

32143 - AUTOMOBILE ENGINES

DETAILED SYLLABUS

I ENGINE PRINCIPLES & FUNDAMENTALS

Introduction to IC engines, Basic engine terminologies, Classification of IC engines, Engines Cycles (Otto & Diesel cycles), Petrol engines construction & working of two stroke and four stroke petrol engines, construction and working of two stroke and four stroke diesel engines, Scavenging in two stroke cycle engines- crankcase scavenged engines and separately scavenged engines, Two stroke Vs Four stroke engines, Petrol Vs Diesel engines, Firing order -4,6 & 8 cylinders, Number and Arrangement of engine cylinders, Valve timing diagram for four stroke petrol engines and four stroke diesel engines, Port timing diagram for two stroke petrol and two stroke diesel engines, Automotive gas turbine & Wankel engine.

II CONSTRUCTIONAL DETAILS OF ENGINE COMPONENTS

Cylinder block & Crankcase, cylinder head, oil pan, manifolds, gaskets & its types cylinder liners- dry liner & wet liner, comparison of dry and wet liners, Functions of piston, piston materials, piston clearance, expansion controlling methods in piston, piston rings- types & functions, piston pin, connecting rod. Crankshafts-function, materials & construction, vibration dampers, engines bearings-requirements, bearing materials & main bearings, flywheel. Engine valves – types, arrangement of valves in engine, valve materials, valve cooling - sodium cooled valve, valve seats, valve guides, valve springs, valve actuating mechanisms, valve clearance, valve train component- camshaft, camshaft drive, valve tappet, push rod, rocker arm & rocker shaft, hydraulic valve lifter, variable valve timing technologies ,mufflers – types of mufflers used in automobiles.

III PETROL ENGINE FUEL SYSTEM

Petrol fuel- properties of petrol fuel, octane number, detonation, combustion stages in petrol engines, combustion chambers for petrol engines, Petrol fuel feed system- layout, construction and working of mechanical & electrical fuel pumps, air cleaners, fuel filters, fuel gauge, carburetion – principles – simple carburetor, carburettor circuits, Solex carburetors, SU Carburetor, Zenith Carburetor, petrol fuel injection – DTSI, CCVTI, PGMFI, MPFI systems.

IV DIESEL ENGINE FUEL SYSTEM

Diesel fuels – properties of diesel fuels, cetane number, diesel knock, and methods of controlling diesel knock, alternate fuels for automobile engines, combustion in diesel

For Syllabus, Notes, Question Papers, Question Banks & Many More

engines, combustion chambers for diesel engines. Diesel fuel feed system- layout, components of diesel fuel feed systems, single acting fuel feed pump, double acting fuel feed pump, fuel injection pumps- jerk type and distributor type, diesel fuel filters, fuel heater and fuel-water separator - CRDI systems, fuel injectors- types, single and multi hole, pintle, pintaux nozzles – working of Glow plug - Governors – mechanical, pneumatic governors and electronic controlled governors- Superchargers and Turbochargers.

V ENGINE COOLING AND LUBRICATION SYSTEM

Cooling system: Air cooling system- role of fins in air cooling system, water cooling system, comparison of air and water cooling systems, thermo-syphon and pump circulation in water cooling system, components of cooling system- thermostat (wax and bellow type) – water pump, radiator - cellular and tubular types, variable speed fan - types of engine coolants, anti freeze solutions.

Lubrication System: Splash lubricating system, Pressure system , Dry sump lubrication system, pre lubrication system, Full flow and by pass systems, Characteristics of lubricating oils, classification & Identification of SAE oils, Filtering Systems — Oil Strainer – Oil pumps – Gear and Rotor type – Crescent type - Construction and operation -Pressure Relief Valve – Construction. Draft tube – Positive Crankcase Ventilation Systems – Construction. Vapour recovery cooling system Oil Cooler.

Text Book

- 1 Internal Combustion Engines, “Ganesan.V”, Tata-McGraw Hill Publishing Co., New Delhi 1994.
- 2 Internal Combustion Engines Theory and Practice, “Dr.K.K.Ramalingam”, Scitech Publications(India) Pvt.Ltd, Chennai-17, 2001.
- 3 Engine Emission, “Springer and Patterson”, Plenum Press, 1990.