

SYLLABUS FOR THE POST OF SUB DIVISIONAL 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
Total	100 questions	100 Marks

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 SDE IN CIVIL ENGINEERING STRUCTURAL ENGINEERING

Solid Mechanics: System of forces, free-body diagrams, equilibrium equations; Internal forces in structures; Bending moment and shear force in statically determinate beams; Simple stress and strain relationships; Theories of failures; Simple bending theory, flexural and shear stresses, shear centre; Uniform torsion, buckling of column, combined and direct bending stresses.

Structural Analysis: Statically determinate and indeterminate structures by force/ energy methods; Method of superposition; Analysis of trusses, arches, beams, cables and frames; Displacement methods: Slope deflection and moment distribution methods; Influence lines; Stiffness and flexibility methods of structural analysis.

Construction Materials and Management: Construction Materials: Structural steel - composition, material properties and behaviour; Concrete - constituents, mix design, short-term and long-term

properties; Bricks and mortar; Timber; Bitumen. Construction Management: Types of construction projects; Tendering and construction contracts; Rate analysis and standard specifications; Cost estimation; Project planning and network analysis - PERT and CPM.

Concrete Structures: Working stress, Limit state and Ultimate load design concepts; Design of beams, slabs, columns; Bond and development length; Prestressed concrete; Analysis of beam sections at transfer and service loads.

Steel Structures: Working stress and Limit state design concepts; Design of tension and compression members, beams and beam- columns, column bases; Connections - simple and eccentric, beam-column connections, plate girders and trusses; Plastic analysis of beams and frames.

SOIL MECHANICS AND FOUNDATION ENGINEERING:

Origin of soils, soil structure and fabric; Three-phase system and phase relationships, index properties; Unified and Indian standard soil classification system; Permeability - one dimensional flow, Darcy's law; Seepage through soils - two-dimensional flow, flow nets, uplift pressure, piping; Principle of effective stress, capillarity, seepage force and quicksand condition; Compaction in laboratory and field conditions; Mohr's circle, stress paths, effective and total shear strength parameters, characteristics of clays and sand. Plate load test, standard penetration and cone penetration tests; Earth pressure theories - Rankine and Coulomb; Stability of slopes - finite and infinite slopes, method of slices and Bishop's method; Stress distribution in soils - Boussinesq's and Westergaard's theories, pressure bulbs; Shallow foundations - Terzaghi's and Meyerhoff's bearing capacity theories, effect of water table; Combined footing and raft foundation; Contact pressure; Settlement analysis in sands and clays; Deep foundations - types of piles, dynamic and static formulae, load capacity of piles in sands and clays, pile load test, negative skin friction.

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.

WATER RESOURCES 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 sanitation. 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.

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.

ENVIRONMENTAL ENGINEERING:

Water and Waste Water: Quality standards, basic unit processes and operations for water treatment. Drinking water standards, water requirements, basic unit operations and unit processes for surface water treatment, distribution of water. Sewage and sewerage treatment, quantity and characteristics of wastewater. Primary, secondary and tertiary treatment of wastewater, effluent discharge standards. Domestic wastewater treatment, quantity of characteristics of domestic wastewater, primary and secondary treatment. Unit operations and unit processes of domestic wastewater, sludge disposal.