

TAMIL NADU PUBLIC SERVICE COMMISSION
SYLLABUS
MECHANICAL ENGINEERING
(DIPLOMA STANDARD)

CODE: 441

UNIT I: INDUSTRIAL ENGINEERING AND MANAGEMENT:

Selection of site – Plant layout – Plant maintenance – Plant safety – Work study – Method study – Work measurements – Functions of Production planning and control – Principles of Management – Personnel management – Fixing selling price of a product – Break even analysis – Make or buy decision – Depreciation methods – EOQ – Supply chain management – TQM tools – Control charts – ISO 9000 Series quality standards – QS 14000.

UNIT II: PRODUCTION TECHNOLOGY:

Foundry - patterns - special casting techniques - welding - hot and cold working – drawing, rolling and forging - powder metallurgy – Processing of plastics - lathe work - planner - shaper - slotter - drilling machine - milling machines - grinding machines - broaching - boring and jig boring - Gears manufacturing practice - Heat treatment and metal finishing - press work – Non conventional production processes – Semi automats – Automats.

UNIT III: ELECTRICAL AND ELECTRONICS ENGINEERING:

Units, Ohm's law, Kirchoff's law, Faraday's law - D.C. Circuits, batteries - electro magnetism - single phase and three phase A.C. circuits - Induction motors – Servo motors Stepper motors – Diodes – resistors – capacitors – transistors – logic gates - PLC – Sensors.

UNIT IV: STRENGTH OF MATERIALS:

Properties of engineering materials– Mechanical testing – Simple stresses and strain – Elastic constants – Properties of sections (centroid, moment of inertia) – Thin cylinders – Theory of simple bending – Torsion and springs – Shear force and bending moment – Friction.

UNIT V: THERMODYNAMICS:

Systems – Basics – Thermodynamic laws – Properties – Processes – SFEE – Air compressors – Types – Intercooling – Turbines – Boilers – Steam properties – working principle of steam power plant - Main elements of a nuclear power plant – Modes of heat transfer – Psychrometric properties, Processes.

UNIT VI: HEAT POWER ENGINEERING:

Working principle and comparison of otto and diesel cycles - construction and working of two stroke and four stroke engines - Heat balance test on I.C. engine – Fuel supply systems of petrol and diesel engines – Ignition systems – Cooling systems – Lubrication systems – Refrigeration – Types – Factors affecting human comfort – Air conditioners – Types.

UNIT VII: FLUID MECHANICS AND MACHINERY:

Fluid properties – Pressure measurements – Fluid flow – Flow through pipes – Reciprocating pumps – Centrifugal pumps – Hydraulic turbines – Components of hydraulic systems and pneumatic systems.

UNIT VIII: COMPUTER INTEGRATED MANUFACTURING:

Computers – Construction – Types – MS Office – CAD – geometric modeling – wireframe, surface and solid modeling – graphic standards – CAM – group technology – part families – parts classification and coding – CAPP – types. CNC – components of CNC – ATC – CNC EDM. Part program – format – coordinate system – types of motion control – types of interpolation – G and M codes – sub program – canned cycles – FMS – AGV – Robotics – Rapid prototyping.

UNIT IX: DESIGN OF MACHINE ELEMENTS:

Engineering materials – Types - Design of Joints and Fasteners – Design of shafts, keys and couplings – Design of bearings – Belt drives and gear drives.

UNIT X: METROLOGY AND MEASUREMENTS:

Scope of metrology – Accuracy – Precision – Limits – Fits – Tolerance – Linear and angular measurements – Measuring instruments – Form measurements – Surface textures and lays – Comparators – Gauges – Measurement of mechanical parameters – Computer aided inspection – Measurement of force, power and flow.

Dated: 23.12.2024