

21. परीक्षा की स्कीम एवं पाठ्यक्रम:-

1. संविदा कनिष्ठ तकनीकी सहायक:-

क्रम संख्या	विषय	अधिकतम अंक	समय
1	सामान्य ज्ञान (राजस्थान के संदर्भ में)	24	3.00 घंटे
2	दैनिक विज्ञान	24	
3	गणित	26	
4	कम्प्यूटर के मूल सिद्धान्त	26	
5	Bulding Technology, Construction Technology and Construction Management	30	
6	Fluid Mechanics	30	
7	Survying, Estimating, Costing & Field Engineering	30	
8	Irrigation & Water Resources	30	
9	Theory of Stuctures and Strength of Materials	30	
10	Soil Menchanics and Foundations Engineering	30	
11	Design of R.C. Concrete and Masonry Structures and Structural Analysis, Design of Steel Structures	30	
12	Auto Cad Civil Engineering Drawing	30	
13	Soil and Water Conservation	30	
14	Farm Power and Machinery	10	
15	Agriculture Processing	10	
16	Renewable Energy Sources	10	
17	योग	400	

नोट:-

1. प्रश्न पत्र में बहुविकल्पीय प्रकार के 200 प्रश्न होंगे तथा सभी प्रश्नों के अंक समान होंगे।
2. परीक्षा में न्यूनतम निर्धारित उत्तीर्णांक 40 प्रतिशत है। अनु.जाति एवं अनु.जनजाति के अभ्यर्थियों के लिए न्यूनतम निर्धारित उत्तीर्णांक 35 प्रतिशत है। इससे कम अंक प्राप्त करने वाले अभ्यर्थी नियुक्ति के लिए पात्र नहीं होंगे।
3. किसी प्रश्न के गलत उत्तर के लिए परीक्षार्थी के प्राप्तांकों में से उस प्रश्न के पूर्णांक का एक-तिहाई(1/3) अंक काटा जावेगा।

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पाठ्यक्रम (Syllabus)

भाग-अ

सामान्य ज्ञान

राजस्थान का इतिहास, कला, संस्कृति, साहित्य, परम्परा एवं विरासत	
1.	राजस्थान के इतिहास के प्रमुख स्रोत
2.	राजस्थान की प्रमुख प्रागैतिहासिक सभ्यतायें
3.	राजस्थान के प्रमुख राजवंश एवं उनकी उपलब्धियां
4.	मुगल- राजपूत संबंध
5.	स्थापत्य कला की प्रमुख विशेषताएँ
6.	महत्वपूर्ण किले, स्मारक एवं संरचनाएँ
7.	राजस्थान के धार्मिक आंदोलन एवं लोक देवी-देवता
8.	राजस्थान की प्रमुख चित्रकलाएँ, शैलियां एवं हस्तशिल्प
9.	राजस्थानी भाषा एवं साहित्य की प्रमुख कृतियां, क्षेत्रीय बोलियां
10.	मेले, त्यौहार, लोक संगीत, लोक नृत्य, वाद्ययंत्र एवं आभूषण
11.	राजस्थानी संस्कृति, परम्पराएं एवं विरासत
12.	महत्वपूर्ण ऐतिहासिक पर्यटन स्थल
13.	राजस्थान के प्रमुख व्यक्तित्व
14.	राजस्थान की रियासतें एवं ब्रिटिश संधिया, 1857 का जन- आंदोलन
15.	कृषक एवं जन- जाति आंदोलन, प्रजामंडल आंदोलन
16.	राजस्थान का एकीकरण
17.	राजस्थान का राजनीतिक जनजागरण एवं विकास- महिलाओं के विशेष संदर्भ में
राजस्थान का भूगोल	
1.	स्थिति एवं विस्तार
2.	मुख्य भौतिक विभाग:- मरुस्थलीय प्रदेश, अरावली पर्वतीय प्रदेश, मैदानी प्रदेश, पठारी प्रदेश
3.	अपवाह तंत्र
4.	जलवायु
5.	मृदा
6.	प्राकृतिक वनस्पति
7.	वन एवं वन्य जीव संरक्षण
8.	पर्यावरणीय एवं पारिस्थितिकीय मुद्दे
9.	मरुस्थलीकरण
10.	कृषि- जलवायु प्रदेश एवं प्रमुख फसलें

