

Module 16

Piston Engines

	Level			
	A	B1	B2	B3
16.1 Fundamentals	1	2	-	2
Mechanical, thermal and volumetric efficiencies;				
Operating principles — 2 stroke, 4 stroke, Otto and Diesel;				
Piston displacement and compression ratio;				
Engine configuration and firing order.				
16.2 Engine Performance	1	2	-	2
Power calculation and measurement;				
Factors affecting engine power;				
Mixtures/leaning, pre-ignition.				
16.3 Engine Construction	1	2	-	2
Crank case, crank shaft, cam shafts, sumps;				
Accessory gearbox;				
Cylinder and piston assemblies;				
Connecting rods, inlet and exhaust manifolds;				
Valve mechanisms				
Propeller reduction gearboxes.				
16.4 Engine Fuel Systems				
16.4.1 Carburettors	1	2	-	2
Types, construction and principles of operation;				
Icing and heating.				
16.4.2 Fuel injection systems	1	2	-	2
Types, construction and principles of operation.				
16.4.3 Electronic engine control	1	2	-	2
Operation of engine control and fuel metering systems including electronic engine control (FADEC);				
Systems lay-out and components.				

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16.5 Starting and Ignition Systems Starting systems, pre-heat systems; Magneto types, construction and principles of operation; Ignition harnesses, spark plugs; Low and high tension systems.	1	2	-	2
16.6 Induction, Exhaust and Cooling Systems Construction and operation of: induction systems including alternate air systems; Exhaust systems, engine cooling systems — air and liquid.	1	2	-	2
16.7 Supercharging/Turbocharging Principles and purpose of supercharging and its effects on engine parameters; Construction and operation of supercharging/turbocharging systems; System terminology; Control systems; System protection.	1	2	-	2
16.8 Lubricants and Fuels Properties and specifications; Fuel additives Safety precautions.	1	2	-	2
16.9 Lubrication Systems System operation/lay-out and components.	1	2	-	2
16.10 Engine Indication Systems Engine speed; Cylinder head temperature; Coolant temperature; Oil pressure and temperature; Exhaust Gas Temperature; Fuel pressure and flow; Manifold pressure.	1	2	-	2

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16.11 Powerplant Installation	1	2	-	2
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.				
16.12 Engine Monitoring and Ground Operation	1	3	-	2
Procedures for starting and ground run-up; Interpretation of engine power output and parameters; Inspection of engine and components: criteria, tolerances, and data specified by engine manufacturer.				
16.13 Engine Storage and Preservation	-	2	-	1
Preservation and depreservation for the engine and accessories/systems.				