

## JUNIOR ENGINEER (CIVIL)

### PAPER II

MARKS: 100

**Unit I: Building Materials (20 marks)**

Physical and Chemical properties, classification, standard tests, uses and manufacture/quarrying of materials, e.g. building stones, silicate based materials, cement (Portland), asbestos products, timber and wood based products, laminates, bituminous materials, paints and varnishes.

**Unit II: Estimating, Costing and Valuation (20 marks)**

Estimate, glossary of technical terms, analysis of rates, methods and unit of measurement, Items of work – earthwork, Brick work (Modular & Traditional bricks), RCC work, Shuttering, Timber work, Painting, Flooring, Plastering. Boundary wall, Brick building, Water Tank, Septic tank, Bar bending schedule, Centre line method, Mid-section formula, Trapezoidal formula, Simpson's rule; Cost estimate of Septic tank, flexible pavements, Tube well, isolates and combined footings, Steel Truss, Piles and pile-caps; Valuation – Value and cost, scrap value, salvage value, assessed value, sinking fund, depreciation and obsolescence, methods of valuation.

**Unit III: Surveying (20 marks)**

Principles of surveying, measurement of distance, chain surveying, working of prismatic compass, compass traversing, bearings, local attraction, plane table surveying, theodolite traversing, adjustment of theodolite, Leveling, Definition of terms used in leveling, contouring, curvature and refraction corrections, temporary and permanent adjustments of dumpy level, methods of contouring, uses of contour map, tachometric survey, curve setting, earth work calculation, advanced surveying equipment.

**Unit IV: Environmental Engineering (10 marks)**

Quality of water, source of water supply, purification of water, distribution of water, need of sanitation, sewerage systems, circular sewer, oval sewer, sewer appurtenances, sewage treatments. Surface water drainage. Solid waste management – types, effects, engineered management system. Air and Noise pollution control.

**Unit V: Structural Engineering (15 marks)**

Theory of structures, Concrete Technology, RCC Design (RCC design questions may be based on both Limit State and Working Stress methods), and Steel design and construction.

**Unit VI: Road (5 marks)**

Introduction, general principles of alignment. Classification and construction of different types of roads- Component parts road curves & gradient. Curves-types, designation of curves, setting out simple curve by successive bisection from long chords, simple curve by offsets from long chords.

**Unit VII: Building Planning & Design**

**(10 marks)**

Building rules & bye laws: Objectives & importance, Function & responsibility, lay out plan & key plan-composition of submission drawing. Provision for safety requirement of green belt and land; Computer aided drafting:-Operating system, Hardware & software, Introduction of CAD, Its Graphical User Interface. Method of Installation, Basic commands of CAD.

Building Planning:-Economy & orientation Provision for lighting and ventilation, Provision for drainage and sanitation.

Types of building Planning & design of residential, public and commercial building; Parks & play ground- Types of recreation, landscaping, etc; Concepts of design of earthquake resisting buildings- requirements resistance , safety, flexible building elements, special requirements, base isolation techniques.

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