



Non-conventional machining : Chemical Machining, Electrochemical Machining, Electro Discharge Machining (EDM), Laser Beam Machining, Electron Beam Machining, Water Jet Machining, Abrasive Jet Machining.

**Unit VI Production Management: - 24 Marks**

Plant location and layout, material handling- Factors affecting plant location; necessity of plant layout; process and product layout; work station design; procedural steps for making a plant layout; Demand forecasting, Production planning and control measures. Product inspection and quality control; raw materials management and inventory control.

Work study - Concept and objectives of work study; method study procedure: flow process chart, flow diagram; principles of product design for mass production and simple operations research (OR) models.

**Unit VII Mechanical Measurement: - 10 Marks**

Concept of fits and tolerances; tools and gauges; comparators; inspection of length; position, profile and surface finish. Linear measurement, angular measurement; measurement of screw threads and gears.

Machine tool metrology - Tests for level of installation of machine in horizontal and vertical planes.

**MECHANICAL ENGG. (Objective Type/MCQ) Paper-II (Full Marks : 150)**

**Unit I Fluid Mechanics: - 10 Marks**

Fluid and properties of fluid. Pressure and its measurement -Intensity of pressure; pressure head; Pascal's Law. Equilibrium of floating bodies- Archimedes' principle; buoyancy and principle of floatation. Flow of fluid and flow through pipes- Chezy's equation and Dancy's equation of head loss, Reynold's number and its effect on pipe friction; open channel flow and flow measurement.

**Unit II Fluid Machines: - 24 Marks**

Various types of pumps, reciprocating pump; centrifugal pump; axial flow pump and jet pump. Classification of water turbines- Impulse turbine (Pelton wheel); inward flow reaction turbine (Francis turbine) and axial flow reaction turbine (Kaplan turbine)

**Unit III Thermal Engineering: - 30 Marks**

Basic concept of First law and second law of Thermodynamics; concept of entropy and reversibility; availability and unavailability and irreversibility.

Steam generation- modified Rankine cycle analysis. Modern steam boilers properties of steam, Steam engine- Classification of steam engines; Function and use of steam turbines, Function of a steam condenser, elements of a condensing plant. Type and size of a steam power plant; essential equipment of a steam power plant; coal handling system; pulverized coal firing system.

Function and use of gas turbines- Principle of operation, closed cycle and open cycle, constant pressure and constant volume gas turbine.

**Unit IV I.C. Engines: - 24 Marks**

IC engines - Classification of IC engines; working principle of 2-stroke and 4-stroke cycles IC engines; SI engine and CI engine; Otto cycle; Diesel cycle; dual-combustion cycle.

Firing order of multi cylinder engine; Types of Fuels- additives; knocking, compression ratio, octave

rating; cetane rating; Governing of SI and CI engines. Super-charging and turbo-charging of IC engines.

**Unit V Automobile Engineering: - 16 Marks**

Automobile components, automobile engines-classification and components, petrol and diesel engine. Fuel system- Working principle of different types of modern carburetors. Different types of engine cooling systems. Principles of different types of lubrication system- petrol, splash, semi-pressure, pressure, wet-sump, dry sump. Power train- transmission, clutch and gear boxes and function of propeller shaft. Principle of braking system; functions of Suspension system and Steering system; types of commercial vehicle wheels.

**Unit VI Refrigeration and air-conditioning - 16 Marks**

Concepts of refrigeration and air-conditioning system. Thermal principles- heat transfer by conduction, convection and radiation, heat exchangers, vapour compression system and vapour absorption system.

Psychrometry - properties; processes; charts; sensible heating and cooling; humidification and dehumidification effective temperature; air-conditioning load calculation. Determination for comfort condition and simple load calculations. Concept of an air-conditioning and distribution system

**Unit VII Mechanical Estimation - 10 Marks**

Elements of cost, Components of cost, Indirect expenses. Forms of materials, procedural steps for calculating material cost of a product. Estimation in machine shop, forging, welding and sheet metal shop.

Calculation for machining time, machining cost of machined items.

**UNIT VIII APTITUDE TEST - 20 Marks**

(a) Numerical And Figurework Tests: (4 Marks)

These tests are reflections of fluency with numbers and calculations. It shows how easily a person can think with numbers. The subject will be given a series of numbers. His/Her task is to see how the numbers go together to form a relationship with each other. He/She has to choose a number which would go next in the series.

(b) Verbal Analysis And Vocabulary Tests: (6 Marks)

These tests measure the degree of comfort and fluency with the English language. These tests will measure how a person will reason with words. The subject will be given questions with alternative answers, that will reflect his/her command of the rule and use of English language.

(c) Visual And Spatial/3-D Ability Tests: (4 Marks)

These tests are used to measure perceptual speed and acuity. The subject will be shown pictures where he/she is asked to identify the odd one out; or which comes next in the sequence or explores how easily he/she can see and turn around objects in space.

(d) Abstract Reasoning Tests: (6 Marks)

This test measures the ability to analyse information and solve problems on a complex, thought based level. It measures a person's ability to quickly identify patterns, logical rules and trends in new data, integrate this information, and apply it to solve problems.