Re-Accredited 'B++' 2.86 CGPA by NAAC
VEER NARMAD SOUTH GUJARAT UNIVERSITY
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વીર નર્મદ દક્ષિણ ગુજરાત યુનિવર્સિટી
યુનિવર્સિટી કેમ્પસ, ઉધના-મગદલ્લા રોડ, સુરત - ૩૯૫ ૦૦૭, ગુજરાત, ભારત.
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તા.૨૬-૦૯-૨૦૨૫નાં No.: GAD/NT/GIA/Emp. Notice/25862/2025 એડીશનલ

આસિસ્ટન્ટ ઈજનેર સંવર્ગની સ્પર્ધાત્મક પરીક્ષા સંદર્ભે Detailed અભ્યાસક્રમની અગત્યની સૂચના

એડીશનલ આસિસ્ટન્ટ ઈજનેર માટે સંબંધિત વિષય અને તેની ઉપયોગીતા અંગેના પ્રશ્નનો:

PART: B **TOTAL MARKS : 120**

1. Building Materials: (10 Questions, 10 Marks)

Stone, Lime, Glass, Plastics, Steel, FRP, Ceramics, Aluminum, Fly Ash, Basic Admixtures, Timber, Bricks and Aggregates: Classification, properties and selection criteria; Cement: Types, Composition, Properties, Uses, Specifications and various Tests; Lime & Cement Mortars and Concrete: Properties and various Tests; Design of Concrete Mixes: Proportioning of aggregates and methods of mix design. Pre-cast and Pre-fabricating technology.

2. Solid Mechanics: (08 Questions, 08 Marks)

Elastic constants, Stress, plane stress, Strains, plane strain, Mohr's circle of stress and strain, Principal Stresses, Bending, Shear and Torsion.

Forces & force systems, Centre of Gravity, Moment of Inertia, Friction, Simple lifting machine.

3. Structural Analysis: (05 Questions, 05 Marks)

Basics of strength of materials, Types of stresses and strains, Bending moments and shear force, concept of bending and shear stresses; Analysis of determinate structures; Trusses, beams, plane frames;

Slope and Deflection of determinate beam, Column and Strut.

4. Design of Steel Structures: (05 Questions, 05 Marks)

Principles of Limit State Methods, Design of tension and compression members, Design of beams and beam column connections, built-up sections, Girders, Industrial roofs, Lacing, Battening, Purlin and simple Beam design, Truss design

5. Design of Concrete and Masonry structures: (08 Questions, 08 Marks)

Limit state design for bending, shear, axial compression and combined forces; Design of beams, Slabs, Lintels, Foundations, Retaining walls, Tanks, Staircases; Design of Masonry Structure.

6. Construction Practice, Planning and Management: (08 Questions, 08 Marks)

Construction Planning, Equipment, Site investigation and Management including Estimation with latest project management tools and network analysis for different Types of works; Analysis of Rates of various types of works; Tendering Process and Contract Management, Environment clearance, Quality Control, Productivity, Operation Cost; Laboure safety and welfare, maintenance and repair, Electrical layouts of simple Buildings, Heat Ventilation and air conditioning, Fire safety.

7. Building Construction (08 Questions, 08 Marks)

Brick and stone masonry walls, types of masonry, cavity walls, reinforced brickwork, building services, detailing of floors, roofs, ceilings, stairs, doors and windows, finishing, formwork, ground water control techniques, cofferdams, functional planning of building, orientations of buildings, low cost housings. Cassion

8. Flow of Fluids, Hydraulic Machines and Hydro Power: (05 Questions, 05 Marks)

(a) Fluid Mechanics, Open Channel Flow, Pipe Flow:

Fluid properties; Fluid dynamics including flow kinematics and measurements; Flow net; Viscosity, Boundary layer and control, Flow controls. Hydraulic jump; Surges; Hydrostatics, Hydraulic coefficient, Notches and Weirs, Flow through pipe and open channel

(b) Hydraulic Machines and Hydro power:

Various pumps, Air vessels, Hydraulic turbines types, classifications

9. Hydrology and Water Resources Engineering: (08 Questions, 08 Marks)

Hydrological cycle, Ground water hydrology, Well hydrology and related data analysis; River morphology; Flood, drought and their management; Capacity of Reservoirs.

Water Resources Engineering Multipurpose uses of Water, Irrigation systems, water demand assessment; Resources storages and their yields; Water logging, canal and drainage design, Gravity dams, falls, weirs, Energy dissipaters, barrage Distribution works, Cross drainage works and head-works; Concepts in canal design, construction & maintenance; River training, measurement and analysis of rainfall. Water shed Development, Water harvesting structure

10. Geo-technical Engineering and Foundation Engineering: (08 Questions, 08 Marks)

I. Geo-technical Engineering:

Soil exploration planning & methods, Properties of soil, classification, various tests and interrelationships; Permeability & Seepage, Compressibility, consolidation and Shearing resistance, Earth pressure theories and stress distribution in soil; Properties and uses of geo- synthetics.

II. Foundation Engineering:

Types of foundations & selection criteria, bearing capacity, shallow & deep foundations; Dams and Earth retaining structures: types, Surveying and Geology:

(i) Surveying:

Classification of surveys, various methodologies, instruments & analysis of measurement of distances, elevation and directions; Global Positioning System; Map preparation; Photogrammetry; Remote sensing concepts; Survey Layout for culverts, canals, bridges, road/railway alignment and buildings, Setting out of Curves.

Compass survey, Levelling, Plane table Survey

(ii) Geology:

Basic knowledge of Engineering geology & its application in projects.

11. Transportation Engineering (05 Questions, 05 Marks)

Highways Planning & construction methodology, Alignment and geometric design; Traffic Surveys and Controls; Principles of Flexible and Rigid pavements design. Different modes of transport.

Road materials, Road Drainage system, Railways- Permanent way, Yards, Maintenance of railway track,

Bridges Fundamentals of Bridge Engineering, Bridge Site Investigations and Planning, Bridge Hydrology, Standards of Loadings for Bridge Design, Different Types of Bridges, Bridge Superstructure, Bearings and Substructure Bridge Foundations, Bridge Approaches, River Training Work & Protection Work, Methods of Bridge Construction, Inspection, maintenance & Repair of Bridges, Bridge Architecture.

12. Civil Engineering in Gujarat- (05 Questions, 05 Marks)

Important Buildings, Monuments and Construction- Historical as well as Modern. Important Reservoir It's Storage, Catchment and Command Area, Technical features and important characteristics.

13. Concrete Technology: (08 Questions, 08 Marks)

Cement, Aggregates and Water; Concrete, Concrete Mix Design and Testing of Concrete, Quality Control of Concrete; Chemical Admixture, Special Concrete and Extreme Weather concreting.

14. Tendering and Accounts (05 Questions, 05 Marks)

Procedure to execute the work, Contracts, Tender and Tender Documents, Accounts, Introduction to Valuation.

15. Estimating and Costing (09 Questions, 09 Marks)

Fundamentals of Estimating and Costing, Approximate Estimates, Detailed Estimate, Estimate for Civil Engineering Works, Rate Analysis, Specification

16. Water Supply and Sanitary - (05 Questions, 05 Marks)

Demand of water, Treatment of water, Conveyance of water, Sewage treatment, sewage disposal, recycling of solid waste and waste water.

17. Building Planning (05 Questions, 05 Marks)

Regulation, Byelaws, principles of planning, Perspective, Auto CAD, 2D and 3D command of AutoCAD.

18. Current Trends and Recent Advancements in the Above Fields. (05 Questions, 05 Marks)