2.12 30291 AUTO ENGINE COMPONENTS

UNIT-1 CLASSIFICATION OF AUTO ENGINES:

Classification of Auto Engines, Cycle, Strokes, Fuels, Ignition, Cooling, Speed, Number and arrangement of cylinders, Governing, Types of placement of valves etc.

UNIT-2. ENGINE COMPONENTS:

Constructional details, specifications, qualities, functions, types, materials, working, defects and its rectifications of these parts., Cylinder, Cylinder and cylinder block, Dry and wet cylinder liners, Cylinder head, crank cases and oils pan or sump, Piston, Cast iron piston, Steel piston, Aluminium alloy piston, Slipper piston, Oval section piston, -slot piston, Invar strut piston, Coating for aluminium piston, Piston slap, Major and minor thrust surfaces., Piston Rings :, Compound rings, Oil scrapper ring, Compression ring, Chromium plated ring, Ring gap and Ring clearance, Piston Pin :, Floating piston pin, Fix pin, Offset piston pin, Connecting Rod, Crank Shaft :, Single cylinder crank shaft, Multi cylinder crank shaft, , Left hand crank shaft, Right hand crank shaft, Hardening of crank shafts, Balancing of crank shaft, Vibration damper, Flywheel :, Components, Ring gear, Cam Shaft :, Components of cam, Cam driving mechanism, Chain drive, Timing gear drive, Timing belt drive, Overhead cam shaft, Valve timing adjustment and fixing, Engine Valve:, Components and Dimensions, Poppet valves, Sodium cooled valves, Metal coated valves, Valve seating, Valve pocketing, Valve spring, Valve operating mechanisms, Valve tappet clearance and adjustment, Gasket :, Cylinder head gasket, Oil pan gasket, Manifold gasket, Pump gasket, Bearing:, Requirements of bearing, Main bearing, Big and bearing, Bearing failures and its causes

UNIT-3. I.C. ENGINE FUNDAMENTALS:

Bore, Stroke, Clearance volume, Swept volume, Compression ratio, Crank throw, Dead centres, Piston displacement, Piston speed, Concept of energy work heat and power, Working principal of 4 stroke and 2-stroke cycle and their comparison, Valve timing diagrams and firing order (power balancing), Simple Numerical problems

UNIT-4. TESTING AND PERFORMANCE OF I.C. ENGINES:

Basic Performance parameters, Measurements of -Speed, Air consumption, Fuel consumption, friction power, brake power, indicated power, Heat going to cooling water exhaust etc., Exhaust gas analysis, Smoke density measurement, Emission measurement (Indian emission norms), Euro I and Euro II, Performance Maps, Selection of engine - On basic of fuel used, two-stroke or four-stroke, air-cooled or water-cooled, super charging, number and arrangement of cylinders etc., Simple numerical problems

UNIT-5. GAS TURBINE:

Classification and application of gas turbines, Description of constant pressure (open cycle and closed cycle) and constant volume gas turbines, Comparison of gas turbine and reciprocating I.C. engine, Methods of increasing thermal efficiency of gas turbines, regeneration, inter cooling, re-heating, simple numerical problems

UNIT-6. AIR COMPRESSORS:

Classification of compressors, uses of compressed air, Description of single stage and multi stage reciprocating compressors, P.V. diagram of single and multi-stage reciprocating compressor with inter cooling, Power required (without clearance volume) for single stage and multi stage compressors, Description of rotary and centrifugal compressors, Numerical problems on reciprocating compressors.

Reference books:

1. High-Speed Combustion Engine P.M.Heldt
2. Automobile Engine Arthur W. Judge
3. Automobile Engg. Kirpalsingh
4. Automobile Engg. R.B. Gupta
5. Automobile Engg. C.P.Nakra
6. Vehicle &Engine Technology (Vol. I & II) Heinz Heisler
7. Auto Design R.B. Gupta
8. Auto Engine Design Crouse, Anglin
9. Automotive Mechanics Joseph Heitner