

## Module 16. Piston Engine

	Level		
	A	B1	B3
<b>16.1 Fundamentals</b> Mechanical, thermal and volumetric efficiencies; Operating principles — 2 stroke, 4 stroke, Otto and Diesel; Piston displacement and compression ratio; Engine configuration and firing order.	1	2	2
<b>16.2 Engine Performance</b> Power calculation and measurement; Factors affecting engine power; Mixtures/leaning, pre-ignition.	1	2	2
<b>16.3 Engine Construction</b> Crank case, crank shaft, cam shafts, sumps; Accessory gearbox; Cylinder and piston assemblies; Connecting rods, inlet and exhaust manifolds; Valve mechanisms; Propeller reduction gearboxes.	1	2	2
<b>16.4 Engine Fuel Systems</b>			
<b>16.4.1 Carburettors</b> Types, construction and principles of operation; Icing and heating.	1	2	2
<b>16.4.2 Fuel injection systems</b> Types, construction and principles of operation.	1	2	2
<b>16.4.3 Electronic engine control</b> Operation of engine control and fuel metering systems including electronic engine control (FADEC); Systems lay-out and components.	1	2	2
<b>16.5 Starting and Ignition Systems</b> Starting systems, pre-heat systems; Magneto types, construction and principles of operation; Ignition harnesses, spark plugs; Low and high tension systems.	1	2	2
<b>16.6 Induction, Exhaust and Cooling Systems</b>	1	2	2

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Construction and operation of: induction systems including alternate air systems; Exhaust systems, engine cooling systems — air and liquid.			
<b>16.7 Supercharging/Turbocharging</b> 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
<b>16.8 Lubricants and Fuels</b> Properties and specifications; Fuel additives; Safety precautions.	1	2	2
<b>16.9 Lubrication Systems</b> System operation/lay-out and components.	1	2	2
<b>16.10 Engine Indication Systems</b> Engine speed; Cylinder head temperature; Coolant temperature; Oil pressure and temperature; Exhaust Gas Temperature; Fuel pressure and flow; Manifold pressure.	1	2	2
<b>16.11 Powerplant Installation</b> 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.	1	2	2
<b>16.12 Engine Monitoring and Ground Operation</b> 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.	1	3	2
<b>16.13 Engine Storage and Preservation</b> Preservation and de preservation for the engine and accessories/systems.	-	2	1