

Annex A to AMC/GM Part 147 - Module 13 Aircraft structures and systems

CASA module Examinations subjects	CASA mech basics exams equavelant	CASA avionic basics exams equavelant
Module 13 Aircraft structures and systems (B2)		
13.1 Theory of flight		
(a) 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
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
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:		
· Very high frequency (VHF) communication;	Nil	WZ
· High frequency (HF) communication;	Nil	WZ
· Audio;	Nil	WB
· Emergency locator transmitters;	Nil	WZ
· Cockpit voice recorder;	Nil	WB
· Very high frequency omnidirectional range (VOR);	Nil	WD
· Automatic direction finding (ADF);	Nil	WC
· Instrument landing system (ILS);	Nil	WE
· Microwave landing system (MLS);	Nil	Nil
· 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
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
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		
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
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
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
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
· access to pre-departure/departure reports	Nil	Nil
· e-mail/intranet/internet access	Nil	Nil
· passenger database	Nil	Nil
· cabin core system	Nil	Nil
· in-flight entertainment system	Nil	Nil
· external communication system	Nil	Nil
· cabin monitoring system	Nil	Nil
· cabin mass memory system	Nil	Nil
· 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
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