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11. पशुधन 12. बहुउद्देशीय परियोजनाएँ 13. सिंचाई परियोजनाएँ 14. जल संरक्षण 15. परिवहन 16. खनिज सम्पदाएँ
राजस्थान की राजनीतिक एवं प्रशासनिक व्यवस्था
1 भारत का संविधान, राज्यपाल, मुख्यमंत्री, राज्य विधानसभा, उच्च न्यायालय, राजस्थान लोक सेवा आयोग, जिला प्रशासन, राज्य मानवाधिकार आयोग, लोकायुक्त, राज्य निर्वाचन आयोग, राज्य सूचना आयोग। 2 लोक नीति, विधिक अधिकार एवं नागरिक अधिकार—पत्र
राजस्थान की अर्थव्यवस्था
1 अर्थव्यवस्था का वृहत परिदृश्य। 2 कृषि, उद्योग व सेवा क्षेत्र के प्रमुख मुद्दे। 3 संवृद्धि, विकास एवं आयोजना। 4 आधारभूत—संरचना एवं संसाधन। 5 प्रमुख विकास परियोजनाएँ।
समसामयिक घटनाएँ
1 राजस्थान राज्यस्तरीय, राष्ट्रीय एवं अंतर्राष्ट्रीय महत्व की प्रमुख समसामयिक घटनाएँ एवं मुद्दे। 2 वर्तमान में चर्चित व्यक्ति एवं स्थान। 3 खेल एवं खेलकूद गतिविधियाँ।
नरेगा अधिनियम तथा ग्रामीण विकास एवं पंचायतीराज की योजनाएँ
महात्मा गांधी नरेगा अधिनियम एवं ग्रामीण विकास एवं पंचायती राज विभाग राजस्थान के तहत संचालित योजनाओं का सामान्य ज्ञान
दैनिक विज्ञान (Every Day Science)
1 Physical and chemical reactions, oxidation and reduction reactions, metals and non – metals. Hydro – carbons, Chloro – Fluro Carbon (CFC) Compressed Natural Gas (CNG), Soap and Detergent Pesticides, Reflection of light and its laws, examples of refraction, types of Lenses, Defects of vision and their corrections. 2 Electric current, Unit of electric current, Electric cell, Electric generator, Electric connection arrangement in house. Working of house hold electrical appliances. Uses of space science, Remote Sensing Technique and its uses. Information

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Technology.

- 3 Environment – Components (Atmosphere, Lithosphere and Hydrosphere), Ecosystem – structure. Food – chain, Food – web, Nitrogen cycle. General information about – Bio – technology, Bio – patents, Stem cell, Cloning, Test Tube baby, Artificial insemination.
- 4 Apiculture, Sericulture, Fishery, Poultry, Dairy industry, Cereals, Pulses, Vegetables, Fruits, Medicinal Plants. Blood group, Blood transfusion, Rh factor, Pollution and human health, Pathogen & human health, Intoxicant and human health, Mal – nutrition & human health.
- 5 Immunity, Vaccination, Types of diseases, Hereditary disease – Hemophilia Color blindness, Thalassaemia, National Health Programme, Manures – Bio – manure, Vermi compost. Crop rotation, Plant disease control.

गणित (Mathematics)

- 1 Natural numbers, rational and irrational numbers and their decimal expansions, operations on real numbers, laws of exponents for real numbers, rational numbers and their decimal expansions.
- 2 Ratio and proportion, percentage, Profit and loss, simple and compound interest, time and distance, time and speed, work and time.
- 3 Collection of data, presentation of data, graphical representation of data, measure of central tendency, mean, mode, median of ungrouped & grouped data.

कम्प्यूटर के मूल सिद्धान्त (Basics of Computer)

- 1 **Introduction to Computer & Windows:** Input/output Devices, Memory PORTs, Windows Explorer Menu, Managing Files & Folders, Setup & Accessories, Formatting, Creating CD/DVD.
- 2 **Word Processing & Presentations:** Menu Bars, Managing Documents & Presentations, Text Formatting, Table Manipulations, Slide Designs, Animations, Page Layout, Printing.
- 3 **Spread Sheets:** Excel Menu Bar, Entering Data, Basic Formula & Inbuilt Functions, Cell & Text Formatting, Navigating, Charts, Page Setup, Printing, Spread Sheets for Accounting.
- 4 **Working with Internet and e-mails:** Web Browsing & Searching, Downloading & Uploading, Managing an E – mail Account, e – Banking

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भाग-ब

1. Building Technology And Construction Management

Building Materials: stones, bricks, steel, Timber, lime, cement, sand, aggregates for cement concrete, paints, distempers, use of pozzolana manufacturing of lime concrete, cement concrete for plain, reinforced and pre-stressed concrete work.

Road Materials: Coarse aggregate, screenings and binding materials for WBM, Bricks for soling, Coarse and fine aggregate for bituminous roads, IRC standard size aggregates, Tars and Asphalt, Asphaltic concrete, Asphaltic emulsions, Mastic Asphalt and Minerals fillers

Construction Management: Plants and equipments, planning for construction using network analysis CPM and PERT techniques

2. Fluid Mechanics

Fluids: Definition, Ideal fluids, real fluids, Newtonian and Non-Newtonian fluids.

