic flight;	BB	QB
Mach number, critical Mach number, compressibility buffet, shockwave, aerodynamic heating, area rule;	BB	QB
Factors affecting airflow in engine intakes of high speed aircraft;	BB	QB
Effects of sweepback on critical Mach number.	BB	QB
11.2 Airframe structures — general concepts		
(a)		

CASA module Examination subjects	CASA mech basics exams equivalent	CASA avionic basics exams equivalent
Airworthiness requirements for structural strength;	FG	Nil
Structural classification, primary, secondary and tertiary;	FG	Nil
Fail safe, safe life, damage tolerance concepts;	FG	Nil
Zonal and station identification systems;	FG	QB
Stress, strain, bending, compression, shear, torsion, tension, hoop stress, fatigue;	FG	Nil
Drains and ventilation provisions;	FG	Nil
System installation provisions;	FG	Nil
Lightning strike protection provision;	FG	Nil
Aircraft bonding;	FG	QB
(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;	FG	Nil
Structure assembly techniques: riveting,	FG	Nil
bolting,	BA	Nil
bonding;	FG	QB
Methods of surface protection, such as chromating, anodising, painting;	FG	Nil
Surface cleaning;	FG	Nil
Airframe symmetry: methods of alignment and symmetry checks.	FG	Nil
11.3 Airframe structures — aeroplanes		
11.3.1 Fuselage (ATA52/53/56)		
Construction and pressurisation sealing;	FG	Nil
Wing, stabiliser, pylon and under carriage attachments;	FG	Nil
Seat installation and cargo loading system;	FG	Nil
Doors and emergency exits: construction, mechanisms, operation and safety devices;	FG	Nil

CASA module Examination subjects	CASA mech basics exams equivalent	CASA avionic basics exams equivalent
Windows and windscreen construction and mechanisms.	FG	Nil
11.3.2 Wings (ATA57)		
Construction;	FG	Nil
Fuel storage;	FG	Nil
Landing gear, pylon, control surface and highlift and drag attachments.	FG	Nil
11.3.3 Stabilisers (ATA55)		
Construction;	FG	Nil
Control surface attachment.	FG	Nil
11.3.4 Flight control surface (ATA55/57)		
Construction and attachment;	FG	Nil
Balancing — mass and aerodynamic.	FG	QB
11.3.5 Nacelles and pylons (ATA54)		
Construction;	FG	Nil
Firewalls;	FG	Nil
Engine mounts.	FG	Nil
11.4 Air-conditioning and cabin pressurisation (ATA21)		
11.4.1 Air supply		
Sources of air supply including engine bleed, APU and ground cart.	FM	ED
11.4.2 Air-conditioning		
Air-conditioning systems;	FM	EB & ED
vapour cycle machines;	FM	EB
Air cycle and	FM	ED
Distribution systems;	FM	EB & ED
Flow, temperature and humidity control system.	FM	EB & ED
11.4.3 Pressurisation		
Pressurisation systems;	IM	IM

CASA module Examination subjects	CASA mech basics exams equivalent	CASA avionic basics exams equivalent
Control and indication including control and safety valves;	IM	IM
Cabin pressure controllers;	IM	IM
Heating systems.	FM	Nil
11.4.4 Safety and warning devices		
Protection and warning devices.	IM	IM
11.5 Instruments and avionic systems		
11.5.1 Instrument systems (ATA31)		
Pitot static: altimeter, airspeed indicator, vertical speed indicator;	BC	IA
Gyroscopic: artificial horizon, attitude director, direction indicator, horizontal situation indicator turn coordinator;	BC	IZ
Compasses: direct reading, remote reading;	BC	IZ
Angle of attack indication, stall warning systems;	Nil	Nil
Glass cockpit;	Nil	IZ
Other aircraft system indication.	Nil	IZ
11.5.2 Avionic systems		
Fundamentals of system layouts and operation of:		
Auto flight (ATA22);	BC	IF
Communications (ATA23);	Nil	WA & WZ
Navigation systems (ATA34).	Nil	WC & WD & WE & WJ
11.6 Electrical power (ATA24)		
Batteries installation and operation;	BC	EB
DC power generation;	BC	EB
AC power generation;	Nil	QD
Emergency power generation;	Nil	Nil
Voltage regulation;	BC	EB
Power distribution;	BC	ED

CASA module Examination subjects	CASA mech basics exams equivalent	CASA avionic basics exams equivalent
Inverters, transformers, rectifiers;	Nil	ED
Circuit protection;	BC	QB
External and ground power.	Nil	Nil
11.7 Equipment and furnishings (ATA25)		
(a)		
Emergency equipment requirements;	FG	Nil
Seats, harnesses and belts;	FG	Nil
(b)		
Cabin layout;	FG	Nil
Equipment layout;	FG	Nil
Cabin furnishing installation;	FG	Nil
Cabin entertainment equipment;	Nil	Nil
Galley installation;	FG	Nil
Cargo handling and retention equipment;	FG	Nil
Airstairs.	FG	Nil
11.8 Fire protection (ATA26)		
(a)		
Fire and smoke detection and warning systems;	BC	ED
Fire extinguishing systems;	BC	ED
System tests;	BC	ED
(b)		
Portable fire extinguisher.	BC	ED
11.9 Flight controls (ATA27)		
Primary controls: aileron, elevator, rudder, spoiler;	BB	QB
Trim control;	BB	QB
Active load control;	BB	QB
High lift devices;	BB	QB

CASA module Examination subjects	CASA mech basics exams equivalent	CASA avionic basics exams equivalent
Lift dump, speed brakes;	BB	QB
System operation: manual, hydraulic, pneumatic, electrical, fly by-wire;	BB	Nil
Artificial feel, Yaw damper, Mach trim, rudder limiter, gust locks systems;	BB	QB
Balancing	BB	Nil
and rigging;	BB	Nil
Stall protection and warning system.	BB	QB
11.10 Fuel systems (ATA28)		
System layout;	FA	Nil
Fuel tanks;	FA	Nil
Supply systems;	FA	Nil
Dumping, venting and draining;	FA	Nil
Cross-feed and transfer;	FA	Nil
Indications and warnings;	FA	IA
Refuelling and defuelling;	FA	Nil
Longitudinal balance fuel systems.	FA	Nil
11.11 Hydraulic power (ATA29)		
System layout;	FF	Nil
Hydraulic fluids;	FF	Nil
Hydraulic reservoirs and accumulators;	FF	Nil
Pressure generation: electric, mechanical, pneumatic;	FF	Nil
Emergency pressure generation;	FF	Nil
Pressure control;	FF	Nil
Power distribution;	FF	Nil
Indication and warning systems;	FF	IA
Interface with other systems.	FF	Nil
11.12 Ice and rain protection (ATA30)		

