

CIVIL ENGINEERING

Group Code: CE

Total Marks 100

1. Materials of construction**06 Marks**

Stones - Classification of rocks, Tests on stones, quarrying of stones. **Bricks** - Types, Indian Standard classification, manufacturing process, types and tests, water absorption, Refractory bricks. **Cement** – Compounds, clinker Composition, types, tests setting times, strength. **Timber** - Classification, defects, dry and wet rots, preservation, seasoning, market forms of timber Plywood. **Metals** - mild steel, copper, aluminum alloy, steel alloy. **Paints, varnish & distemper** - Ingredients, types

2. Surveying**10 Marks**

Principles, Classification of surveys, prismatic compass, local attraction; triangulations and traversing **Leveling** - Terms in leveling, Bench mark, types of leveling, Reduction of levels, L/S, C/S, Contour, characteristics of contour, computation of area, volumes, Capacity reservoir, **Theodolite surveying** – measurement of horizontal & vertical angles, deflection angle, latitude, departure, Bowditch's & Transit rule measurements and adjustment of observations. **Trigonometric leveling** – height & distance for different cases. **Tacheometry** – definition, stadia, system of tacheometry. **Curves**- types, elements of curve, designation, setting out curves, GIS, GPS global positioning system, remote sensing,

3. Engineering Mechanics and Strength of materials**14 Marks**

Moment & Couples, resolving of forces, Centre of gravity, Moment of Inertia, radius of gyration, Parallel & Perpendicular axis theorem, **Stress & strain** – Types of stress, Hook's law, factor of safety, lateral & linear strain, stress strain diagram, Poisson's ratio, **Bending moment & Shear force** – Types of supports, beam & load, Shear force & Bending Moment Calculation for cantilever, Simply supported & Over hanging beam with point load & UDL, Point of contra flexure. **Simple Bending** – bending stress, equation, flexural rigidity, section modulus, modulus of rupture. **Slope & Deflection** – definition of slope, deflection & curvature, calculation of Slope & deflection for cantilever, simply supported beams with point load & UDL (moment area method). **Columns & strut** – Definition of column & Strut, types, effective length for different end conditions, slenderness ratio, Buckling load.

4. Construction Technology**06 Marks**

Types of foundation & suitability, SBC of soil, Technical terms in Brick & stone masonry, Types of damp proofing materials, types of Doors & windows, fixtures for doors & windows, Lintel & arches, Scaffolding, shoring & under pinning, Technical terms in stair, types of stairs, Types of roof, Plastering & pointing, types of floors, Ventilation.

5. Water supply Engineering**05 Marks**

Ecological chain and balance, Sources of water, Intakes water requirements, Estimation of demand, per capita demand, Water quality standards, impurities, tests, purification of water, Primary and secondary treatment, sedimentation, coagulation, chlorination, Conveyance and distribution system, appurtenance, water conservation.

6. Sanitary Engineering**05 Marks**

Definition of sewage, sewer, garbage, sullage, types of sewerage system, Characteristics of sewage, quantity of sewage, sewer appurtenance, sewage treatment & disposal, house drainage system, collection & disposal of solid waste. Sources and effects of air pollution, Noise pollution and standards

7. Hydraulics**09 Marks**

Fundamentals – properties of fluids, total pressure, centre of pressure for circular, rectangular & triangular vertical plates. **Flow of fluids** – Types of flow, Bernoulli's equation, continuity equation. Hydraulic jump, **Flow through orifice** – Types of orifice, Vena contracta, Hydraulic co-efficients & their relationships. **Flow through Notches**- discharge over rectangle & triangular notches. **Flow over weir** – Types of weir, discharge over rectangular weir, end contraction. **Flow through canals** – Types, Chezy's & manning's formula, Most economical section. **Flow through pipes** – Types of Major & minor losses, water hammer, surge tanks.

8. Water Resources Engineering**10 Marks**

Hydrology – Hydrological cycle, precipitation, Evaporation and transpiration, runoff, computation of average rainfall. **Irrigation** – Base period, Crop period, Duty, Delta & Relationship, hydrographs, types of irrigation, methods of irrigation. **Reservoirs & Dams** – gravity & earthen dams, spillways, gates. **Distribution & cross drainage works**- Types of canals, Canal alignment, canal lining, aqueduct sluices. **Diversion & river training works**- Weirs, barrages, canal head regulator, marginal bunds, guide banks. **Ground water** – Types of Aquifers, porosity, ground water yield, specific yield, specific retention, permeability, transmissibility.

9. Concrete Technology**06 Marks**

Ingredients of concrete, Admixture-mineral and chemical, W/C ratio, Grade of concrete & steel, calcium silicate hydrate, Transition zone, Workability, Segregation, bleeding, Strength, Maturity concept, characteristic strength, Modulus of elasticity, Permeability, durability, Shrinkage, Creep, chloride attack, sulphate attacks, NDT, Design mix concepts, Curing, Special concrete, High strength concrete & steel for Pre stressing, Post tensioning, Pre tensioning.

10. Design of RCC**10 Marks**

RCC Limit state – Limit state of collapse, limit state of serviceability, as per IS 456-2000 Characteristic strength of materials, partial safety factors, stress block, Neutral axis, Moment of resistance.

Analysis and design requirements for – Singly reinforced, doubly reinforced sections for flexure and shear, lintels, T-Beam, one way slab, Two way slab, Continuous slab, sun shade and cantilever slab, short column for axial load, square footing, dog legged stair case spanning longitudinally.

11. Design of Steel structures**04 Marks**

Analysis and design requirements for – Bolted & welded joint, main & secondary beams, effective length & slenderness ratio for column, slab base & gusseted base plate, strut, end conditions.

12. Transportation Engineering**09 Marks**

Roads – Importance of transportation, classification of roads, geometrics, types of pavements, road drainage, traffic engineering. **Railways**- Permanent way, rails, sleepers, ballast, points & crossings, station & yards. **Bridges**– Elements of bridges, types of bridges.

13. Construction management**03 Marks**

Construction Team, Construction stages, Bar chart, CPM, PERT, Organization in PWD, Contract, Types of Contract, Tender, EMD, SMD, measurement book, Indents, Bin cards, payment of bills, Safety in construction.

14. Estimation & costing**03 Marks**

Units of measurements, types of estimate, specification, analysis of rates, BOQ, schedule of rates, valuation, rent fixation, depreciation, scrape value, market value, book value, earth work quantities.