

## **Syllabus for Junior Manager (Diploma Level)**

### **CIVIL ENGINEERING**

#### **Strength of Materials & Theory of Structures:**

Normal stress, shearing stress, Normal strain, Hooke's Law, Stress-strain behaviour of mild steel, Poisson's Ratio, Shearing strain, Torsion of Circular Shaft, Relations among load, Shear and Bending Moment, Shear and Bending-Moment Diagrams, Pure Bending, Bending of Members Made of several Materials, Shearing Stresses in a Beam, Mohr's Circle for Plane Stress, Principal Stresses, Maximum Shearing Stress, Euler's Formula for Pin-Ended Columns and columns with other End conditions. Equation of the Elastic Curve by Double Integration Method, Slope and Deflection of Determinate Beams by Moment-Area Theorems, Deflections and Slope by Energy Methods, Castigliano's Theorem, Stability and Degree of Indeterminacy, Rolling loads and Influence lines for Determinate Beams, Trusses, and Floor Girders, Cables and Three-Hinged Arch.

**Water Resources Engineering:** Hydrology: rainfall, stream flow measurements, runoff, hydrographs, flood studies, reservoir and channel routing, flood forecasting, flood protection measures, river training works, well hydraulics; Irrigation: Command area, duty and delta, canal outlets, crop-water requirement.

**Fluid Mechanics:** Properties of Fluid, Manometry, Forces on Plane and Curved surfaces, Flow classification, Continuity Equation, Momentum Equation, and Energy Equation and their Applications, Orifices, Venturimeter, Weirs and Notches, Laminar and Turbulent Flow through Pipes, Darcy Weisbach Equation, Moody Diagram, Steady Uniform Flow in Open Channels, Manning's Formula.

**Geotechnical Engineering:** Preliminary definitions & relationship, Determination of index properties, classification of soils, soil structure and clay mineralogy, permeability, Darcy's law, seepage analysis, compaction, one dimensional consolidation, Terzaghi's theory, shear strength, theoretical consideration and tests, shallow and deep foundations, soil exploration.

**Highway and Railway Engineering:** Highway Geometric Design: Cross sectional elements, Sight distances, horizontal and vertical alignments; Types and components of Pavement structures, Design of Flexible Pavements; Traffic Characteristics: Road user and vehicular characteristics, traffic volume studies, O-D studies and traffic capacity studies;

**Railways:** Components, construction and maintenance of rail tracks, points and crossings.

**Surveying:** Contouring, Theodolite and its adjustment, measurement of angles and setting out lines, Trigonometrical leveling, Tacheometry, Curves and different methods of setting out curves, Introduction to electronic Theodolites and Total Stations.

**Structural Design:** Working stress methods of design, singly and doubly reinforced sections, rectangular and Tee beams, shear, torsion and development length, one and two way slabs, short and long column, Design of isolated footings, Introduction of limit state design, Design for flexure, shear and compression, Design of riveted and welded connections, tension and compression members, splicing and lacing, Beam column connection, roof trusses.

**Environmental Engineering:** Estimation of quantity of water, per capita demand, population forecasting, water quality parameters, treatment of water, distribution system, Estimation of quantity of sewage, dry weather flow and storm run off, sewer appurtenances, characteristics of sewage, treatment and disposal of sewage, sludge digestion.