CASA module Examination subjects	CASA mech basics exams equivalent	CASA avionic basics exams equivalent
Ice formation, classification and detection;	FG	ED
Anti-icing systems: electrical, hot air and chemical;	FG	ED
De-icing systems: electrical, hot air, pneumatic and chemical;	FG	ED
Rain repellent;	FG	Nil
Probe and drain heating;	FG	ED
Wiper systems.	FG	Nil
11.13 Landing gear (ATA32)		
Construction, shock absorbing;	FG	Nil
Extension and retraction systems: normal and emergency;	FG	Nil
Indications and warning;	FG	EB
Wheels, brakes, antiskid and auto braking;	FF	ED
Tyres;	FA	Nil
Steering,	FF	Nil
Air-ground sensing.	FG	EB
11.14 Lights (ATA33)		
External: navigation, anti-collision, landing, taxiing, ice;	Nil	EB
Internal: cabin, cockpit, cargo; emergency.	Nil	EB
11.15 Oxygen (ATA35)		
System layout: cockpit, cabin;	FG	IZ
Sources, storage, charging and distribution;	FG	IZ
Supply regulation;	FG	IZ
Indications and warnings.	FG	IZ
11.16 Pneumatic and vacuum (ATA36)		
System layout;	FM IM	IM
Sources: engine and APU, compressors, reservoirs, ground supply;	FF	Nil
Pressure control;	IM FM	IM

CASA module Examination subjects	CASA mech basics exams equivalent	CASA avionic basics exams equivalent
Distribution;	FM IM	Nil
Indications and warnings;	FM IM	IM
Interfaces with other systems.	FM IM	Nil
11.17 Water and waste (ATA38)		
Water system layout, supply, distribution, servicing and draining;	FG	Nil
Toilet system layout, flushing and servicing;	Nil	Nil
Corrosion aspects.	FG	Nil
11.18 On-board maintenance systems (ATA45)		
Central maintenance computers;	Nil	Nil
Data loading system;	Nil	Nil
Electronic library system;	Nil	Nil
Printing;	Nil	Nil
Structure monitoring (damage tolerance monitoring).	Nil	Nil
11.19 Integrated modular avionics (ATA42)		
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 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.	Nil	Nil
11.20 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). These include voice, data, music and video transmissions.	Nil	Nil
The cabin intercommunication data system provides an interface between cockpit/cabin crew and cabin systems. These systems support data exchange of the different	Nil	Nil

CASA module Examination subjects	CASA mech basics exams equivalent	CASA avionic basics exams equivalent
related LRUs 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.	Nil	Nil
The cabin network service may host functions such as:	Nil	Nil
<ul style="list-style-type: none"> access to pre-departure/departure reports 	Nil	Nil
<ul style="list-style-type: none"> e-mail/intranet/internet access 	Nil	Nil
<ul style="list-style-type: none"> passenger database 	Nil	Nil
<ul style="list-style-type: none"> cabin core system 	Nil	Nil
<ul style="list-style-type: none"> in-flight entertainment system 	Nil	Nil
<ul style="list-style-type: none"> external communication system 	Nil	Nil
<ul style="list-style-type: none"> cabin monitoring system 	Nil	Nil
<ul style="list-style-type: none"> cabin mass memory system 	Nil	Nil
<ul style="list-style-type: none"> miscellaneous cabin system. 	Nil	Nil
11.21 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. These do not include units or components installed for other uses and shared with other systems, such as flight deck printer or general use display.	Nil	Nil
Typical examples include: 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.	Nil	Nil

Module 11B – Piston Aeroplane aerodynamics, structures, and systems (B1.2 Licence)

CASA module Examination subjects	CASA mech basics exams equivalent	CASA avionic basics exams equivalent
11.1 Theory of flight		
11.1.1 Aeroplane aerodynamics and flight controls		
Operation and effect of the following:		
roll control: ailerons and spoilers	BB	QB
pitch control: elevators, stabilators, variable incidence stabilisers and canards	BB	QB
yaw control, rudder limiters	BB	QB
Control using elevons, ruddervators;	BB	QB
High-lift devices, slots, slats, flaps, flaperons;	BB	QB
Drag-inducing devices, spoilers, lift dumpers, speed brakes;	BB	QB
Effects of wing fences, sawtooth leading edges;	BB	Nil
Boundary layer control, using vortex generators, stall wedges or leading-edge devices;	BB	Nil
Operation and effect of trim tabs, balance and anti-balance (leading) tabs, servo tabs, spring tabs, mass balance, control surface bias, aerodynamic balance panels.	BB	Nil
11.1.2 High-speed flight (This subject not required for B1.2)	This subject N/A for B1.2	This subject N/A for B1.2
11.2 Airframe structures — general concepts		
(a)		
Airworthiness requirements for structural strength;	FG	Nil
Structural classification, primary, secondary and tertiary;	FG	Nil
Fail safe, safe life, damage tolerance concepts;	FG	Nil

CASA module Examination subjects	CASA mech basics exams equivalent	CASA avionic basics exams equivalent
Zonal and station identification systems	FG	QB
Stress, strain, bending, compression, shear, torsion, tension, hoop stress, fatigue;	FG	Nil
Drains and ventilation provisions;	FG	Nil
System installation provisions	FG	Nil
Lightning strike protection provision;	FG	Nil
Aircraft bonding	FG	QB
(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;	FG	Nil
Structure assembly techniques: riveting	FG	Nil
bolting	FG	Nil
bonding	FG	QB
Methods of surface protection, such as chromating, anodising, painting;	FG	Nil
Surface cleaning;	FG	Nil
Airframe symmetry: methods of alignment and symmetry checks.	FG	Nil
11.3 Airframe structures — aeroplanes		
11.3.1 Fuselage (ATA52/53/56)		
Construction and pressurisation sealing;	FG	Nil
Wing, tailplane, pylon and undercarriage attachments;	FG	Nil
Seat installation;	FG	Nil
Doors and emergency exits: construction and operation and safety devices	FG	Nil
Windows and windscreen construction and mechanisms.	FG	Nil
11.3.2 Wings (ATA57)		
Construction;	FG	Nil

