RAJASTHAN PUBLIC SERVICE COMMISSION, AJMER

SCHEME & SYLLABUS FOR THE POST OF ASSISTANT CONSERVATOR FOREST & FOREST RANGE OFFICER GRADE Ist COMPETITIVE EXAMINATION, 2018 FOREST DEPARTMENT

OPTIONAL SUBJECT - FORESTRY

Unit I

Forests, forestry and silviculture- Definitions, objectives and scope. Locality factors and their interactions. Trees growth and development. Silvicultural systems- definition, classification, advantages and disadvantages. Regeneration of forests: objectives, natural and artificial regeneration. Origin, distribution, general description, phenology, silvicultural characters, regeneration methods, nursery practices of *economically important tree species* of Rajasthan and India and control measures of nursery pests and diseases and stand management practices. Seed storage and collection. – Methods, Seed dormancy- types and treatments. Forest nursery- Types, management and establishment. Planting Methods and Plantations – advantages and disadvantages, planning, Choice of species, Plantation establishment and maintenance- Nutrition & fertilizers. Major pest and diseases in plantations, Industrial and Energy plantation- high density short rotation plantations- petro crops and avenue plantations.

Unit II

Forest Mensuration: objectives and scope, Diameter, Height and Volume measurements of standing trees, logs -formulae involved and methods. Determination of growth of trees, Stump analysis and Stem analysis. Estimation of biomass. Crop age-crop volume. Yield regulation - In regular and irregular forests. Estimation of growth and Yield of stands. Forest Inventory -enumeration, Sampling, Sampling design , Stand structure - Growth and Stand density, Canopy density , Yield tables- definition, preparation and uses. Aerial photographs and Photo interpretation, Remote sensing –classification, key elements; image processing; GIS and GPS – process, application and uses in forestry.

Unit III

Introduction – classification of injurious agencies. Injury to forests due to fires, grazing, mining, man and his domestic animals, wild animals, weeds, Frost, flood, landslides, drought, etc. and protection measures. Importance of Forest Pathology, tree disease classification, Principles of tree disease management, - Causes , symptoms and losses, Etiology, mode of spread, epidemiology, including chemical, biological, cultural and silvicultural practices. Nursery diseases and their management. Disease due to physiological and abiotic causes. Forest Entomology - Methods and principles of pest control: Mechanical, physical, silvicultural, legal, biological and chemical measures. Insect pests of forest seeds and freshly felled trees, finished timbers.Forest management- Definition, objective and principles, organization of state forests, sustained and progressive yield, Rotation – types, length. Normal forest, Working plan -preparations, objectives and uses, JFM-concept , principles, rules, importance and legislation, - Modern tools. CFM, Scope and importance of PRA, Social Forestry- need and purpose.

Unit IV

Agroforestry - Benefits and Components. Soil improvement- Nutrient cycling, Microclimate amelioration and carbon sequestration, Tree-crop interaction. Classification of agroforestry systems, Major practices in different agro ecological zones of India- arid and semi arid regions. Tree Management –practices, structure and growth of trees - crown and root architecture, Diagnosis and design methodology, National and International organizations in Agroforestry. Forest recreation –social and environmental aspects of recreation components. Principles and elements of landscaping. Landscape components. Urban forestry – definition, uses, scope and Management, Arboriculture, Nature park, nature trial, Biological park, Ecopark, BD park , Ecotourism, Signages, Restoration and rehabilitation of natural landscapes in India.

Unit V

Wood anatomy (dicots and monocots). Simple and Complex tissues. Secondary growth. Anatomical features of common Indian timbers. Kinds of woods and their properties. Wood seasoning- defects ,types and mechanism. Classification of timbers. Wood preservation, Wood machining. Various forest based industries. Composite and improved woods. Wood modification and types. Adhesives and their uses. Rayon manufacture and destructive distillation of wood. Logging and conversion. Felling rules and methods. Transport of timber. Grading and storage of timber. Ergonomics: components and provision of energy. Personal protective equipments.

Unit VI

Non timber forest products: classification, sources, extraction, storage and uses. Ethnobotany - Terms & Folk uses of plants for medicines, food, dyes, tans, etc. Medicinal and Aromatic plants in Rajasthan and India, origin, cultivation, Active principles and their uses: *Atropa*, *Cinchona*, *Rauvolfia*, , *Acorus, Withania, and Aloe,* Periwinkle, Safed musli , *Sandal, Neem, Dioscorea, Costus, Solanum*, *Ocimum, Plumbago*, *Tinospora*, *Indigofera* . Anthropology: Terms and description. Distribution and classification of tribes in Rajasthan and India.

