

**Syllabus for written test to the post of Junior Engineer (Trainee- Civil)  
Chhattisgarh State Power Companies limited.**

**Section -A** -20 marks - (20 multiple choice type questions of each 1 mark)

General Knowledge

- Current events — National & International
- Constitution of India, Political system and Indian Administrative system
- Knowledge of Chhattisgarh, geographical location, natural resources, industries, education, administrative structure, history & culture of Chhattisgarh, ancient history, freedom struggle, major archaeological tourist centers of the state.

2. Reasoning and arithmetic

- Coding — Decoding
- Number series
- Non-verbal series
- Directions
- Decision making
- Alphabet series
- Clocks & calendars
- Number ranking
- Cube & dice
- Mirror images
- Blood relations
- Arithmetical reasoning
- Embedded figures
- Arithmetic - multiplication, division, addition, subtraction etc.


  
**DY. General Manager (HR)-II**  
**C.S.P.T.C.L., RAIPUR**

**Section –B-80 marks - (80 multiple choice type questions of each 1 mark)**

1. **Surveying** : Linear Measurement, Chain Surveying, Compass Surveying Plane table surveying, Levelling, Contouring, Study of toposheets, Theodolite Survey, Tacheometric Surveys. Circular Curves, Electronic Theodolite, Electromagnetic Distance Measurement (EDM).
2. **Construction material** : **Bricks**- size & shape, Indian standard classification and specification as per BIS- 1077, testing of bricks, Fly ash bricks. **Aggregates**- classification of aggregates, coarse and fine aggregates, testing of aggregates, grading of aggregates, fineness modulus and bulking of sand. **Cement** - Composition & properties of cement, Bouge's compound, hydration & heat of hydration of cement, field & laboratory test of cement as per IS, type & grades of cement & its suitability, mortar, its type & suitability. **Concrete**- Composition of concrete, its grades, types of concrete, fresh & hardened concrete & its properties, process of manufacture of concrete, testing of concrete.
3. **Transportation Engineering**: Highway Alignment and Surveys, Highway geometrics, Pavement materials, Highway construction, Drainage of Roads, Bridge- Classification, Site Investigation, Bridge Substructure, Bridge Superstructure, Waterways.
4. **Hydraulics: Hydro-statics**- Pressure, Pascal's law, total pressure on horizontal vertical and inclined surface, center of pressure, Manometer. **Hydro-kinematics**- law of conservation of mass, continuity equation, types of flow. **Hydro- dynamics**- various forms of energy, Bernoulli's theorem, Water discharge measurement- venturimeter orifice meter, pitot tube, Notches and weirs. **Flow through pipes**- characteristics of pipe flow, Darcy-Weisbach equation, Expression for head losses due to friction, sudden enlargement and bends. **Flow through open channel**- Wetted perimeter, hydraulic mean depth, hydraulic gradient, Chezy's formula Manning's formula
5. **Geotechnical Engineering** :- Weight and Volume relationships of soil; IS classification of soil; Index properties; Permeability; Well hydraulic; Shear strength; Earth pressure- only cohesion less soil; Bearing capacity-Definitions and plate load test.
6. **Hydrology** :- Definition, Hydrologic, cycle, water budget equation, catchment area, Precipitation, forms of precipitation, measurement of rainfall, rain gauge and types, rain gauge density as per IS and WMO, computation of average rainfall over a basin, mean annual rainfall. Losses from precipitation, evaporation, infiltration. runoff, factors affecting runoff, computation of runoff hydrograph, unit hydrograph, peak flow determination, Stream flow measurement- area velocity method, Weir method, Stage discharge curve.
7. **Water Resource Engineering** :- Water Requirement of crops, Reservoir Planning, Purposes of reservoir, classification of reservoir, bases on purpose, Investigation for reservoir planning, Engineering surveys area elevation curve, storage elevation curve, Geological Investigation, Hydrological Investigation, factors affecting selection of site for a reservoir, Zones of storages and various water levels, storage capacity and yield of reservoir. Dams- various types of dam, Factors governing the selection of type of dam, Factors for selection of Site for a dam, Earthen Dams, Gravity Dams, Spillway, Diversion Headwork, Canal Irrigation System- Canals, canal outlets, Canal Regulation works, Cross Drainage Works (Only Components and their functions), Canal lining and New irrigation techniques such as Drip Irrigation and Sprinkler Irrigation, lift irrigation.
8. **Public Health Engineering** :- Quantity of Water — Population Forecast, Water Demand: Source of Water- Surface sources, Ground water; yield of well; Quality of water- Physical, Chemical

and Microbiological tests; Treatment of water- Sedimentation, Filtration, Water softening, Disinfection; Collection and Conveyance of sewage, House Drainage.

9. **Structural Engineering** :- Stress and strain, Bending moments and Shear Forces in Simply supported, cantilever, fixed, and continuous beams; Slopes and deflection in cantilever and simply supported beam, Stresses in beams, axially loaded column- Euler's formula. RCC Design (Limit State Method IS 456:2000)- Design of singly and doubly reinforced RCC beams. Design of retaining Wall and Weir.
10. **Estimating and Costing** :- Estimate for construction of Dams and canal & canal structures, Estimate for a budding, Estimate of water supply and sanitary works, Earthwork for roads, Rate analysis, Estimate of RCC work, Estimate of steel and timber roof trusses, Valuation- types of values, depreciation.
11. **Construction Management** :- Organisation of civil works department - its structure & working, important formats of measurements, payment & bills. Gantt Chart, CPM network.

  
**DY. General Manager (HR)-II**  
**C.S.P.T.C.L., RAIPUR**