CASA module Examination subjects	CASA mech basics exams equivalent	CASA avionic basics exams equivalent
Fuel storage;	FG	Nil
Landing gear, pylon, control surface and high-lift/drag attachments.	FG	Nil
11.3.3 Stabilisers (ATA55)		
Construction;	FG	Nil
Control surface attachment.	FG	Nil
11.3.4 Flight control surfaces (ATA55/57)		
Construction and attachment;	FG	Nil
Balancing — mass and aerodynamic	FG	QB
11.3.5 Nacelles and pylons (ATA54)		
Construction	FG	Nil
Firewalls	FG	Nil
Engine mounts.	FG	Nil
11.4 Air-conditioning and cabin pressurisation (ATA21)		
Pressurisation and air-conditioning systems;	FM	EB & ED
Cabin pressure controllers;	IM	IM
Protection and warning devices;	IM	IM
Heating systems	FM	Nil
11.5 Instruments and avionic systems		
11.5.1 Instrument systems (ATA31)		
Pitot static: altimeter, airspeed indicator, vertical speed indicator;	BC	IA
Gyroscopic: artificial horizon, attitude director, direction indicator, horizontal situation indicator, turn and slip indicator, turn coordinator;	BC	IZ
Compasses: direct reading, remote reading;	BC	IZ
Angle of attack indication, stall warning systems;	Nil	Nil
Glass cockpit;	Nil	IZ

CASA module Examination subjects	CASA mech basics exams equivalent	CASA avionic basics exams equivalent
Other aircraft system indication.	Nil	IZ
11.5.2 Avionic systems		
Fundamentals of system layouts, and operation of the following:		
<ul style="list-style-type: none"> • auto flight (ATA22) 	BC	IF
<ul style="list-style-type: none"> • communications (ATA23) 	Nil	WA & WZ
<ul style="list-style-type: none"> • navigation systems (ATA34) 	Nil	WC & WD & WE & WJ
11.6 Electrical power (ATA24)		
Batteries installation and operation;	BC	EB
DC-power generation	BC	EB
Voltage regulation	BC	EB
Power distribution;	BC	ED
Circuit protection;	BC	QB
Inverters, transformers.	Nil	ED
11.7 Equipment and furnishings (ATA25)		
(a)		
Emergency equipment requirements;	FG	Nil
Seats, harnesses and belts;	FG	Nil
(b)		
Cabin layout;	FG	Nil
Equipment layout;	FG	Nil
Cabin furnishing installation;	FG	Nil
Cabin entertainment equipment;	Nil	Nil
Galley installation;	FG	Nil
Cargo handling and retention equipment;	FG	Nil
Airstairs.	FG	Nil
11.8 Fire protection (ATA26)		

CASA module Examination subjects	CASA mech basics exams equivalent	CASA avionic basics exams equivalent
(a)		
Fire and smoke detection and warning systems;	BC	ED
Fire extinguishing systems;	BC	ED
System tests;	BC	ED
(b)		
Portable fire extinguisher.	BC	ED
11.9 Flight controls (ATA27)		
Primary controls: aileron, elevator, rudder	BB	QB
Trim tabs;	BB	QB
High-lift devices;	BB	QB
System operation: manual;	BB	QB
Gust locks;	BB	QB
Balancing and rigging;	BB	Nil
Stall warning system.	BB	Nil
11.10 Fuel systems (ATA28)		
System layout;	FA	Nil
Fuel tanks;	FA	Nil
Supply systems;	FA	Nil
Cross-feed and transfer;	FA	Nil
Indications and warnings;	FA	IA
Refuelling and defuelling.	FA	Nil
11.11 Hydraulic power (ATA29)		
System layout;	FF	Nil
Hydraulic fluids;	FF	Nil
Hydraulic reservoirs and accumulators;	FF	Nil
Pressure generation: electric, mechanical;	FF	Nil
Filters;	FF	Nil

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Mapping — CASA basics exam syllabus to Part 66 basic knowledge syllabus

CASA module Examination subjects	CASA mech basics exams equivalent	CASA avionic basics exams equivalent
Pressure control;	FF	Nil
Power distribution;	FF	Nil
Indication and warning systems.	FF	IA
11.12 Ice and rain protection (ATA30)		
Ice formation, classification and detection;	FG	ED
De-icing systems: electrical, hot air, pneumatic and chemical;	FG	ED
Probe and drain heating;	FG	ED
Wiper systems	FG	Nil
11.13 Landing gear (ATA32)		
Construction, shock absorbing;	FG	Nil
Extension and retraction systems: normal and emergency;	FG	Nil
Indications and warning;	FG	EB
Wheels, brakes, antiskid and autobraking;	FG	ED
Tyres;	FA	Nil
Steering;	FF	Nil
Air-ground sensing.	FG	EB
11.14 Lights (ATA33)		
External: navigation, anti-collision, landing, taxiing, ice	Nil	EB
Internal: cabin, cockpit, cargo;	Nil	EB
Emergency.	Nil	EB
11.15 Oxygen (ATA35)		
System layout: cockpit, cabin;	FG	IZ
Sources, storage, charging and distribution;	FG	IZ
Supply regulation	FG	IZ
Indications and warnings.	FG	IZ
11.16 Pneumatic and vacuum (ATA36)		

CASA module Examination subjects	CASA mech basics exams equivalent	CASA avionic basics exams equivalent
System layout;	FM IM	IM
Sources: engine/APU, compressors, reservoirs, ground supply;	FF	Nil
Pressure and vacuum pumps;	FM	Nil
Pressure control;	FM IM	IM
Distribution;	FM IM	Nil
Indications and warnings;	FM IM	IM
Interfaces with other systems.	FM IM	Nil
11.17 Water and waste (ATA38)		
Water system layout, supply, distribution, servicing and draining;	FG	Nil
Toilet system layout, flushing and servicing;	Nil	Nil
Corrosion aspects.	FG	Nil

Module 12 Helicopter aerodynamics, structures and systems (B1.3 & B1.4)

