

## The Scheme & Syllabus for the competitive examination for the post of Assistant Conservator of Forests:-

1. A candidate for the Rajasthan Forest Service must take all the compulsory subjects and **Any Two** of the optional subjects listed below. The time allowed for each paper shall be **Three** hours.

### (I) Compulsory subjects: Marks

(1) General Knowledge	100
(2) General English	100
(3) Mathematics (Higher Secondary/Matriculation or equivalent standard).	100

### (II) Optional subjects:

(1) Botany	} <b>100 Each</b>
(2) Zoology	
(3) Mathematics	
(4) Chemistry	
(5) Physics	
(6) Geology	
(7) Mechanical Engineering	
(8) Agriculture	
(9) Civil Engineering	
(10) Chemical Engineering	
(11) Statistics	

नोट:- सामान्य अंग्रेजी (General English) का पेपर वर्णनात्मक प्रकार (Descriptive Type) का होगा। शेष सभी पेपर (General Knowledge, Mathematics and any two of the Optional subjects) वस्तुनिष्ठ प्रकार (Objective Type) के होंगे। इनमें प्रत्येक प्रश्न-पत्र में प्रश्नों की संख्या 200 तथा प्रत्येक प्रश्न 1/2 अंक का होगा।

### SCOPE OF PAPER

#### Compulsory subjects

- 1. General Knowledge** Includes knowledge of current events and of such matters of every day observation as may be expected of an educated person who has not made a special study of any specific subject. Questions on Indian History and Geography with special reference to Rajasthan may be included.
- 2. General English** The paper will be set to test the candidate's proficiency in the language besides in essay to be written in English on one of the several specified subjects, it may include translation from Hindi to English, precis writing and use of idioms etc."
- 3. Mathematics** Mathematics of Matriculation standard and Algebra of Intermediate standard.

#### Optional subjects

- 1. Botany** Morphology, Physiology and Life histories of the Cryptogams and Gymnosperms, Life histories of Angiosperms, General Plant Physiology, Ecology, Evolution, Variation and Heredity, Economic botany.
- 2. Zoology** Non-Chordata, cell and tissue, the subjects of Reproduction and Histology, General Principles of Evolution, Chordata, Elementary facts about Embryology, Physiology, Geological and Geographical distribution.
- 3. Geology** Dynamical and Structural Geology, Palaeontology, Historical Geology, Crystallography, Mineralogy, Petrology and Economic Geology.
- 4. Chemistry** Inorganic, Organic and Physical Chemistry.
- 5. Physics** General Properties of Matter, Sound, Heat, Light, Electricity and Magnetism.
- 6. Agriculture** Agronomy, Animal Husbandry and Dairy, Horticulture, Agricultural Economics, Farm Management and Extension.
- 7. Mech. Engineering** Theory of Machines II, Heat Engines IV, Mechanical Engineering, Design, Power Plant Engineering, Engineering Production and Metrology, Industrial Organisation and Management.
- 8. Mathematics** Degree Standard.
- 9. Civil Engineering**

**1. Building material and Properties and strength of materials:-** Building materials-Timber, Stone brick, lime, files and surkhi, mortar and concrete metal and glass-Structural properties of metals and alloy used in engineering practice.

Stresses and strains- Hooke's law-bending. Torsion and direct stresses. Elastic theory of bending of beams-maximum and minimum stresses due to eccentric loading. Bending moment and Shear force diagrams and deflection of beams under static and live loads.

**2. Building construction and Water Supply and Sanitary engineering:-** Construction-Brick and Stone masonry; walls, floors and roofs, staircases, carpentry in wooden floor, roofs, ceilings, doors and windows, finishes(plastering painting, painting and varnishing etc.).

Soil mechanics-Soils and their investigation, Bearing capacities and foundations of building and structures-Principles of design.

Building estimates-Principles, units of measurement; Taking out quantities for building and preparation of abstract of cost-specifications and data sheets for important items.

Water supply-Sources of water, standards of purity, methods of purification, layout of distribution system, pump and boosters.

Sanitation-Sewers, storm water; overflows, house drainage, requirements and appurtenances, septic tanks, Imhoff tanks, sewage, treatment and dispersion trenches-Activated sludge process.

