

RURAL DEVELOPMENT AND PANCHAYATS DEPARTMENT
SYLLABUS FOR THE POST OF JUNIOR ENGINEER (CIVIL)

English	05 questions	5 Marks
Punjabi	05 questions	5 Marks
General Knowledge / Awareness	05 questions	5 Marks
Mental Ability /Aptitude/Numerical Ability	05 questions	5 Marks
Computer Proficiency	10 questions	10 Marks
Professional (As per prescribed qualifications for job related)	90 questions	90 Marks
Total	120 questions	120 Marks

PART A- GENERAL (30 Q)

1. ENGLISH (5 Q): Upto 10th standard

2. PUNJABI (5 Q): Upto 10th standard

3. GENERAL KNOWLEDGE / AWARENESS (5 Q):

General information about the state of Punjab, India and world, Economy, Science and Technology, Current Events, Political Awareness/Polity, Persons in News, Places in News, Important Awards & Honors, Sports.

4. Mental Ability /Aptitude/Numerical Ability (5 Q):

Verbal Reasoning, Data Interpretation, Number system, Simplification, HCF & LCM, Percentage, Average, Ratio & Proportion, Profit & Loss, Partnership, Time and Work, Time and Distance, Reasoning Ability: Analogy / Analogous Problems, Distance and Direction, Concept of angles, measurement of angles in degrees.

5. COMPUTER PROFICIENCY (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, Security Aspects for PC, Various uses of Computers, server types, connectivity (TCP/IP, shell), Applications of internet like: e-mail and browsing, Various Browsers like WWW (World wide web); hyperlinks; HTTP (Hyper Text Transfer Protocol); FTP (File Transfer Protocol).

PART B - PROFESSIONAL (90 Q) - CIVIL ENGINEERING

- 1) CIVIL ENGINEERING MATERIAL:** General characteristics of stones, Requirements of good building stones, Identification of common building stones, Bricks and Tiles, Cement (Various types of Cements, Properties of cement etc.), Lime, Timber and Wood Based Products, Paints and Varnishes, Miscellaneous Materials, Concrete, uses of concrete in comparison to other building materials, Ingredients of Concrete, Properties of Concrete, Concrete Mix Design, Introduction to Admixtures for improving performance of concrete, Special Concretes, Concreting Operations (Storing of Cement, Storing of Aggregate, Batching, Mixing, Transportation of concrete, Placement of concrete, Compaction, Curing, Jointing, Defects in concrete etc.).

- 2) SURVEYING & LEVELING:** Basic principles of surveying, Concept and purpose, Instruments used for taking these measurements etc., Chain surveying, Compass surveying, Leveling, Plane Table Surveying, Total Station Method, Auto Level, Contouring, Theodolite Surveying, Tacho-metric surveying, Curves, Digital Survey, Introduction to the use of Modern Surveying equipment and techniques.

- 3) BUILDING CONSTRUCTION:** Introduction to Building Construction, Foundation, Walls, Masonry, Arches and Lintels, Doors, Windows and Ventilators, Damp Proofing and Water Proofing, Floors, Roofs, Stairs, Surface Finishes, Building Planning, Quantity Surveying & Rate analysis of various building items, Types of estimates, Different methods of taking out quantities, Preparation of Detailed and Abstract Estimates for building projects.

- 4) THEORY OF STRUCTURES AND STRENGTH OF MATERIALS:** Simple stresses and strains, Elasticity, Hooke's Law, Modulus 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, Moment of Inertia, Slope and Deflection, Deflection in beams, Moment area theorem, Bending stresses in beams, Moment of Resistance, Shear Stresses in beams, shear stress distribution in rectangular, circular I, T, L sections for beams, Theory of columns, Eulers and Rankine Formula. Introduction to IS: 456 (latest edition), Design of singly and doubly Reinforced beams, Design of Columns, 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, Design of tension members in structural steel, Design of compression

members, Bolt connections, Analysis and design of single section simply supported laterally restrained steel beams.

5) HIGHWAYS, BRIDGES & RAILWAYS: Introduction of Transportation Engineering, Traffic Engineering, Road materials, California Bearing Ratio, Types of Binders and Bitumen testing, Geometric design of highways, Design & Construction of flexible and rigid pavements, Road maintenance and overlay, Classification of Bridges and their structural elements, Railway Engineering: Permanent way section, Types of Rails, Sleepers, ballast, Rail Fastenings, points and crossings, Track laying and track maintenance.

6) WATER SUPPLY, SANITATION AND IRRIGATION: Water requirement, Rate of demand and supply, Per capita consumption, Population Forecasting etc., Physical, Chemical and bacteriological properties, Standard of potable water as per Indian Standard etc., Water Treatment including Sedimentation, Coagulation, flocculation, Filtration, disinfection of water, chlorination, Conveyance of Water, Different types of pipes, fire hydrants, water meters their working and uses, Distribution system etc., Laying out Pipes.

Sanitation-Definition of terms in sanitary engineering, Surface drains, Types of sewage, Sewerage Systems, Laying and Construction of Sewers, Sewage characteristics (Properties of sewage as per IS standards), Natural Methods of Sewerage Disposal, Sewage Treatment, BOD, COD, Building Drainage, Drains and Sewers, Traps.

Irrigation Engineering: Introduction to irrigation, Water Requirement of Crops, methods of irrigation, tube well irrigation, tank irrigation, sprinkler irrigation, drip irrigation, water logging, various types of canal lining and Canal Head Works.