CASA module Examinations subjects	CASA mech basics exams equivalent	CASA avionic basics exams equivalent
12.1 Theory of flight — rotary wing aerodynamics		
Terminology;	FI	Nil
Effects of gyroscopic precession;	FI	IH
Torque reaction and directional control;	FI	Nil
Dissymmetry of lift, blade tip stall;	FI	IH
Translating tendency and its correction;	FI	Nil
Coriolis effect and compensation;	FI	IH
Vortex ring state, power settling, overpitching;	FI	IH
Auto-rotation;	FI	IH
Ground effect.	FI	IH
12.2 Flight control systems		
Cyclic control;	FI	IH
Collective control;	FI	IH
Swashplate;	FI	Nil
Yaw control: Anti-torque control, tail rotor, bleed air;	FI	IH
Main rotor head: design and operation features;	FI	Nil
Blade dampers: function and construction;	FI	Nil
Rotor blades: main and tail rotor blade construction and attachment;	FI	Nil
Trim control, fixed and adjustable stabilisers;	FI	Nil
System operation: manual, hydraulic, electrical and fly-by-wire;	FI	Nil
Artificial feel;	FI	Nil
Balancing and rigging.	FI	Nil
12.3 Blade tracking and vibration analysis		

CASA module Examinations subjects	CASA mech basics exams equivalent	CASA avionic basics exams equivalent
Rotor alignment;	FI	Nil
Main and tail rotor tracking;	FI or FR	Nil
Static and dynamic balancing;	FI	Nil
Vibration types, vibration reduction methods;	FI	Nil
Ground resonance.	FI	IH
12.4 Transmissions		
Gearboxes, main and tail rotors;	FI	Nil
Clutches, freewheel units and rotor brake.	FI	Nil
12.5 Airframe structures		
(a)		
Airworthiness requirements for structural strength;	FI	Nil
Structural classification, primary, secondary and tertiary;	FI	Nil
Fail safe, safe life, damage tolerance concepts;	FI	Nil
Zonal and station identification systems;	FI	Nil
Stress, strain, bending, compression, shear, torsion, tension, hoop stress, fatigue;	FI	Nil
Drains and ventilation provisions;	FI	Nil
System installation provisions;	FI	Nil
Lightning strike protection provision;	FG	Nil
(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;	FI	Nil
Pylon, stabiliser and undercarriage attachments;	FI	Nil
Seat installation;	FI	Nil
Doors: construction, mechanisms, operation and safety devices;	FI	Nil
Windows and windscreen construction;	FI	Nil

CASA module Examinations subjects	CASA mech basics exams equivalent	CASA avionic basics exams equivalent
Fuel storage;	FR	Nil
Firewalls;	FI	Nil
Engine mounts;	FI	Nil
Structure assembly techniques: riveting, bolting, bonding;	FI	Nil
Methods of surface protection, such as chromating, anodising, painting;	FI	Nil
Surface cleaning;	FI	Nil
Airframe symmetry: methods of alignment and symmetry checks.	FI	Nil
12.6 Air-conditioning (ATA21)		
12.6.1 Air supply		
Sources of air supply including engine bleed and ground cart.	FM	ED
12.6.2 Air-conditioning		
Air-conditioning systems;	FM	EB & ED
Distribution systems;	FM	EB & ED
Flow and temperature control systems;	FM	EB & ED
Protection and warning devices.	FM	IM
12.7 Instruments and avionic systems		
12.7.1 Instrument systems (ATA31)		
Pitot static: altimeter, air speed indicator, vertical speed indicator;	BC	IA
Gyroscopic: artificial horizon, attitude director, direction indicator, horizontal situation indicator, turn and slip indicator, turn coordinator;	BC	IZ
Compasses: direct reading, remote reading;	BC	IZ
Vibration indicating systems — HUMS;	Nil	Nil
Glass cockpit;	Nil	IZ
Other aircraft system indication.	Nil	IZ
12.7.2 Avionic systems		

CASA module Examinations subjects	CASA mech basics exams equivalent	CASA avionic basics exams equivalent
Fundamentals of system layouts and operation of:		
Auto flight (ATA22);	BC	IF
Communications (ATA23);	Nil	WZ
Navigation Systems (ATA34).	Nil	WC & WD & WE & WJ
12.8 Electrical power (ATA24)		
Batteries installation and operation;	BC	EB
DC power generation, AC power generation;	Nil	QD
Emergency power generation;	Nil	Nil
Voltage regulation, circuit protection;	BC	ED
Power distribution;	BC	ED
Inverters, transformers, rectifiers;	Nil	ED
External and ground power.	Nil	Nil
12.9 Equipment and furnishings (ATA25)		
(a)		
Emergency equipment requirements;	FI	Nil
Seats, harnesses and belts;	FI	Nil
Lifting systems;	FI	Nil
(b)		
Emergency flotation systems;	FI	Nil
Cabin layout, cargo retention;	Nil	Nil
Equipment layout;	Nil	Nil
Cabin furnishing installation.	Nil	Nil
12.10 Fire protection (ATA26)		
Fire and smoke detection and warning systems;	BC	ED
Fire extinguishing systems;	BC	ED
System tests.	BC	ED

CASA module Examinations subjects	CASA mech basics exams equivalent	CASA avionic basics exams equivalent
12.11 Fuel systems (ATA28)		
System layout;	FR FA	Nil
Fuel tanks;	FA	Nil
Supply systems;	FA	Nil
Dumping, venting and draining;	FA	Nil
Cross-feed and transfer;	FA	Nil
Indications and warnings;	FA FR	IA
Refuelling and defuelling.	FA	Nil
12.12 Hydraulic power (ATA29)		
System layout;	FF	Nil
Hydraulic fluids;	FF	Nil
Hydraulic reservoirs and accumulators;	FF	Nil
Pressure generation: electric, mechanical, pneumatic;	FF	Nil
Emergency pressure generation;	FF	Nil
Pressure control;	FF	Nil
Power distribution;	FF	Nil
Indication and warning systems;	FF	IA
Interface with other systems.	FF	Nil
12.13 Ice and rain protection (ATA30)		
Ice formation, classification and detection;	FR	ED
Anti-icing and de-icing systems: electrical, hot air and chemical;	FR	ED
Rain repellent and removal;	FR	Nil
Probe and drain heating.	Nil	ED
12.14 Landing gear (ATA32)		
Construction, shock absorbing;	FI	Nil
Extension and retraction systems: normal and emergency;	FI	Nil

