

## **SYLLABUS FOR THE POST OF JUNIOR ENGINEER (CIVIL)**

English	5 questions	05 Marks
Punjabi	5 questions	05 Marks
General Knowledge / Awareness	15 questions	15 Marks
Mental Ability / Aptitude/ Numerical Ability	15 questions	15 Marks
Computer Proficiency	10 questions	10 Marks
Professional (As per prescribed qualifications for job related)	50 questions	50 Marks
<b>Total</b>	<b>100 questions</b>	<b>100 Marks</b>

### **LANGUAGE PROFICIENCY (ENGLISH 05 Q, PUNJABI 05 Q)**

- i. General English up to 10th standard
- ii. General Punjabi up to 10th standard

**GENERAL KNOWLEDGE / AWARENESS (NATIONAL AND INTERNATIONAL) (15 Q):** General information about the state of Punjab, Economy, Science and Technology, Current Events, History, Geography, Political Awareness/Polity, Persons in News, Places in News, Important Awards & Honors, Sports.

**MENTAL ABILITY / APTITUDE/ NUMERICAL ABILITY (15 Q)** Reasoning Ability: Analogy / Analogous Problems, Classification, Word formation, Ranking / Arrangement, Series, Coding & Decoding, Distance and Direction, Symbol & Notation, Scheduled Day or Date, problem based on Ages and Calendar, Data Interpretation. Numbers, Simplification, HCF & LCM, Percentage, Average, Ratio & Proportion, Profit & Loss, Partnership, Time and Work, Time and Distance, Area and Volumes, Trigonometry, Probability, Permutations & Combinations.

**COMPUTER AWARENESS (10 Q):** Introduction of Computer and History, Operating Systems, PC and System Software, Computer Network, Computer Devices, Windows, Microsoft Office, MS Word, MS Excel, MS PowerPoint, Internet Programming Language (HTML/DHTML), Security Aspects for PC, Various uses of Computers.

### **PROFESSIONAL (50 Q)**

#### **PROFESSIONAL SYLLABUS FOR EXAMINATION FOR THE POST OF J.E. IN CIVIL ENGINEERING**

**Irrigation Engineering:** Introduction to irrigation, Soils and Crops, Water requirement of Crops, Method of Irrigation, Tubewell Irrigation, Tank Irrigation, Sprinkler Irrigation, Drip Irrigation, Water logging, Investigation and preparation of Irrigation Projects, Design of Irrigation Canals and Irrigation Outlets.

**Structural Analysis and Design:** Simple stresses and strains, Elasticity, Hooke's Law, Moduli of Elasticity and Rigidity. Stresses and strains of homogeneous materials and composite sections. Types of beams and supports and loads, concept of bending moment and shear force. Bending moment and shear force diagrams for simple cases. Deflection in beams. Moment area theorem, Bending and shear stresses in circular, rectangular, T and L sections, Comparison of strength of the above sections, Design of singly and doubly Reinforced beams, Design of Columns-Types of Columns. Short and long

column, load carrying capacity, effective length of column, lateral and helical ties. I.S. Specifications for reinforcement detailing. Design of slabs types of slabs, one-way slab, two-way slab, I.S. specifications for Reinforcement detailing method of design as per I.S. code. Design of foundations- isolated footing rectangular footing, square footings, circular footings. Design of tension members in structural steel, gross area, net area, tension splice, design of tension member. Design of compression members, column splice, load carrying capacities. Design of beams in structural steel.

**Surveying:** Linear measurements with tape, corrections, chain surveying, offsets, perpendicular offset, oblique offset, measurement of offsets, limiting length of offset, Field book, Instructions for booking field notes, Instruments for setting out right angles, Compass surveying, Prismatic compass. Surveyor's compass, comparison between prismatic and surveyor's compass, meridians & bearings, calculation of included angles from bearings, calculation of bearing from including angles, local attraction, magnetic declination levelling, types of levels. Principles of levelling, Classification of levelling. Rise & Fall method, Height of Instrument method, various corrections in levelling.

**Transportation Engineering:** Introduction of Transportation Engineering, Traffic Engineering, Road materials, Geometric design, Design of flexible and rigid pavements, Road maintenance, Railway Engg. Rails, Sleepers, ballast, points and crossing, Track laying and track maintenance.

**Soil and Construction Engineering:** Foundations-types, construction details, walls, load bearing and non-load bearing walls, brick masonry, bonds in masonry, stone masonry, type of a stone masonry, partition walls, doors. Floors-types of floors, construction procedure, maintenance of buildings, properties of bricks and stones, cement, aggregates, workability of concrete, Batching, mixing, compaction, placing, curing of concrete. Properties of hardened concrete. Introduction to soil mechanics, Soil classification. Index properties of soil, Shear strength concept.

**Fluid Mechanics, and Water Supply Engineering:** Specific weight, density, specific gravity, viscosity, vapour pressure, cohesion, adhesion, surface tension, capillarity and compressibility. Pressure, intensity of pressure, pressure head, and Pascal's Law and its applications. Total pressure, resultant pressure and centre of pressure on rectangular, triangular, trapezoidal, circular and curved surfaces. Atmospheric, gauge and absolute pressure, simple differential manometers. Steady and unsteady flow, laminar and turbulent flow, uniform and non-uniform flow. Discharge and continuity equation, Bernoulli's theorem, statement and description, venturimeter, orifices, time of emptying tanks of uniform cross section by a single orifice. Laminar and turbulent flow explained through Reynolds experiments. Reynolds number and critical velocity and velocity distribution, losses in pipes, hydraulic gradient line, and total energy line flow from one reservoir to another through a long pipe of uniform and composite section. Water hammer, uniform and non-uniform flow, discharge through channels using Chezy's formula and Manning's formula. Most economical sections, rectangular, trapezoidal and circular. Measurement of discharge by notches and weirs, measurement of velocity by Pitot tube and current meter, water supply, sources of water. Types of pipes, lying of pipes, Quality of sewage, lying of sewers, Building drainage and rural sanit.