Properties of Fluids: Units of measurement, Mass density, Specific weight, Specific volume, Specific Gravity, Viscosity, Surface tension and Capillarity, Compressibility and Elasticity.

Hydrostatics: Pressure at a point in a static fluid; pressure variation in an incompressible static fluid; atmospheric pressure, Gauge pressure, vacuum pressure, absolute pressure, Manometers Bourdon pressure gauge.

Buoyancy: Forces acting on immersed plane surface. Centre of pressure, forces on curved surfaces. Conditions of equilibrium for floating bodies, meta-center and met centric height experimental and analytical determination of met centric height.

Equilibrium of Fluid particles and flow: Fluid mass subjected to horizontal and vertical acceleration and uniform rotation.

Hydro-kinematics: Types of Flows: Steady and unsteady, uniform and non-uniform, stream lines, path lines, stream tubes, principles of conservation of mass, equation of continuity, acceleration of fluid particles local and connective, Rotation and circulation, motions, free and forced vortex, circulation and vorticity velocity potential and stream function

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function, elementary treatment of flow net. Euler's equations of motion and integration of Euler's equations, Bernoulli's equation for incompressible Fluids, assumptions in Bernoulli's equation, Energy correction factor.

Applications of Bernoulli's equation: Pitot tube, Venturi meter, orifice meter, orifices & mouth pieces, time of emptying of tanks by orifices, sharp edged rectangular, triangular and trapezoidal notches, Francis formula. Velocity of approach. End contractions Cipoletti Weir, time of emptying reservoirs by weirs.

Momentum Equation and its Application: Development of momentum equation by control volume concept, Momentum correction factor, applications-Borda's mouth pieces, sudden enlargement of flow, pressure on flat plates, Nozzles.

Flow Through Pipes: Laminar flow, Reynolds experiment, transition from laminar to turbulent flow. Turbulent Flow: Laws of fluid friction, friction factor Moodys diagram, loss of head due to friction and other causes. Hydraulic gradient, total energy line Chezy's, Darcy's and Manning's formula, flow through parallel pipes and pipes in series, flow through branched pipes. Flow along a bypass. Power transmission through pipe, condition for maximum power. Elementary water hammer concept,

3. Surveying, Estimating, Costing & Field Engineering

Introduction: Importance of surveying to engineers, Plane and geodetic surveying, methods of location of points, principle of surveying from whole to part, conventional signs.

Measurement of Distances: Different types of chains, tapes and their uses. Sources of error and precautions, corrections to tape measurements. Field problems in distance measurement. Advance techniques of distance measurement.

Measurement of Angles & Direction: Different types of direction measuring instruments and their uses. Reference meridians, Bearing and azimuths, magnetic declination and its variation. Use and adjustment of surveyors and prismatic compass.

Venire and micro optic theodolite, temporary and permanent adjustment of venire theodolite Measurement of horizontal and vertical angle by different methods.

Application of theodolite in field problems-

Traversing: Different methods of traversing; chain traverse, chain & compass traverse, transit-tape traverse. Methods of computations and adjustment of traverse; transit rule, Bowditch rule, graphical method, axis method. Gales traverse table.

Leveling: Definitions of various terms in leveling. Different types of leveling, sources of error sin leveling curvature and refraction corrections. Temporary adjustment

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adjustment of dumpy and tilting levels. Computation and adjustment of level. Profile leveling L-Section and cross-sections.

Plane Table Surveying: Elements of plane table survey working operations, methods of plane table survey; inter section, traversing and resection, two point and three point problems

Contouring: Characteristics of contours, contour interval, contour gradient, Methods of locating contours, uses of contour maps.

Trigonometric Leveling: Trigonometric leveling, Objects accessible and non-accessible,

Determination of levels object- when.

Field Astronomy: Definitions of terminology used in Astronomy, Introduction to Remote Sensing and GIS Estimation for quantities for various types of construction, Rate Analysis, Preparation of Tender & contract documents, Centre-line diagram, Building layout.

4. Irrigation & Water Resources

Definition, necessity, benefits, types and methods of irrigation, Hydrology-Measurement of rainfall, run off 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. Shallow and deep to wells, yield from a well. Weir and barrage, Failure of weirs and permeable foundation, Silt and Scour, Kennedy's theory of critical velocity. Lacey's theory of uniform flow. Definition of flood, causes and effects, methods of flood control, water logging, preventive measure. Land reclamation, Characteristics of affecting fertility of soils, purposes, methods, description of land and reclamation processes. Major irrigation projects in India.