CASA module Examinations subjects	CASA mech basics exams equivalent	CASA avionic basics exams equivalent
Indications and warning;	FI	EB
Wheels, tyres, brakes;	FI	ED
Steering;	FI	Nil
Skids, floats.	FI	Nil
12.15 Lights (ATA33)		
External: navigation, landing, taxiing, ice;	Nil	EB
Internal: cabin, cockpit, cargo; emergency.	Nil	EB
12.16 Pneumatic and vacuum (ATA36)		
System layout;	Nil	IA
Sources: engine, compressors, reservoirs, ground supply;	FF	Nil
Pressure control;	IM	IA
Distribution;	Nil	IA
Indications and warnings;	IM	IA
Interfaces with other systems.	FF	Nil
12.17 Integrated modular avionics (ATA42)		
Functions that may be typically integrated in the integrated modular avionic (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 BITE, fuel management, braking control, steering control, landing gear extension and retraction, tyre pressure indication, oleo pressure indication, brake temperature monitoring;	Nil	Nil
Core system;	Nil	Nil
Network components.	Nil	Nil
12.18 On-board maintenance systems (ATA45)		
Central maintenance computers;	Nil	Nil
Data loading system;	Nil	Nil
Electronic library system;	Nil	Nil

CASA module Examinations subjects	CASA mech basics exams equivalent	CASA avionic basics exams equivalent
Printing;	Nil	Nil
Structure monitoring (damage tolerance monitoring).	Nil	Nil
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. These include units that are dedicated to the information storage and retrieval function such as the electronic library mass storage and controller. These do not include units or components installed for other uses and shared with other systems, such as flight deck printer or general use display.	Nil	Nil
Typical examples include: air traffic and information management systems; network server system; aircraft general information system; flight deck information system; maintenance information system; passenger cabin information system; miscellaneous information system.	Nil	Nil

Module 13 Aircraft structures and systems (B2)

CASA module Examinations subjects	CASA mech basics exams equivalent	CASA avionic basics exams equivalent
13.1 Theory of flight		
(a) Aeroplane aerodynamics and flight controls		
Operation and effect of:		
<ul style="list-style-type: none"> roll control: ailerons and spoilers; 	BB	QB
<ul style="list-style-type: none"> pitch control: elevators, stabilators, variable incidence stabilisers and canards; 	BB	QB
<ul style="list-style-type: none"> yaw control, rudder limiters; 	BB	QB
Control using elevons, ruddervators;	BB	QB
Highlift devices: slots, slats, flaps;	BB	QB
Drag inducing devices: spoilers, lift dumpers, speed brakes;	BB	QB
Operation and effect of trim tabs, servo tabs, control surface bias;	BB	QB
(b) High speed flight		
Speed of sound, subsonic flight, transonic flight, supersonic flight, Mach number, critical Mach number;	BB	QB
(c) Rotary wing aerodynamics		
Terminology;		
Operation and effect of cyclic, collective and anti-torque controls.	FI	IH
13.2 Structures — general concepts		
(a)		
Fundamentals of structural systems;	FG	Nil
(b)		
Zonal and station identification systems; electrical bonding;	BA or FG	QB
Lightning strike protection provision.	FG	Nil

CASA module Examinations subjects	CASA mech basics exams equivalent	CASA avionic basics exams equivalent
13.3 Autoflight (ATA22)		
Fundamentals of automatic flight control including working principles and current terminology;	Nil	IF or IH
Command signal processing;	Nil	IF
Modes of operation: roll,	Nil	IF
pitch	Nil	IF
and yaw channels; Yaw dampers;	Nil	IF
Stability augmentation system in helicopters;	Nil	IH
Automatic trim control;	Nil	IF
Autopilot navigation aids interface;	Nil	IF
Autothrottle systems;	Nil	Nil
Automatic landing systems: principles and categories, modes of operation, approach, glide slope, land, go-around, system monitors and failure conditions.	Nil	IF
13.4 Communication and navigation (ATA23/34)		
Fundamentals of radio wave propagation, antennas, transmission lines, communication, receiver and transmitter.	Nil	WA
Working principles of following systems:		
<ul style="list-style-type: none"> • Very high frequency (VHF) communication; 	Nil	WZ
<ul style="list-style-type: none"> • High frequency (HF) communication; 	Nil	WZ
<ul style="list-style-type: none"> • Audio; 	Nil	WB
<ul style="list-style-type: none"> • Emergency locator transmitters; 	Nil	WZ
<ul style="list-style-type: none"> • Cockpit voice recorder; 	Nil	WB
<ul style="list-style-type: none"> • Very high frequency omnidirectional range (VOR); 	Nil	WD
<ul style="list-style-type: none"> • Automatic direction finding (ADF); 	Nil	WC
<ul style="list-style-type: none"> • Instrument landing system (ILS); 	Nil	WE
<ul style="list-style-type: none"> • Microwave landing system (MLS); 	Nil	Nil

CASA module Examinations subjects	CASA mech basics exams equivalent	CASA avionic basics exams equivalent
• Flight director systems;	Nil	IZ
• Distance measuring equipment (DME);	Nil	WJ
• Doppler navigation;	Nil	WK
• Area navigation, RNAV systems;	Nil	Nil
• Flight management systems;	Nil	IZ
• Global positioning system (GPS), Global navigation satellite systems (GNSS);	Nil	WL
• Inertial navigation system;	Nil	IK
• Air traffic control transponder, secondary surveillance radar;	Nil	WG
• Traffic alert and collision avoidance system (TCAS);	Nil	Nil
• Weather avoidance radar;	Nil	WF
• Radio altimeter;	Nil	WI
• ARINC communication and reporting.	Nil	Nil
13.5 Electrical power (ATA24)		
Batteries installation and operation;	BC	EB
DC power generation;	BC	EB
AC power generation;	Nil	EB
Emergency power generation;	Nil	Nil
Voltage regulation;	BC	EB
Power distribution;	BC	ED
Inverters, transformers, rectifiers;	Nil	ED
Circuit protection;	BC	ED
External and ground power.	Nil	Nil
13.6 Equipment and furnishings (ATA25)		
Electronic emergency equipment requirements;	Nil	Nil
Cabin entertainment equipment.	Nil	Nil

