DETAILED SYLLABUS FOR THE POST OF MANAGER IN KERALA FOREST DEVELOPMENT CORPORATION LTD. CAT NO: 211/2024

Total : 100 Marks

Module 1 **10 marks**

Definition of forest and forestry. Classification of forest and forestry, branches of forestry and their relationships. Definition, objectives and scope of Silviculture. Status of forests in India and their role. History of forestry development in India. Trees and their distinguishing features. Growth and development. Forest reproduction. Site factors. Classification of climatic factors. Role played by light, temperature, rainfall, snow, wind, humidity and evapo-transpiration in relation to forest vegetation. Bioclimatic and micro climate effects. Edaphic factors - influence of biological agencies, parent rock, topography on the soil formation. Soil profile – physical and chemical properties. Physiographic factors - influence of altitude, latitude, aspect and slope on vegetation. Biotic factors - influence of plants, insects, wild animals, man and domestic animals on vegetation.. Influence of forests on environment. Tending and cultural operations. Thinning-kinds of thinning - improvement felling- salvage cuttings- pruning- pollarding, lopping. Forest types of India and their distribution. Plant- forest succession, competition and tolerance.

Module 2 **10 marks**

Regeneration of forests – objectives, ecology of regeneration- Natural and Artificial regeneration. Advance growth, coppice, root sucker. Regeneration survey. Artificial regeneration. Factors governing the choice of regeneration techniques. Choice of species. Preparation of planting material - field planting-site preparation- planting density spacing -marking- boundary demarcation, fencing, alignment and staking-kinds of pit making-patterns of planting, Plant protection and sanitation measures, - forest nutrition-fertilization in trees. Silvicultural system -definition, scope and classification. Even aged and uneven aged forests and their crown classes. Detailed study of the silvicultural systems: Clear felling systems including clear strip, alternate strip and progressive strip systems. Shelterwood system -Uniform system, Group system, Shelterwood strip system, Wedge system, Strip and group system, Irregular shelterwood system, Indian irregular shelterwood system. Seed tree method. Selection system and its modifications. Accessory systems. Coppice system -Simple coppice system, Coppice of the two rotation system, Shelterwood coppice system, Coppice with standard system, Coppice-with-reserve system, Coppice selection system, Pollard system. Conversion and its implications. Choice of silvicultural system. Dauerwald concept. Culm selection system in Bamboo, Silvicultural systems followed in other countries. Plantation silviculture - Choice of species-Plantation establishment- Plantation maintenance-. Nutrition in plantations-

nutrient deficiencies, symptoms of deficiency- use of fertilizers- - Major pest and disease in plantations. Dynamics of stand growth- stand density management in plantations- spacing-planting density regulation- Thinning regimes- improvement fellings- CCF-MCA- Site quality evaluation- stand basal area site index concept in plantation forestry- plantation productivity assessment- growing stock assessment Clonal plantations. LULUCF and REDD concepts, AR-CDM concepts.

Module 3 **05 marks**

Propagation through seeds; seed germination, seed dormancy. Seed biology. Production of quality seeds; Candidate tree, plus tree and elite seed tree. Seed production areas; establishment and management of SPA. Seed orchards; types of seed orchard, establishment and management of seed orchards. Seed collection; planning and organization, seed collection methods, factors affecting choice of seed collection methods, seed maturity tests, precaution for handling of recalcitrant seeds. Seed processing. Seed storage. Seed testing. Classes of tree seeds, certification procedure of tree seeds. Vegetative propagation techniques: cuttings, factors affecting rooting of cuttings budding, layering and grafting. Propagation through specialized organs like bulb, rhizome, corm, runners and suckers. Micro-propagation. Establishments of nursery: types of nursery, site selection, planning and layout of nursery area. Nursey growing containers and media.

Module 4 **10 marks**

Origin, distribution, general description, phenology, silvicultural characters, regeneration methods, silvicultural systems, and economic importance of the following tree species of India. Broadleaved species: *Tectona grandis, Shorea robusta, Dalbergia latifolia, Dalbergia sissoo, Anogeissus spp, Terminalia spp., Santalum album, Swietenia macrophylla, Albizia spp, Santalum album, Pterocarpus marsupium, Gmelina arborea, Pterocarpus santalinus, Azadirachta indica, Hopea parviflora, Lagerstroemia microcarpa, Bamboos, reeds and rattan, Quercus spp.* Conifers*: Abies pindrow, Picea smithiana, Cedrus deodara, Pinus roxburghii, Pinus wallichiana*. Fast growing MPTs*:,Tropical pines, Eucalyptus spp, Casuarina equisetifolia, Leucaena leucocephala, Ailanthus triphysa, Grevillea robusta, Pongamia pinnata, Melia dubia, Acacia spp, Populus spp*

