

**DETAILED SYLLABUS FOR THE POST OF ASSISTANT
MANAGER(BOILER OPERATION) IN TRAVANCORE TITANIUM
PRODUCTS LIMITED**

(Cat.No. :593/2024) - (Total Marks- 100)

Module 1: Fluid Mechanics (5 Marks)

Definition of fluid, properties of Fluid, Pascal's Law, Hydrostatic law, Measurement of pressure, Total pressure, center of pressure, Buoyancy, Meta centre, Metacentric height, types of fluid flow, discharge, continuity equation, Euler's equation, Bernoulli's equation, Venturi meter, orifice meter, pitot tube, flow through Orifices, notches and weirs, Reynolds experiments, major and minor losses, Darcy Weisbach equation, Chezy's formula, water hammer, vapour pressure

Module 2: Hydraulic machines: (5 Marks)

Impact of jet, jet Propulsion, Hydraulic turbines such as Pelton turbine, Francis and Kaplan turbines and its various efficiencies, draft tube, uses, different types, Specific speed, unit quantities, Governing of turbines, Centrifugal pumps and Reciprocating pumps, cavitation, effect

acting on the beams

Simple stresses and strains, Hook's law, elastic constants, Factor of safety, linear stress and strain, lateral stress and strain, Poisson's ratio, Thermal stress and strains, composite bar, Mohr's circle, Shear force and bending moments, torsion of shafts, thin and thick cylinders, Columns and struts.

Module 6: Engineering Materials (5 Marks)

Metals and Nonmetals, Alloys and alloy materials, Heat treatments, Upper critical temperature and lower critical temperature, Heat treatments and various heat treatment and surface hardening processes, composition and properties and uses of various steels, plastics and other newer engineering materials

Module 7: Manufacturing process and Production Engineering (5 Marks)

Elementary ideas about various basic workshop practices of Carpentry, foundry, sheet metal, welding, smithy and Fitting and various tools using in each sections Machine tools like lathe, shaper, planer, milling, drilling and slotting machines and its operations, Cutting tools, Tool materials, cutting speed, feed, depth of cut, tool nomenclature, tool life, shaper mechanisms

Module 8: Engineering Drawing and Machine design (5 Marks)

Module 11 (5 Marks)Fundamentals of Electricity

Voltage, current, resistance, energy, power-definitions and units, ohm's law-statement, simple problems related to ohm's law, power and energy, Resistance in series and parallel-simple problems. Kirchhoff's laws-KCL and KVL

Module 12 (5 Marks)Electrostatics and electromagnetism

Laws of electrostatics, permittivity, electric flux, flux density, potential, potential difference $\pm$ equations and simple problems, Lightning phenomenon, potential gradient, dielectrical strength, capacitors in series and parallel, energy stored in a capacitor. Coulomb's law, permeability, magnetic flux, flux density, reluctance, mmf, Faraday's law of electromagnetic induction, Lenz's law. self inductance, mutual inductance, energy stored in an inductor, Fleming's laws

Module 13 (5 Marks)Fundamentals of AC systems

Generation of ac voltage, equation of voltage, Basic

Switches- SPST, SPDT, TPTT, ICDP, ICTP, Toggle switch, Limit switch, safety devices- MCB,ELCB,RCCB,electrical illumination,Earthing-Pipe and Plate earthing.

Module 17 (5 Marks)

DC Machines

Dc generator- construction, working, classification, emf equation, wave and lap windings, characteristics, simple problems.

Dc motor- construction, working, types, emf equation, torque-simple problems, various starters, speed control, testing, MG set.

Module 18 (5 Marks)

Ac Machines

Transformer-construction, principle, types, emf equation, transformation ratio, losses and efficiency, all day efficiency-simple problems

Three phase induction motor- principle, construction, types, slip, torque, losses, efficiency, power