

Syllabus for the Post of Junior Engineer, Civil

1. Introduction: Importance of safety and general precautions observed in the in the industry/shop floor. Familiarization & information about rules and regulations of the Trade. List of the Instruments, equipment's and materials
2. Importance of B.I.S.: Introduction of Code for practice of Architectural and Building Drawings (IS: 962- 1989, SP-46:2003). Layout of drawing. Lines, Lettering, Dimensioning. • Knowledge of different types of scale. Principle of R.F. • Different types of projection views: Orthographic, Isometric, Oblique and Perspective.
3. Characteristic, types and uses of Materials:- • Stones, Bricks, Lime, Pozzolanic, Cement, Sand, Clay Products (types, earthenware, stoneware, porcelain, terracotta ,glazing) ,Mortar & Concrete (Types, uses, preparation, proportion, admixtures and applications), • Timber (Types, Structure, disease & defects, characteristic, seasoning, preservation and utility) Alternative material to Timber (Plywood, Block board, Particle board, Fireproof reinforced plastic(FRP), Medium density fireboard (MDF)etc.), Tar, bitumen, asphalt • Protective materials:- Paints, Varnishes, Metal and Plastics
4. Building Construction: - • Sequence of construction of a building, different parts of building, Stonemasonry (Terms, use and classification), Principle of construction, composite masonry, Strength of walls, Strength of masonry, Brick masonry – principles of construction of bonds, Tools and equipment's used. • Foundation:-Purpose of foundation, Causes of failure of foundation, Bearing capacity of soils, Dead and live loads, Examination of ground, Types of foundation, Drawing of footing foundation setting out of building on ground excavation, Simple machine foundation • Types of shoring, scaffolding, Underpinning and Timbering • Carpentry joints, Doors, Windows, Ventilators • Floors, Flooring, Stairs, lift and Escalator • Roofs & Roof coverings, Truss, Shell, Dome, Roof & coverings • House drainage of building:-Introduction, Terms used in PHE, Systems of sanitation, System of house drainage, plumbing, sanitary fittings, etc, Types of sewer appurtenance, Systems of plumbing, Manholes & Septic tank, Water treatment plant, Sewerage treatment plant
5. Treatments of building structures: - • DPC Sources and effects of dampness, Method of prevention of dampness in building, Damp proofing materials, Anti-termite treatment, Weathering course, Fire proofing, Arches, Lintel (types, wooden, brick, stone, steel & RCC), Chajjahs, Centering & Shuttering
6. Surveying: - • Introduction, History and principles of chain survey, Instruments Classification, accuracy, types, Main divisions (plane & geodetic), Chaining, Mouza Map, Compass survey, Plane table survey. • Levelling: -Auto level, dumpy Level, Tilting Level, Principle of levelling Types, component / part and function, Datum Focusing & parallax, Deduction of levels / Reduced Level, Types of leveling, Application to chain and Levelling Instrument to Building construction. • Contouring: -Definition, Characteristics, Methods, Interpolation of Contour, Contour gradient, Uses of Contour plan and Map. • Introduction to Theodolite survey
7. Electrical Wiring: - • Safety precaution and elementary first aid, Artificial respiration and treatment of electrical shock, Elementary electricity, General ideas of supply system,

Wireman's tools kit, Wiring materials, Electrical fittings, System of wirings. Wiring installation for domestic lightings,

8. Building: - • Principle of planning, Objectives & importance Function & responsibility, Orientation, Local building Bye-Laws as per ISI code, Lay out plan & key plan, composition of drawing, Provisions for safety, Requirement of green belt and land, Economy & orientation, Provision for lighting, ventilation, drainage and sanitation. • Types of building, planning & designing of residential, public and commercial building • Parks & play ground-Types of recreation, landscaping etc. • Prefabricated Structure: Method of construction and assembling • Concepts of design of earthquake resisting buildings-requirements resistance, safety, flexible building elements, special requirements, base isolation techniques.
9. Computer aided drafting: -Operating system, Hardware & software, CAD,3D modeling concept in CAD, 3D coordinate systems to aid in the construction of 3D objects
10. Reinforced cement concrete structure:-Introduction to RCC uses, Materials, Formwork, Bar bending details as per IS Code, Reinforced brickwork, Materials used for RCC Construction, Selection of materials – coarse aggregate, fine aggregate, cement water and reinforcement, Characteristics, Method of mixing concrete, Slump test, Structure – columns, beams, slabs - one-way slab & two-way slab, Innovative construction, Safety against earthquake, Grade of cement, steel behaviour and test, Bar-bending schedule, Retaining wall, R.C.C. Framed structure. • Steel structures: -Structural fasteners, Joints, Tension & compression member, Classification, fabrication, Construction details.
11. Roads: - 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, Road drainage system, • Basics of Bridges & Culvert.
12. Irrigation Engineering: - • Basic terms used in irrigation, Hydrology like duty, delta, base period, intensity of irrigation, Hydrograph, peak flow, run off, catchment area, CCA, corps like, rabi, kharif etc., • Storage, diversion head, work -characteristics and types. • Reservoir –types of reservoirs, i.e., single purpose and multi- purpose, area, capacity and curves of reservoir. • Dams, weir & barrages- types purposes. • Hydroelectric project like Forebay, Penstock, Turbines, Power house, etc. • Canals- classification and distribution system, canal structures. • Types of cross drainage works like Aqueduct, Super passage, Syphon, Level crossing, inlet and outlet, etc.
13. Estimating and Costing: - • Introduction, Purpose and common techniques, Drawing of construction, Measurement techniques. • Estimate-necessity, importance, types- approximate and detailed estimate-main and sub estimates, revised, supplementary, maintenance/repair estimate-taking off quantities-method Rate analysis of typical item sand their specifications, Labor and materials, Govt. Schedule of rate, Estimating of irregular boundaries by trapezoidal and Simpsons formula.

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