Soil-Water-Plant relationship, water requirements of different crops irrigation scheduling, measurement of irrigation water. Water conveyance and control, data of field channels. Design of irrigation methods, irrigation efficiencies. Drainage: Benefits drainage, surface drainage, drainage of flat and slopping lands. Design and layout of surface and sub surface drainage, depth and spacing of drains, installation of drains and drains walls, Types of aquifer, well log, groundwater prospects and water lifting devices. Water Resources Development and Management: water resources of India, surface water

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groundwater, development of irrigation potential, canal irrigation, command development, on farm development works.

5. Theory of Structures and Strength of Materials

Elasticity constants, types of beams - determinate 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 and shear stress for tee, channel and compound sections, chimneys, dams and retaining walls, Eccentric loads, slope deflection of simply supported and cantilever beams, critical load and columns. Torsion of circular section. Springs, Vibration.

6. Structural Analysis

Introduction to Indeterminate structures, Degrees of freedom per node, Static and Kinematic indeterminacy (i.e. for beams, frames & portal with & without sway etc.), Releases in structures, Maxwell's reciprocal theorem and Betti's theorem, Analysis of statically indeterminate structures using slope - deflection method. Analysis of structures using moment - distribution method applied to continuous beams and portal frames with and without inclined members. Unit load method and their applications: deflection of determinate beams and frames, analysis of determinate and redundant frames upto two degree of redundancy, lac of fit in redundant frames.

7. Soil Mechanics and Foundations Engineering

Origin of soil, phase diagram, Definitions-void ratio, porosity, degree of saturation, water content, 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. Permeability of soil, coefficient of permeability. determination of coefficient of permeability, Unconfined and confined aquifers, effective stress, quick sand, consolidation of soils, Principles of consolidation, 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, etc.

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pressure theories, active and passive earth pressures, bearing capacity of soils, plate load test, standard penetration test.

8. Design of R.C. Concrete and Masonry Structures

RCC beams- flexural strength, shear strength, bond strength, design of singly reinforced and double reinforced beams, cantilever beams, T-beams, lintels, one way and two way slabs, isolated footings. Reinforced brick works, columns, staircases, retaining wall, water tanks (RCC design questions may be based on both limit State and working stress methods).

Concrete Technology : Properties, Advantages and uses of Concrete, Cement Aggregates, 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.

9. Design of Steel Structures

Steel design : Steel design and constructions of steel columns, beams roof trusses plate girders.

10. Construction Technology

Stone and Brick Masonry: Ashlar, course and random rubble, stone pillar, dry stone and arch masonry, brick bonds and type of walls.

Lintels: Plastering, pointing, flooring, Expansion and construction joints; Centering and shuttering. General Selection criteria of site, Planning and orientation of buildings.

Roofing: Stone slab, RCC, G.C. Steel, Asbestos cement and jack arch roofing.

Flooring: Cement concrete, flag stone, terrazzo mosaic, Terrazzo tile, Brick on edge, timber Granolithic, linoleum and other floorings.

Plastering: Lime, cement sand, composite and rough coat plaster, Plaster of Paris, painting, Damp proof course, anti-termite treatment.

Centering and Shuttering: Centering form work, shuttering and moulds, timber & steel trestles and false work, scaffolding and shoring, under pinning.

11. Auto Cad Civil Engineering Drawing

12. Soil and Water Conservation:

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Precipitation, hydrologic cycle, runoff measure prediction of peak rate of runoff, factors affecting runoff, hydrograph, Erosion-type factors associated with erosion, assessment of actual annual soil loss by erosion a Impact on agricultural production and productivity. Water erosion control measures, vegetation in soil and water conservation, grass waterways and design. Design of control measures Including permanent structures, stream bank erosion, mechanics of water erosion, wind erosion control, water harvesting structures i.e. Farm Ponds, Tanka, Nadi and Anicut.

Watershed: definition, concept and objectives, water management. Surveying instruments and their uses in watershed planning and executions.

13. Farm Power and Machinery:

Primary and secondary tillage machinery, their select operation, field capacity and efficiency. Machinery for sowing and intercultural operations. Power operated grains harvesting and threshing machinery, Farm tractors, Introduction different systems of tractors and their maintenance.

14. Agricultural Processing:

Mass and energy balance in food engineering, size reduction material handling and separation equipments. Principles of drying and drying equipments. Use of Psychrometric chart. Processing of milk, dairy equipments. Storage of grains a principles of food preservation. Rice and Pulse milling

15. Renewable Energy Sources:

Energy consumption pattern and energy resources, non conventional energy sources viz, solar thermal, solar photovoltaic, bio-energy resources and utilization, selection of biogas plant (site size and type), Improved biomass, cookstoves, wind energy, present status and potential of renewable energy sources in Rajasthan state.

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