**3. Roads and bridges:-** Survey and alignment- Highway materials and their placement-Principles of design-width of foundation and pavement, camber, gradient, curves and super-elevation-Retaining walls.

Construction-Earth roads stabilized and water bound macadam roads, Bituminous surfaces and concrete roads, drainage of roads, Bridges-Types, economical spans, I.R.C. loading,

designing super-structure of small span bridges-Principles of designing foundation of abutments and pillars of bridge, pile and well foundation.

Estimating Earthwork for roads and canals.

#### **4. Structural Engineering. :-**

Steel structures-Permissible stresses, Design of beams, simple and build-up columns and simple roof trusses and girders column bases and grillages for axially and eccentrically loaded columns-Bolted rivetted and welded connections.

R.C.C. structures-Specifications of materials used-proportioning workability and strength requirement. I.S.I. standards for design loads, permissible stress in R.C.C. members subject to direct and bending stresses, Design of simply supported, overhanging and cantilever beams, rectangular and Tee beams in floors, roofs, and lintels-addily loaded columns; their bases;

10. Chemical Engineering

#### **1. Transport phenomena(under steady state conditions):-**

(a) Momentum transfer-(i) Different patterns of flow and their criteria-

(ii) Velocity profile.

(iii) Filtration, Sedimentation centrifuge;

(iv) Flow of solids through fluids.

(b) Heat transfer-Different modes of heat transfer:

Conduction- Calculation for single and composite walls of flat, cylindrical and spherical shapes.

Convection- Different dimensionless groups used in forced and free convection. Equivalent diameter. Determination of individual and overall heat transfer co-eff.

Evaporation-Radiation-Stefan-Boltzman law. Emmissivity and absorptivity.

Geometrical Shapes factor.

Head load of furnaces-calculation.

(c) Mass transfer-Diffusion in gases and liquids, Absorption, desorption humidification, dehumidification, drying and distillation. Analogy between momentum, heat and mass and transfer.

**2. Thermodynamics:-**(a) 1<sup>st</sup>, 2<sup>nd</sup> and 3<sup>rd</sup> Laws of thermodynamics.

(b) Determination of internal energy, entropy, enthalpy and free energy-Determination of Chemical equilibrium constants for homogeneous and heterogeneous systems. Use of thermodynamics in combustion, distillation and heat transfer, Mechanism and theory of mixing, various mixers for liquid-liquid, solid-liquid and solid-solid.

**3. Reaction Engineering:-** (i) Kinetics: Homogeneous and heterogeneous reactions 1<sup>st</sup> and 2<sup>nd</sup> order reactions.

Batch and flows- Reactors and their design.

(ii) Catalysis-Choice of catalysts-preparation.

mechanics of catalysts based upon mechanism.

**4. Transportation:-** Storage and transport of materials and in particular powders, resins, volatile and non-volatile liquids, emulsions and dispersions, pumps, compressors and blowers. Mixers-Mechanism and theory of mixing various mixers for liquid-liquid solid-liquid solid-solid.

**5. Materials:-** Factors that determine choice of materials of construction in chemical industries, Metals and Alloys, ceramic, plastics and rubbers. Timber and timber products, Ply-wood laminates;

Fabrication of equipment with particular reference to production of vats, Barrels, filter presses etc.

**6. Instrumentation and process control:-** Mechanical, hydraulic, pneumatics, thermal optical, magnetic, electrical and electronic instruments. Controls and control systems.

Automation.

11. Statistics

1. Frequency distributions-averages percentiles and simple methods of measuring, dispersion, graphic methods, treatment of qualitative data e.g. investigation of association by comparison of ratios, the practice of graphic and algebraic methods of interpolation.

2. Practical methods used in the analysis and interpretation of statistics of prices, wages and income, trade, transport, production and consumption, education etc. methods of dealing with population and vital statistics, miscellaneous methods used in handling statistics of experiments observations.

3. Elements of modern mathematical theory of statistics, frequency curves and the mathematical representation of groups generally of accuracy sampling as affecting averages, percentages, the standard deviation, significance of observed differences between averages of groups etc. theory of co-relation for two variables.