Module 5 **10 marks**

Agroforestry definition and scope. History of agroforestry. Classification of agroforestry system - structural, functional, socioeconomic, and ecological basis. Traditional agroforestry systems: shifting cultivation, taungya, homegardens. Land capability classification and land use . Plantation agriculture and plantation forestry. Choice of species for agroforestry. Provisional and regulatory services of agroforestry- Food and nutritional security- Tree crop interactions in Agroforestry-Positive and Negative interactions. Industrial agroforestry concept and importance. Agroforestry systems in different agro climatic zones, components, production and management techniques. Alley cropping, High-density short rotation plantation systems, silvicultural woodlots/energy plantations. Different types of Pastoral siviculture and silvopastoral

systems Silvoagriculture systems- Agrosilviulture, Pastoral silviculture , Silvopastoral and Agrosilvopastoral systems and their mangement; agrihortisilviculture, silvihorticulture, hortipastoral , aquaforestry, shelterbelts and windbreaks ; live fences; fodder trees and protein banks. Canopy management. Diagnosis and design methods and approaches. Biophysical and ecological functions of agroforestry: Nutrient cycling and role of agroforestry in soil and water conservation. Carbon sequestration-Climate change mitigation and phytoremediation. Adverse effects of trees on soils - competition, allelopathy – causes and mechanisms. Soil fertility considerations in Agroforestry – nutrient needs of trees and crops, activities of soil fauna and microorganisms affecting plant growth. People's participation, rural entrepreneurship through Agroforestry and industrial linkages. Financial and socio-economic analysis of Agroforestry systems. Evaluation of tangible and intangible benefits.

Module 6 **10 marks**

Forest Protection – classification of injurious agencies. Forest Fire - causes and Management. Injury to forest due to man, lopping – fuel wood collection – Encroachment- - method of control. Forest weeds and weed management, management of woody climbers, parasites and epiphytes. Forest Pathology- tree disease classification, Principles of tree disease management, - Causes and symptoms- losses due to forest tree diseases, root diseases (wilt, root- and butt rot), stem diseases (heart rots, stem blisters, rusts, stem wilt, cankers, pink diseases, gummosis, water blister) and foliar diseases (rust, powdery mildew, leaf spot, leaf and twig blight, abnormal leaf fall, needle blight etc.) of Etiology, symptoms, mode of spread, epidemiology and management, including chemical, biological, cultural and silvicultural practices. Nursery diseases and their management. Disease due to physiological causes. Abiotic diseases. Forest Entomology in India. Methods and principles of pest control: Mechanical, physical, silvicultural, legal, biological and chemical. Principles and techniques of Integrated Pest Management in forests. Classification of forest pests: types of damages and symptoms; factors for outbreak of pests. Nature of damage and management: Insect pests of forest seeds, forest nursery and standing trees of timber yielding species of natural forest and Plantation forest species. Insect pests of freshly felled trees, finished timbers and their management.

Module 7 **05 marks**

Forest Mensuration- Definition, objectives and scope of forest mensuration. Scales and Units of measurement, error and accuracy. Measurement of individual tree parameters. Bark measurements. Crown measurement . Height measurement –principles, instruments.Trees stem form- classification of form factors and form quotient. Volume tables- classification and preparation. Tree biomass- estimation methods. Age determination of tree- objective and methods. Tree growth measurement –stump analysis, stem analysis and increment boring. Measurement of tree crops –crop diameter, crop height, crop age and crop volume. Stand growth, site quality, site index, stand structure, yield tables, preparation and stand table. Forest inventory –

definition objectives, kinds of enumeration. Sampling- definition, advantages, kinds of sampling, random sampling, Non random sampling. Point sampling-horizontal and vertical point sampling.

Module 8 **05 marks**

Forest Management - Scope, Objective and Principles. Organization of state forests.. Sustained yield-definition, Principles and limitations increasing and progressive yields. Sustainable Forest Management-Criteria and Indicators- Rotation-definitions-various types of Rotations-length of rotations choice of type and kind of rotation. Normal forest-definitions basic factors of normality. Growing stock, Estimation of growing stock. Yield regulation- concept, basis and yield regulation models- Estimation of growth and yield prediction in forest stands- Stand structure - Stand density - Working plan-Working Plan Code 2014- preparations objectives and uses-forest maps and their uses. Joint forest management - Modern tools in forest management. Concept and Importance of Ecotourism.

