

**UNIVERSITY OF JAMMU**

**Syllabus of Entrance/Screening Test for the Post of Junior Engineers (Civil)**

S.No	Examination Type	Subject	No. of Question	Marks	Duration
1	Multiple Choice Questions	General Intelligence and Reasoning General Awareness (Common to all disciplines)	20	20	2hrs
2		Discipline oriented	80	80	

**GENERAL INTELLIGENCE & REASONING:**

15 Marks

Questions of both verbal and non-verbal type. The test may include questions on analogies, similarities, differences, space visualization, problem-solving, analysis, judgment, decision making, visual memory, discrimination, observation, relationship concepts, arithmetical reasoning, verbal and figure classification, arithmetical number series etc. The test will also include questions designed to test the ability to deal with abstract ideas and symbols and relationships, arithmetical computations and other analytical functions.

**GENERAL AWARENESS:**

05 Marks

Questions will be aimed at testing general awareness of the environment around and its application to society. Questions will also test the knowledge of current events and of matters of everyday observations and experience in scientific aspect. The test will also include questions relating to India and its neighboring countries especially pertaining to History, Culture, Geography, Economic, Science, General Polity.

**DISCIPLINE ORIENTED**

**1. BUILDING MATERIALS:**

05 Marks

Physical and Chemical properties, Classification, Standard Tests, Uses and manufacture/quarrying of materials e.g. building stones, silicate based materials, Cement (Portland), Asbestos products, Timber and Wood based Products, Laminates, bituminous materials, Paints, Varnishes.

**2. ESTIMATING, COSTING, AND VALUATION:**

05 Marks

Estimate, Glossary of technical terms, Analysis of rates, Methods, and unit of measurement, Items of work – Earthwork, Brickwork (Modular & Traditional bricks), RCC work, Shuttering, Timber work, Painting, Flooring, Plastering.

Boundary wall, Brick building, Water Tank, Septic tank, Bar bending schedule. Centre line method, Mid-section formula, Trapezoidal formula, Simpson's rule.

The cost estimate of Septic tank, flexible pavements, Tube well, isolated and combined footings. Steel Truss, Piles and piles caps.

Valuation – Value and cost, scrap value, salvage value, assessed value, sinking fund, depreciation and obsolescence, methods of valuation.

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**3. SURVEYING:**

05 Marks

Principals of surveying, measurement of distance, chain surveying, working of prismatic compass, compass traversing, bearings, local attraction, plane table surveying, theodolite traversing, adjustment of thodolite. Levelling, Definition of terms used in leveling, contouring, curvature and refraction corrections, temporary and permanent adjustments of dumpy level, methods of contouring, uses of contour map, tachometer survey, curve setting, earthwork calculation, advanced surveying equipment.

**4. SOIL MECHANICS:**

10 Marks

Origin of soil, phase diagram, Definitions – void ratio, porosity, a degree of saturation, water contenta specific gravity of soil grains, unit weights, density index and interrelationship of different parameters, Grain size distribution curves and their uses.

Index properties of soils, Atterberg's limits, ISI soil classification, and plasticity chart. the Permeability of soil. and coefficient of permeability, determination of the coefficient of permeability, Unconfined and confined aquifers, effective stress, quicksand, consolidation of soils, Principals of consolidations, the degree of consolidation, pre – consolidation pressure, normally consolidated soil,  $e - \log p$  curve, computation of ultimate settlement. Shear strength of soils, direct shear test, Vane shear test, Triaxial test.

Soil compaction, Laboratory compaction test, Maximum dry density and optimum moisture content, earth pressure theories, active and passive earth pressures, Bearing capacity of soils, plate load test, standard penetration test.

**5. HYDRAULICS:**

10 Marks

Fluid properties, hydrostatics, measurements of flow, Bernoulli's theorem and its application, and turbines.

**6. CONSTRUCTION EQUIPMENT, PLANNING AND MANAGEMENT**

05 Marks

Weight Batcher, Mixer, vibrator, batching plant, concrete pump. Earthwork Equipment: Power shovel, hoe, dozer, dumper, trailers and tractor, rollers, sheep foot rollers, pumps.

**7. IRRIGATIONS ENGINEERING:**

05 Marks

Definition, Necessity, Benefits, III effects of irrigation, types, and methods of irrigation. Hydrology – Measurement of rainfall, runoff coefficient, rain gauge, losses from precipitation – evaporation, infiltration, etc.

Water requirement of crops, duty, delta and base period, Kharif and Rabi Crops, Command area, Time factor, Crop ratio, Overlap allowance, Irrigation efficiencies.

Different type of canals, types of canal irrigation, loss of water in canals. Canal lining – types and advantages.

**8. WATER POWER ENGINEERING:**

10 Marks

Power generation through storage (dams) and diversion (barrages); run – of the river schemes with and without pondage;

Storage scheme; tidal power plants; hydroelectric plant layouts for open flow diversion schemes and pressure diversion system or their combination; undergrounds projects with pressure diversion systems;

Reservoir type intakes a trash rack; intakes for embankment dams; water conducting systems a open channels. fore-bays, tunnels, surge tanks, penstocks, valves and anchor blocks;

Layout and sections of tunnels; tunnels deign basics; construction methods for tunnels; penstock components

**9. STRUCTURAL ENGINEERING:**

10 Marks

Theory of structures: Elasticity constants, types of beams – determine and indeterminate, bending moment and shear force diagrams of simply supported, cantilever and over hanging beams.

Moment of area and moment of inertia for rectangular & circular sections, bending moment shear stress for a tee, channel and compound sections, chimneys, dams and retaining walls, eccentric loads, slops deflection of simply supported and cantilever beams, critical load and columns, Torsion of circular section.

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Mason's

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**10. CONCRETE TECHNOLOGY:**

05 Marks

Properties, Advantages, and uses of concrete, cement aggregates, the importance of water quality, water cement ratio, workability, mix design, storage, batching, mixing, placement, compaction, finishing and curing of concrete, quality control of concrete, hot weather and cold weather concreting, repair and maintenance of concrete structures, Roller Compacted concrete and its Use.

**11. RCC DESIGN AND STEEL DESIGN:**

10 Marks

Rcc beams – flexural strength, shear strength, bond strength, the design of singly reinforced and doubly reinforced beams, cantilever beams, T – beams, lintels.

One – way and two – way slabs, isolated footings.

Reinforced brickworks, columns, staircases, retaining walls, water tanks (RCC design question may be based on both Limit State and Working Stress methods).

**Steel Design:** Steel design and construction of steel columns, beams roof trusses plate girders

*Masroha*  
**REGISTRAR**  
*[Signature]*

**Note:**

- I. Weightage of Entrance/Screening Test shall be as per the Selection Criteria notified vide No. Estab./C&R-NTW/22/1520-32 dated 01.09.2022 and uploaded in the University website [www.jammuuniversity.ac.in](http://www.jammuuniversity.ac.in)