

**Annex A to AMC/GM Part 147 - Module 15 Gas turbine engine**

<b>CASA module Examinations subjects</b>	<b>CASA mech basics exams equavelant</b>	<b>CASA avionic basics exams equavelant</b>
<b>Module 15 Gas turbine engine (B1.1 &amp; B1.3)</b>		
<b>15.1 Fundamentals</b>		
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
<b>15.2 Engine performance</b>		
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
<b>15.3 Inlet</b>		
Compressor inlet ducts;	GG	Nil
Effects of various inlet configurations;	GG	Nil
Ice protection.	GG	Nil
<b>15.4 Compressors</b>		
centrifugal types;	GG	Nil
Axial and	GG	Nil
Constructional features and operating principles and applications;	GG	Nil
Fan balancing;	GH	Nil
Operation;	GG	Nil
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
<b>15.5 Combustion section</b>		
Constructional features and principles of operation.	GG	Nil
<b>15.6 Turbine section</b>		
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
<b>15.7 Exhaust</b>		
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

<b>15.8 Bearings and seals</b>		
Constructional features and principles of operation.	GG	Nil
<b>15.9 Lubricants and fuels</b>		
Properties and specifications;	GG	Nil
Fuel additives;	GG	Nil
Safety precautions.	GG	Nil
<b>15.10 Lubrication systems</b>		
System operation and layout and components.	GH	Nil
<b>15.11 Fuel systems</b>		
Operation of engine control and fuel metering systems including	GH	Nil
: electronic engine control (FADEC), systems layout and components.	GH	Nil
<b>15.12 Air systems</b>		
Operation of engine air distribution and anti-ice control systems, including internal cooling, sealing and external air services.	GH	Nil
<b>15.13 Starting and ignition systems</b>		
Operation of engine start systems and components;	GH	EB
Ignition systems and components;	GH	EB
Maintenance safety requirements.	GH	EB
<b>15.14 Engine indication systems</b>		
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
<b>15.15 Power augmentation systems</b>		
Operation and applications;	GH	Nil
Water injection, water methanol;	GH	Nil
Afterburner systems.	GH	Nil
<b>15.16 Turbo-prop engines</b>		
Gas coupled and free turbine and gear coupled turbines;	GG	Nil
Reduction gears;	GH	Nil
Integrated engine and propeller controls;	GH	Nil
Over speed safety devices.	GH	Nil
<b>15.17 Turbo-shaft engines</b>		
Arrangements drive systems, reduction gearing, couplings, control systems.	GH	Nil
<b>15.18 Auxiliary power units (APUs)</b>		
Purpose, operation, protective systems.	GH	Nil
<b>15.19 Powerplant installation</b>		

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
<b>15.20 Fire protection systems</b>		
Operation of detection and extinguishing systems.	BC	EB
<b>15.21 Engine monitoring and ground operation</b>		
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
<b>15.22 Engine storage and preservation</b>		
Preservation and de preservation for the engine and accessories and systems.	GH	Nil