Module 9 **05 marks**

Tree improvement. Reproduction in forest trees. Anthesis and pollination – their importance in tree breeding. Incompatibility and sterility. Quantitative inheritance- Genetic, environmental and interaction components of variation - heritability and genetic advance. Genetic basis of tree breeding. Natural variability in trees – types and importance.- forces that change variability. Exotic forestry. Provenance testing. Selection- seed production areas–seed orchards. Progeny trial and improvement of seed orchards. Combining ability and genetic gain – Hybridization in trees – back cross breeding, heterosis breeding. Mutation breeding; Ploidy breeding. Breeding procedures for development of hybrids, / varieties of various crops. DUS testing, Concepts of Geographical indications. Artificial hybrids in trees crossing in trees-problems and perspectives. Breeding for resistance to insect pests' diseases, air pollution and for wood properties. Vegetative propagation and Clonal forestry. Conservation of forest tree germplasm.

Module 10 **10 marks**

Wood as raw material - merits and demerits of wood as raw material. Kinds of woods. Physical properties of wood–density and specific gravity; wood and water relationship-moisture content, shrinkage, swelling, movement, fibre saturation point, equilibrium moisture content; electrical, thermal and acoustic properties of wood. Mechanical properties of wood- tension, compression, static bending, impact bending, shear, indentation, torsion, cleavage and nail and screw pulling test. Suitability of wood for various end uses based on mechanical and physical properties. Wood seasoning – Introduction, principles, objectives and importance of wood seasoning; classification of timber based on seasoning behaviour; seasoning methods – air seasoning, kiln seasoning, type of kilns and drying schedules, special seasoning methods; seasoning defects and their control. Wood preservation– principles, processes, need, types of wood preservatives. classification of timbers based on durability, general idea about fire retardants and their usage. Non-pressure methods – steeping, dipping, soaking open tank process, Boucherie process. Pressure methods – full cell process, empty cell

process (Lowry and Rueping). Wood machining: Sawing milling– sawing techniques; Saw mill machineries-cross-cutting machines, head saws re-saws. Wood working- wood working machineries**.** Dimensional stabilization of wood by surface coating method, bulking method, impregnation of resins and polymers. Wood finishing. Pulping-mechanical, chemical, semichemical and semi-mechanical- manufacture of rayon and other cellulose derived products. Manufacture, properties and uses of Composite wood-plywood, fiberboard, particleboard and hard board. Improved wood-types . Destructive distillation of wood. Saccharification of wood. Production of wood molasses, alcohol and yeast. Structural uses of Timber. Decorative uses of wood. Wood carving and handicrafts. Nano technology in wood.. Other forest based industries – veneer, sawn wood, furniture, bamboo, sports goods, pencil making, match box and splint making.

Module 11 **05 marks**

Collection and management and importance of Non-Timber Forest Products (NTFP). Fodder (grasses and tree leaves), canes and bamboos. Essential Oils and Non-essential oils. Important fixed oil yielding trees. Gums and resins - Resins and Oleoresins, Tans, Dyes , Beedi leaves , Fibers and flosses, Katha and Cutch, Drugs, spices, wild edible plants . Animal products – honey and wax, silk, lac, fish, Wild edible animal products. Mineral products and other miscellaneous products.

Module 12 **05 marks**

History of Wildlife in India; Values of Wildlife, Basic requirements of wildlife – Food chain, Food web, Ecological pyramids; Wildlife Ecology: Biotic factors, Biological basis of wildlife, Productivity; Effect of light and temperature on animals; Zoogeographical regions and biomes of the world; Wildlife Habitat, Animal behavior and adaptation; Wildlife census; Habitat Improvement; Captive wildlife: Zoos and safari parks, Captive breeding for conservation, Central zoo authority of India. Principles and practices of wildlife management; Forest and wildlife management in India. Population Management. Species conservation projects. Wildlife Management plan for Protected Areas; *In-situ* and *Ex-situ* management/ conservation. Man-animal conflict and its management; Red data book and IUCN; Wildlife Ecotourism: sustainable tourism and people's participation; Agencies in wildlife conservation: IUCN, CITES, WWF, IBWL; Community participation in wildlife management; Case studies; Wildlife policies and legislation.

Module 13 **10 marks**

Forest Policy: definition, necessity and scope. Legal and institutional approaches to forest resource management. Legal rights- types of legal rights, law of evidence, admission, confession, punishments. Constitutional provisions related to forest conservation. Indian National Forest Policies-NFP-1894, NFP, 1952 and NFP, 1988, Forest Law: legal definition. Indian Evidence Act, 1872 as applied to forestry matters. Indian Forest Act. Detailed study of IFA 1927. Forest (Conservation) Act, 1980 and its amendments. The Biological Diversity Act, 2002 and amendmends. The Scheduled Tribes and Other Traditional Forest Dwellers (Recognition of Forest

Rights) Act, 2006. Indian Penal Code and Criminal Procedure Code related to forests. National Green Tribunal.

NOTE: - It may be noted that apart from the topics detailed above, questions from other topics prescribed for the educational qualification of the post may also appear in the question paper. There is no undertaking that all the topics above may be covered in the question paper