CASA module Examinations subjects	CASA mech basics exams equivalent	CASA avionic basics exams equivalent
13.7 Flight controls (ATA27)		
(a)		
Primary controls: aileron, elevator, rudder, spoiler;	BB	QB
Trim control;	BB	QB
Active load control;	BB	QB
High lift devices;	BB	QB
Lift dump, speed brakes;	BB	QB
System operation: manual, hydraulic, pneumatic;	BB	Nil
Artificial feel, Yaw damper, Mach trim, rudder limiter, gust locks;	BB	QB
Stall protection systems;	BB	QB
(b)		
System operation: electrical, fly-by-wire.	Nil	IF
13.8 Instrument systems (ATA31)		
Classification;		
Atmosphere;	Nil	IA
Terminology;	Nil	IA
Pressure measuring devices and systems;	Nil	IA
Pitot static systems;	BC	IA
Altimeters;	BC	IA
Vertical speed indicators;	BC	IA
Airspeed indicators;	BC	IA
Machmeters;	Nil	IA
Altitude reporting and alerting systems;	Nil	IA
Air data computers;	Nil	IA
Instrument pneumatic systems;	Nil	IA
Direct reading pressure and temperature gauges;	Nil	IA

CASA module Examinations subjects	CASA mech basics exams equivalent	CASA avionic basics exams equivalent
Temperature indicating systems;	Nil	IA
Fuel quantity indicating systems;	FA	IA
Gyroscopic principles;	Nil	IZ
Artificial horizons;	BC	IZ
Slip indicators;	BC	IZ
Directional gyros;	Nil	IZ
Ground proximity warning systems;	Nil	IZ
Compass systems;	BC	IZ
Flight data recording systems;	Nil	IZ
Electronic flight instrument systems;	Nil	IZ
Instrument warning systems including master warning systems and centralised warning panels;	Nil	Nil
Stall warning systems and angle of attack indicating systems;	Nil	Nil
Vibration measurement and indication.	Nil	IA
13.9 Lights (ATA33)		
External: navigation, landing, taxiing, ice;	Nil	EB
Internal: cabin, cockpit, cargo;	Nil	EB
Emergency.	Nil	EB
13.10 On-board maintenance systems (ATA45)		
Central maintenance computers;	Nil	Nil
Data loading system;	Nil	Nil
Electronic library system;	Nil	Nil
Printing;	Nil	Nil
Structure monitoring (damage tolerance monitoring).	Nil	Nil
13.11 Air-conditioning and cabin pressurisation (ATA21)		
13.11.1 Air supply		

CASA module Examinations subjects	CASA mech basics exams equivalent	CASA avionic basics exams equivalent
Sources of air supply including engine bleed, APU and ground cart.	FM	ED
13.11.2 Air-conditioning		
Air-conditioning systems;	FM	ED & EB
Air cycle and vapour cycle machines;	FM	ED & EB
Distribution systems;	FM	ED & EB
Flow, temperature and humidity control system.	FM	ED & EB
13.11.3 Pressurisation		
Pressurisation systems;	IM	IM
Control and indication including control and safety valves;	IM	IM
Cabin pressure controllers.	IM	IM
13.11.4 Safety and warning devices		
Protection and warning devices.	IM	IM
13.12 Fire protection (ATA26)		
(a)		
Fire and smoke detection and warning systems;	BC	ED
Fire extinguishing systems;	BC	ED
System tests;	BC	ED
(b)		
Portable fire extinguisher.	BC	ED
13.13 Fuel systems (ATA28)		
System layout;	FA	Nil
Fuel tanks;	FA	Nil
Supply systems;	FA	Nil
Dumping, venting and draining;	FA	Nil
Cross-feed and transfer;	FA	Nil
Indications and warnings;	FA	IA

CASA module Examinations subjects	CASA mech basics exams equivalent	CASA avionic basics exams equivalent
Refuelling and defuelling;	FA	Nil
Longitudinal balance fuel systems.	FA	Nil
13.14 Hydraulic power (ATA29)		
System layout;	FF	Nil
Hydraulic fluids;	FF	Nil
Hydraulic reservoirs and accumulators;	FF	Nil
Pressure generation: electrical, mechanical, pneumatic;	FF	Nil
Emergency pressure generation;	FF	Nil
Filters;	FF	Nil
Pressure control;	FF	Nil
Power distribution;	FF	Nil
Indication and warning systems;	FF	IA
Interface with other systems.	FF	Nil
13.15 Ice and rain protection (ATA30)		
Ice formation, classification and detection;	FG	ED
Anti-icing systems: electrical, hot air and chemical;	FG	ED
De-icing systems: electrical, hot air, pneumatic and chemical;	FG	ED
Rain repellent;	FG	Nil
Probe and drain heating;	FG	ED
Wiper systems.	FG	Nil
13.16 Landing gear (ATA32)		
Construction, shock absorbing;	FA	Nil
Extension and retraction systems: normal and emergency;	FG	Nil
Indications and warnings;	FG	EB
Wheels, brakes, antiskid and autobraking;	FA	ED
Tyres;	FA	Nil

CASA module Examinations subjects	CASA mech basics exams equivalent	CASA avionic basics exams equivalent
Steering;	FA	Nil
Air-ground sensing.	FG	Nil
13.17 Oxygen (ATA35)		
System layout: cockpit, cabin;	FG	IZ
Sources, storage, charging and distribution;	FG	IZ
Supply regulation;	FG	IZ
Indications and warnings.	FG	IZ
13.18 Pneumatic/vacuum (ATA36)		
System layout;	BC	IA
Sources: engine/APU, compressors, reservoirs, ground supply;	BC	IA
Pressure control;	IM	IA
Distribution;	FM	Nil
Indications and warnings;	IM	IM
Interfaces with other systems.	IM	Nil
13.19 Water/waste (ATA38)		
Water system layout, supply, distribution, servicing and draining;	FG	Nil
Toilet system layout, flushing and servicing.	Nil	Nil
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;	Nil	Nil
Core system;	Nil	Nil
Network components.	Nil	Nil

