

Subjects : Mechanical (Automobile) Engineering

FLUID MECHANICS AND FLUID MACHINE: Properties of Fluids, working of pressure measuring devices, continuity equation and Bernoulli's Theorem, impact of frictional loss of head in flow through pipes, discharge through orifices, working principles of pumps and turbines, centrifugal pumps and reciprocating pumps, compare pneumatic system with hydraulic system, Pneumatic circuits for industrial application, properties of hydraulic system.

MACHINE AND MACHINE TOOLS: Cutting tool geometry and its material, concepts of chips, its types, forces & importance of each types, mechanical working processes of metals, various advanced welding methods & applications, basic press work practices, machines & applications, plastic processing methods, applications & limitations in manufacturing, concepts of powder metallurgy, methods, process & applications in manufacturing, cutting fluids & coolants & their types & uses.

THEORY OF MACHINES: Definitions, Kinematics of Machines, their Mechanisms & Inversions, friction involved in bearings, clutches & brakes, methods of transmission of power, types of cams and their motions and also to draw cam profiles for various motions, of vibration and to understand critical speed of shaft, balancing of masses in the same plane, different types of governors their uses.

THERMODYNAMICS: Fundamental concepts of thermodynamics to thermodynamic systems and various laws of thermodynamics, laws of perfect gases, various thermodynamic processes, fuels and importance of calorific value of fuel, air standard cycles and their practical significance, properties of steam and calculate properties of two phase system by using steam tables/ mollier charts, basic Vapour power cycles.

STRENGTH OF MATERIALS: Theoretical and physical meaning of Stress and strain, problems related with stress and strain, beam and the shear forces, simple bending and its related affect, stresses developed along different section of a beam, Torsion and its affect on shaft and helical spring, thin cylinders, Column and struts and its related problems.

MACHINE TOOLS: Operation performed in lathe machine, Rectilinear machine tools like Shaper, Planer & Slotter, their uses, mechanisms & applications, grinding, their techniques & super finishing processes, milling machines, their construction, operations, indexing methods & milling cutters, Non-conventional machining methods, applications & limitations in manufacturing, importance of jigs & fixtures, methods & applications in manufacturing, plastic processing methods, applications & limitations, powder metallurgy, methods, process & applications

IC ENGINES: Types of IC engine along with its working principle, parts of IC engine and its uses in the engine assembly, IC engine system viz. Cooling, lubricating, fuel feed (including MPFI), Ignition system etc., different problems and remedies of an IC engine.

AUTOMOBILE CHASSIS AND TRANSMISSION: Different types of chasis frames, components of chasis and its layout, construction and working of various systems employed in a vehicle such as suspension system, steering system, braking system and transmission system, causes and remedies of various problems associated with these systems, construction of axles and wheels used in automobiles, importance of chasis lubrication.

GARAGE PRACTICE AND MANAGEMENT: Identify and utilization of garage tools, equipments and prepare garage layout for setting up new garage and service station, Classification of garages, activities in a modern garage, service station and also know the importance of motor vehicle act along with traffic signs and signals, importance of store management, inventory control, and material handling equipments in an industry or a manufacturing plant, different types of maintenance schedules carried out in an automobile industry.

HEAT POWER ENGINEERING: Working, construction, mountings and accessories of Steam generators, principle and working of steam nozzles, principle and operations of different types of steam turbines, principle and operations of Steam condensers and Cooling towers, principle and working and application of Nuclear power plant, different laws of heat transfer.

MACHINE DRAWING AND CAD: True shape of solid sections, surface development of solid sections, Read and interpret machine elements and assembly drawing, drawing of machine elements and engine parts, draw 2D and 3D machine element using software(AUTOCAD).

ADVANCED AUTOMOBILE ENGINEERING: Different components and terms related to an IC engine performance, Otto, Diesel cycle, characteristics of fuel, types and fuel ratings used in IC engines, combustion, phenomena of detonation and knocking of an IC engine, working principle of Wankel engines, Stirling engine and gas turbine used in automobiles, comfort, safety features and emission control measures utilised in a modern automobile.

AUTO ELECTRICAL EQUIPMENT: Construction and working principles of storage battery, battery ratings, testing, charging and maintenance, construction and working principles of DC generators and alternators, circuit diagram of electrical wiring system of automobiles, construction and working principles starting motor and various starting drives with diagrams, components of charging system, generating system and starting system other electrical and electronic accessories, troubles, its causes and remedies, and related testing, functions, locations and working of different electrical and electronic accessories used in modern vehicles.

AUTOMOBILE HEAVY EQUIPMENT: Construction and operation of heavy equipments viz. tractors, dumpers, graders, compactors, dozers, loaders, excavators, cranes, scrapers, lift trucks, Dredgers, tanker Carriers; different components of a hydraulic system utilized in a hydraulically operated heavy vehicle (pumps, actuators, pistons valves, filters etc); importance of maintenance and safety measures for heavy vehicles.

DESIGN ESTIMATING AND COSTING: Design of shaft, springs; elements of estimation and costing; cost of sheet metals, fabrication welding; mensuration in calculation of surface area, volume and weight of mechanical parts; calculation of materials required and machining time; bill of materials for jobs/parts.

ENGINEERING MATERIALS: Properties of engineering materials; internal structure of material; concepts of ferrous and non-ferrous materials; advantages of plastic; testing method of materials, need of heat treatment process and it's benefits; corrosion protection methods, applications & limitations.

METROLOGY: Different measuring device for a particular application; concepts of limits, fits and tolerance, device and tools for angular measurements, comparators with their working principles and applications; devices used to measure screw treads, gears; devices used to measure textures and surface finish; different techniques and devices used to measure a groove, bores, ring and plug gauges.