Unit VII

NFP'S -scope, necessity, importance and comparative analysis. Indian judicial system-Legal definitions, application of IPC to forests, general principles of criminal law, punishment, criminal procedure code, the law of evidence and the Indian Evidence Act, 1872 as applied to forestry matters. Indian Forest Act, 1927 -general provisions, Code of Civil procedure, 1908. FCA-1980, NGT, Forest Dwellers Act 2006 , EPA (1986), WPA (1972) and its amendments. National Agroforestry Policy 2014, Green highways-2015, Rajasthan State Forest Acts and Rules.

Unit- VIII

Structure and functions of gene and cell. Mendelism, Mutation. Totipotency and Morphogenesis, Micro propagation, Somaclonal variation and cybrids, Restriction enzymes; Vectors for gene transfer, DNA finger printing. Dendrology- ICBN. Families description of some important monocot and dicot plants. C_3, C_4 and CAM plants. Photosynthesis, Respiration, Plant water relations, PGR's, Tree improvement: Germplasm, Incompatibility and sterility. Quantitative genetics. variability. Provenance trials, Selection methods, seed production areas, seed orchards. Progeny trial and improvement of seed orchards. Hybridization, back cross and heterosis breeding.

Unit-IX

Ecosystem and its components. Nutrient cycling, Population ecology. Ecological successions, Wetland and Ramsar sites of Rajasthan. Restoration of degraded lands. Weather and climate and their interactions with plants. Agro climatic zones of Rajasthan and India. Global warming. Vulnerability and adaptability. UNFCCC, NATCOM, NAPCC, Green India mission. Environmental Pollution. Population growth, population explosion. Disaster management, NDM framework; role of different organization.

Unit-X

Wildlife, Wildlife Ecology- habitat and its management. Edge effect, Cruising Radius, Carrying Capacity. Biogeographic zones of India, IUCN threat categories, Red data book, wildlife census. Telemetry, Conservation and its methods. Projects: Tiger, Elephant, Muskdeer, Wildlife Corridors, MAB, CITES, Protected areas: National Parks, Sanctuaries and Biosphere Reserves. Important PA's of Rajasthan and India. Origin and classification of birds, Thermoregulation, Migration, Feeding, Song, Nests. Herpetology: Classification and origin of amphibians and reptiles. Nutrition and disease management in wild animals. Taxidermy and its techniques.

Unit XI

Economics- definition and Basic concepts, Theory of consumption- Laws of utility, Consumer surplus, Demand and supply with reference to timber and non-timber products. Production –Meaning, factors & functions, Marketing- definition, process, Need, Role, functions and channels, Classification of markets, Price spread, Marketing Efficiency, Integration, Constraints in marketing of forest produce. SWOT analysis. Markets- features and classification, Market inefficiencies in timber and NTFP's and measures to check it. Essentials of WTO, GATT, Dunkel proposals, IPR and Patenting. ITTO and timber certification. Forest certification- Definition, Principal stages and Key aspects, Certification schemes in operation.

Unit XII

Surveying - methods, uses, classification. Instruments used Scales, Contour surveying, Buildings materials- types, strength and characteristics, forest roads- alignment, construction and drainage; retaining walls and culverts; bridges-types. Properties of soils under different forests. Site productivity and nutrient cycling. Role of microorganisms in soil fertility. Mineral transformations-carbon cycle. Bio-fertilizers – their importance. Nitrogen fixation- Rhizobium-tree legume symbiosis, *Frankia* x non-legume symbiosis, asymbiotic, Mycorrhizae: types, biology and importance in forestry. INM in plantation forestry. Hydrological cycle. precipitation- rain and snow hydrology. Interception, infiltration, evaporation and transpiration- surface water, run off processes. Watershed management- principles and practices- Methods for water conservation. Role of trees in water conservation, natural terracing, species suitability- Recharging of water springs.

Note :- **Pattern of Question Paper**

1. **Objective type paper**
2. **Maximum Marks : 200**
3. **Number of Questions : 120**
4. **Duration of Paper : Three Hours**
5. **All questions carry equal marks.**
6. **There will be Negative Marking.**