CASA module Examinations subjects	CASA mech basics exams equivalent	CASA avionic basics exams equivalent
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). These include voice, data, music and video transmissions.	Nil	Nil
The cabin intercommunication data system provides an interface between cockpit/cabin crew and cabin systems. These systems support data exchange of the different related LRUs and they are typically operated via flight attendant panels.	Nil	Nil
The cabin network service typically consists on a server, typically interfacing with, among others, the following systems: data/radio communication, in-flight entertainment system.	Nil	Nil
The cabin network service may host functions such as:	Nil	Nil
<ul style="list-style-type: none"> access to pre-departure/departure reports 	Nil	Nil
<ul style="list-style-type: none"> e-mail/intranet/internet access 	Nil	Nil
<ul style="list-style-type: none"> passenger database 	Nil	Nil
<ul style="list-style-type: none"> cabin core system 	Nil	Nil
<ul style="list-style-type: none"> in-flight entertainment system 	Nil	Nil
<ul style="list-style-type: none"> external communication system 	Nil	Nil
<ul style="list-style-type: none"> cabin monitoring system 	Nil	Nil
<ul style="list-style-type: none"> cabin mass memory system 	Nil	Nil
<ul style="list-style-type: none"> miscellaneous cabin system. 	Nil	Nil
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. These include units that are dedicated to the information storage and retrieval function such as the electronic library mass storage and controller. These do not include units or components installed for other uses and shared with other systems, such as flight deck printer or general use display.	Nil	Nil

CASA module Examinations subjects	CASA mech basics exams equivalent	CASA avionic basics exams equivalent
Typical examples include: 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.	Nil	Nil

Module 14 Propulsion - avionic systems (B2)

CASA module Examinations subjects	CASA mech basics exams equivalent	CASA avionic basics exams equivalent
14.1 Turbine engines		
(a)		
Constructional arrangement and operation of turbojet, turbofan, turbo shaft and turbopropeller engines;	GG	Nil
(b)		
Electronic engine control and fuel metering systems (FADEC).	GH	Nil
14.2 Engine indicating systems		
Exhaust gas temperature and interstage turbine temperature systems;	GH	IA
Engine speed;	GH	IA
Engine thrust indication: engine pressure ratio, engine turbine discharge pressure or jet pipe pressure systems;	GH	IA
Oil pressure and temperature;	GH	IA
Fuel pressure, temperature and flow;	GH	IA
Manifold pressure;	BC	IA
Engine torque;	GH	IA
Propeller speed.	Nil	IA
14.3 Starting and ignition systems		
Operation of engine start systems and components;	GH	EB
Ignition systems and components;	GH	EB
Maintenance safety requirements.	GH	EB

Module 15 Gas turbine engines (B1.1 & B1.3)

CASA module Examinations subjects	CASA mech basics exams equivalent	CASA avionic basics exams equivalent
15.1 Fundamentals		
Potential energy, kinetic energy, Newton’s laws of motion, Brayton cycle;	GG	Nil
The relationship between force, work, power, energy, velocity, acceleration;	GG	Nil
Constructional arrangement and operation of turbojet, turbofan, turbo shaft, turboprop.	GG	Nil
15.2 Engine performance		
Gross thrust, net thrust, choked nozzle thrust, thrust distribution, resultant thrust, thrust horsepower, equivalent shaft horsepower, specific fuel consumption;	GG	Nil
Engine efficiencies;	GG	Nil
By-pass ratio and engine pressure ratio;	GG	Nil
Pressure, temperature and velocity of the gas flow;	GG	Nil
Engine ratings, static thrust, influence of speed, altitude and hot climate, flat rating, limitations.	GG	Nil
15.3 Inlet		
Compressor inlet ducts;	GG	Nil
Effects of various inlet configurations;	GG	Nil
Ice protection.	GG	Nil
15.4 Compressors		
centrifugal types;	GG	Nil
Axial and	GG	Nil
Constructional features and operating principles and applications;	GG	Nil
Fan balancing;	GH	Nil
Operation;	GG	Nil

CASA module Examinations subjects	CASA mech basics exams equivalent	CASA avionic basics exams equivalent
Causes and effects of compressor stall and surge;	GG	Nil
Methods of airflow control: bleed valves, variable inlet guide vanes, variable stator vanes, rotating stator blades;	GG	Nil
Compressor ratio.	GG	Nil
15.5 Combustion section		
Constructional features and principles of operation.	GG	Nil
15.6 Turbine section		
Operation and characteristics of different turbine blade types;	GG	Nil
Blade to disk attachment;	GG	Nil
Nozzle guide vanes;	GG	Nil
Causes and effects of turbine blade stress and creep.	GG	Nil
15.7 Exhaust		
Constructional features and principles of operation;	GG	Nil
Convergent, divergent and variable area nozzles;	GG	Nil
Engine noise reduction;	GG	Nil
Thrust reversers.	GG	Nil
15.8 Bearings and seals		
Constructional features and principles of operation.	GG	Nil
15.9 Lubricants and fuels		
Properties and specifications;	GG	Nil
Fuel additives;	GG	Nil
Safety precautions.	GG	Nil
15.10 Lubrication systems		
System operation and layout and components.	GH	Nil
15.11 Fuel systems		
Operation of engine control and fuel metering systems including	GH	Nil

CASA module Examinations subjects	CASA mech basics exams equivalent	CASA avionic basics exams equivalent
: electronic engine control (FADEC), systems layout and components.	GH	Nil
15.12 Air systems		
Operation of engine air distribution and anti-ice control systems, including internal cooling, sealing and external air services.	GH	Nil
15.13 Starting and ignition systems		
Operation of engine start systems and components;	GH	EB
Ignition systems and components;	GH	EB
Maintenance safety requirements.	GH	EB
15.14 Engine indication systems		
Exhaust gas temperature and interstage turbine temperature;	GH	IA
Engine thrust indication: engine pressure ratio, engine turbine discharge pressure or jet pipe pressure systems;	GH	IA
Oil pressure and temperature;	GH	IA
Fuel pressure and flow;	GH	IA
Engine speed;	GH	IA
Vibration measurement and indication;	GH	IA
Torque;	GH	IA
Power.	GH	IA
15.15 Power augmentation systems		
Operation and applications;	GH	Nil
Water injection, water methanol;	GH	Nil
Afterburner systems.	GH	Nil
15.16 Turbo-prop engines		
Gas coupled and free turbine and gear coupled turbines;	GG	Nil
Reduction gears;	GH	Nil
Integrated engine and propeller controls;	GH	Nil

