

SUBJECT TITLE : AUTOMOBILE POWER PLANT
(for AU)

SUBJECT CODE :

PERIODS/WEEK : 5

PERIODS/SEMESTER : 90

CREDITS : 5

TIME SCHEDULE

Module	Topic	Periods
I	Construction Details of Automobile Engines	20
	Test I	2
II	Fuel System in Petrol Engines	20
	Test II	2
III	Fuel System in Diesel Engines	20
	Test III	2
IV	Lubrication and Cooling Systems	22
	Test IV	2
Total		90

OBJECTIVES

1.1.0 Understand constructional details of I.C. Engines

1.1.1 Explain the details of components of I.C. Engines – cylinder block, cylinder head, piston rings, gudgeon pin, connecting rod, crank shaft, main bearings, flywheel, valves, valve operating mechanisms and cam shaft

2.1.0 Comprehend the working of Petrol and Diesel fuel systems

2.1.1 Describe petrol fuel system – different fuel feed system, petrol fuel filters and air cleaners

2.1.2 Describe the working of carburetors- classifications

2.1.3 Describe the working of Solex, Su, and Solex - Mikuni carburetors

2.1.4 Explain exhaust system

3.1.0 Explain diesel fuel system with various components

3.1.1 Describe fuel injection systems, common rail, unit injection and individual pump system.

3.1.2 Explain the types of combustion chamber in diesel engines

3.1.3 Describe, fuel injection pump for single and multi cylinder engines, distributor type pump, rotary type pump, feed pump and hand primer

3.1.4 Describe diesel fuel filters.

3.1.5 Describe governors – purpose and types

3.1.6 Describe fuel injectors and its types

4.1.0 Comprehend the working of lubricating and cooling system

- 4.1.1 Specify properties of lubricating oil
- 4.1.2 Explain the different types of grading of oil
- 4.1.3 Explain the working of engine lubrication
- 4.1.4 Describe types of engine lubrication
- 4.1.5 Describe lubricating oil pumps – gear type, vane type, plunger type and lobe type
- 4.1.6 Describe oil cooler, oil filter, pressure relief valve crank case ventilation, dilution and oil seals
- 4.1.7 Explain cooling system
- 4.1.8 Describe air and water cooling
- 4.1.9 Explain thermo siphon system, pump circulation system, use of thermo stat, types of thermo stat
- 4.1.10 Describe type of radiators, functions of radiator cap
- 4.1.11 Explain types of coolants – antifreeze agents in coolant
- 4.1.12 Explain different types of cooling fans

CONTENT DETAILS

UNIT – I:-

CONSTRUCTIONAL DETAILS OF I.C. ENGINES

Cylinder block - Single cylinder and multicylinder, materials, Water jackets – cooling fins, cylinder liners – wet type and dry type – materials. Cylinder head - Materials, method of fixing the cylinder block, cylinder head gasket, combustion chamber of petrol engines – expansion chambers Pistons - Trunk type pistons, composite pistons - piston materials expansion control in pistons – methods and types of piston

Piston rings - Materials, method of manufacture, types of rings – compression ring, oil ring and special purpose ring Gudgeon pin - Types of fastening, material used Connecting rod - Function, materials used big end and small end bearings Crank shaft - different shapes, different crank shaft arrangements Main bearings, Fly wheel functions

Types of valves - Poppet, reed valve and disc valve, sodium vapour cooled valves, hydraulic tappet and free valve rotators Classification of engine according to valve arrangement I-Head, L-Head, T-Head and F- Head engines Valve operating mechanisms – side cam shaft and over head cam shaft Inlet and exhaust valve materials, valve timing diagram Cam shaft – functions and drives, cam shaft bearings

UNIT – II:-

PETROL FUEL SYSTEM

Different fuel feed systems, A.C. mechanical pump, S U Electrical pump ,petrol filters and air Cleaners, Carburetors, Simple carburetors – parts, principle of working, compensation, mixture strength requirement, modern carburetors, float system, idle and slow speed system, high speed system, Acceleration pump and choke system. Other commercial carburetors, Su, Solex and Solex – Mikoni carburetor. Exhaust system: - Manifolds, silencer types, tail pipes etc.

UNIT – III:-

DIESEL FUEL SYSTEM

Various components in Diesel fuel system – types of fuel injection – air injection and mechanical injection, common rail and unit injection system. Types of combustion chamber in Diesel engines – open, turbulent and pre-combustion chamber, etc

Fuel injection – single cylinder and multicylinder. Distributor type pump, rotary type pumps Fuel feed pump and hand priming, diesel fuel filters. Governors – purpose, types – mechanical, pneumatic and hydraulic governors, Fuel injectors – single hole, multi hole, pintle and pintox type

UNIT – IV:-

LUBRICATION AND COOLING SYSTEM

Lubrication system: - Properties of lubricating oil, different ratings of lubricating oil, types of engine lubrication- wet and dry sump lubrication, splash and pressure feed systems. Oil pumps – gear type, Vane type, plunger type and lobe type, pressure relief valve, oil pressure indicator Oil coolers, oil filters, oil seals, Crank case ventilation – dilution Cooling system: - Air and water cooling, thermo-syphon and pump circulation system over cooling, under cooling and optimum cooling – thermostat Radiators – types, pressure cap, types of coolants, pump, antifreeze solution , cooling fan – types.

REFERENCE BOOKS:-

1. Automobile Engg., Vol. I – Kirpal Singh
2. Automobile Engg., - R.B. Guptha
3. Automobile Engg., Vol. I& II – K.M.Guptha
4. Automobile Engg., Vol. I – Anil Chikara
5. Automotive mechanics – William.H.Crouse
6. Automobile Engg., Theory and Practice – K.K.Ramalingam
7. Automobile Technology – Dr.N.K. Giri
8. I.C. Engines – Mathur and Sharma
- 10 Automotive Mechanics -- S.Sreenivasan