CASA module Examinations subjects	CASA mech basics exams equivalent	CASA avionic basics exams equivalent
Over speed safety devices.	GH	Nil
15.17 Turbo-shaft engines		
Arrangements drive systems, reduction gearing, couplings, control systems.	GH	Nil
15.18 Auxiliary power units (APUs)		
Purpose, operation, protective systems.	GH	Nil
15.19 Powerplant installation		
Configuration of fire walls, cowlings, acoustic panels engine mounts, anti-vibration mounts, hoses, pipes, feeders, connectors, wiring looms, control cables and rods, lifting points and drains.	GH	Nil
15.20 Fire protection systems		
Operation of detection and extinguishing systems.	BC	EB
15.21 Engine monitoring and ground operation		
Procedures for starting and ground run-up;	GH	Nil
Interpretation of engine power output and parameters;	GH	Nil
Trend (including oil analysis, vibration and baroscope) monitoring;	GH	Nil
Inspection of engine and components to criteria, tolerances and data specified by engine manufacturer;	GH	Nil
Compressor washing and cleaning;	GH	Nil
Foreign object damage.	GH	Nil
15.22 Engine storage and preservation		
Preservation and depreservation for the engine and accessories and systems.	GH	Nil

Module 16 Piston engines (B1.2 & B1.4)

CASA module Examinations subjects	CASA mech basics exams equivalent	CASA avionic basics exams equivalent
16.1 Fundamentals		
Mechanical, thermal and volumetric efficiencies;	GA	Nil
Operating principles: 2 stroke, 4 stroke, otto and diesel;	GA	Nil
Piston displacement and compression ratio;	GA	Nil
Engine configuration and firing order.	GA	Nil
16.2 Engine performance		
Power calculation and measurement;	GA	Nil
Factors affecting engine power;	GA	Nil
Mixtures and leaning, pre-ignition.	GA	Nil
16.3 Engine construction		
Crankcase, crankshaft, camshafts, sumps;	GA	Nil
Accessory gearbox;	GA	Nil
Cylinder and piston assemblies;	GA	Nil
Connecting rods, inlet and exhaust manifolds;	GA	Nil
Valve mechanisms;	GA	Nil
Propeller reduction gearboxes.	GA	Nil
16.4 Engine fuel systems		
16.4.1 Carburettors		
Types, construction and principles of operation;	GB	Nil
Icing and heating.	GB	Nil
16.4.2 Fuel injection systems		
Types, construction and principles of operation.	GB	Nil
16.4.3 Electronic engine control		

CASA module Examinations subjects	CASA mech basics exams equivalent	CASA avionic basics exams equivalent
Operation of engine control and fuel metering systems including: electronic engine control (FADEC), systems layout and components.	Nil	Nil
16.5 Starting and ignition systems		
Starting systems, pre-heat systems;	GB	EB
Magneto types, construction and principles of operation;	GB	EB
Ignition harnesses, sparkplugs;	GB	EB
Low and high-tension systems.	GB	EB
16.6 Induction, exhaust and cooling systems		
Construction and operation of induction systems, including alternate air systems;	GB	Nil
Exhaust systems, engine cooling systems — air and liquid.	GB	Nil
16.7 Supercharging and turbo charging		
Principles and purpose of supercharging and its effects on engine parameters;	GF	Nil
Construction and operation of supercharging and turbo charging systems;	GF	Nil
System terminology;	GF	Nil
Control systems;	GF	Nil
System protection.	GF	Nil
16.8 Lubricants and fuels		
Properties and specifications;	GA	Nil
Fuel additives;	GA	Nil
Safety precautions.	GA	Nil
16.9 Lubrication systems		
System operation and layout and components.	GA	Nil
16.10 Engine indication systems		
Engine speed;	Nil	IA
Cylinder head temperature;	Nil	IA

CASA module Examinations subjects	CASA mech basics exams equivalent	CASA avionic basics exams equivalent
Coolant temperature;	Nil	IA
Oil pressure and temperature;	Nil	IA
Exhaust gas temperature;	Nil	IA
Fuel pressure and flow;	Nil	IA
Manifold pressure.	Nil	IA
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.	GD or GE	Nil
16.12 Engine monitoring and ground operation		
Procedures for starting and ground run-up;	GD or GE	Nil
Interpretation of engine power output and parameters;	GD or GE	Nil
Inspection of engine and components: criteria, tolerances and data specified by engine manufacturer.	GD or GE	Nil
16.13 Engine storage and preservation		
Preservation and depreservation for the engine and accessories and systems.	GD or GE	Nil

Module 17 Propeller (B1.1 & B1.2)

CASA module Examinations subjects	CASA mech basics exams equivalent	CASA avionic basics exams equivalent
17.1 Fundamentals		
Blade element theory;	GC	Nil
High and low blade angle, reverse angle, angle of attack, rotational speed;	GC	Nil
Propeller slip;	GC	Nil
Aerodynamic, centrifugal, and thrust forces;	GC	Nil
Torque;	GC	Nil
Relative airflow on blade angle of attack;	GC	Nil
Vibration and resonance.	GC	Nil
17.2 Propeller construction		
Construction methods and materials used in wooden, composite and metal propellers;	GC	Nil
Blade station, blade face, blade shank, blade back and hub assembly;	GC	Nil
Fixed pitch, controllable pitch, constant speed propeller;	GC	Nil
Propeller and spinner installation.	GC	Nil
17.3 Propeller pitch control		
Speed control and pitch change methods, mechanical and electrical and electronic;	GC	Nil
Feathering and reverse pitch;	GC	Nil
Overspeed protection.	GC	Nil
17.4 Propeller synchronising		
Synchronising and synchrophasing equipment.	GC	ED
17.5 Propeller ice protection		
Fluid and electrical de-icing equipment.	GC	ED
17.6 Propeller maintenance		
Static and dynamic balancing;	GC	Nil

CASA module Examinations subjects	CASA mech basics exams equivalent	CASA avionic basics exams equivalent
Blade tracking;	GC	Nil
Assessment of blade damage, erosion, corrosion, impact damage, delamination;	GC	Nil
Propeller treatment and repair schemes;	GC	Nil
Propeller engine running.	GC	Nil
17.7 Propeller storage and preservation		
Propeller preservation and depreservation.	GC	Nil