FURTHER DETAILS REGARDING MAIN TOPICS OF PROGRAMME No. 10/2019 (Item No.2)

FOREST RANGER (RANGE FOREST OFFICER)

(NCA NOTIFICATION)

FOREST

(Category No.012/2018)

1. Forest Ecology and Biodiversity
World forest resources, Forest types of India and Kerala. Basic concepts of
ecology and ecosystems, forest community structure, vegetation dynamics
— succession, retrogression, pioneer and climax communities. Fauna and
flora in forests, animal and plant biodiversity in relation to ecological niches,
endemism, rarity of species, conservation of biodiversity.
2. Silviculture
Site factors, reproduction methods, pure and mixed stands, even and uneven
aged stands, site quality, stand density indexes, silvicultural characteristics
of stands and trees, stand development, biology of stand growth.
Regeneration techniques. Sowing vs. planting, forest nurseries. Site
preparation. Tending and intermediate cutting. Methods and application of
thinning. Silvicultural systems. Silviculture of trees. Plantation forestry in
India. Choice of species. Fertilization in plantations. Clonal plantations.
3. Agroforestry and Social Forestry
Tropical deforestation, rising demands of füelwood, fodder and timber.
Classification of agroforestry systems. Agroforestry for wasteland
development, woodlots and biofuel plantations. Agroforestry for soil

and
water conservation. Micro-site enrichment by trees. Adverse effects of trees
on soils. Choice of species in agroforestry. Crown and root architecture, tree
management - thinning, lopping, pollarding, pruning. Social forestry. Multipurpose trees. Agroforestry and social forestry for climate change mitigation and adaptation. Phytoremediation.

4. Forest Hydrology and Watershed Management

Hydrological cycle. Energy and water balance equations. Hydrological processes. Paired watersheds. Surface water, run off and hydrograph. Soil
water energy concept, movement, availability. Watershed management.
Water harvesting. Forest treatment and water yield.

5. Tree Seed Technology

Seed production areas. Seed collection. Fruit and seed handling, Seed processing. Seed storage, Harrington’s rule of thumb. Seed dormancy. Treatments for breaking dormancy. Seed dressing and pelleting. Seed testing, viability tests. Deterioration of seeds. Concept of seed vigour. Cryopreservation - genetic conservation. Seed Act and seed law enforcement.

6. Forest Mensuration, Inventory and Yield Prediction

Diameter, girth, height, and basal area measurements. Volume measurements of standing trees, logs, branchwood. Volume tables. Determination of growth of trees. Increment - CAI and MAI. Stump and stem analysis. Tree stem form - Metzgr’ s theory. Forest Inventory. Point
sampling. Growth and yield prediction, crown competition factor, yield tables.

7. Forest Management, Policy and Legislation

Principles of forest management. Sustained yield principle and its limitations. Rotation - factors influencing length of rotations. Normal forest,
regular and irregular forests. Working plans. Joint forest management. Forest policies in India, Forest Laws and Acts, The Wildlife (Protection) Act 1972, Forest (Conservation) Act 1980, Environment (Protection) Act
1986. International Treaties like CITES, CBD, RAMSAR. The Biological Diversity Act, 2002.

8. Forest Protection
Injury to forest due to fires, causes and character of forest fires, fire prevention, fire suppression and fire control policy and objectives. Injury to
forests due to man, lopping, cutting for fuelwood, encroachment, illegal
felling. Forest weeds and weed management, management of woody climbers, parasites and epiphytes.
3
9. Forest Entomology and Nematology
Pest problems in forest nurseries. Biology and control of important insect
pests of economically important tree crops. Insect vectors of tree diseases.
Risk in the use of pesticides in forest ecosystems. Newer methods of control,
pheromones, antifeedants, hormone mimics, chitin inhibitors and biocontrol
agents. Integrated pest management. Insect pests of felled trees and storage
yards and their control. Termite problems. Forest nematology - nematode
management.
10. Forest Pathology
Losses due to forest tree diseases - root, stem and foliar diseases of major
species - etiology, symptoms, mode of spread, epidemiology and management (chemical, biological, cultural and silvicultural practices). Nursery diseases. Timber decay and its management. Beneficial fungi -
Mycorrhizal association of forest trees - edible mushrooms.
11. Remote Sensing and GIS in Forestry
Aerial and space remote sensing; Aerial photographs, Photointerpretation;
Satellite remote sensing, Indian Remote Sensing Programme; Visual and
digital image processing - vegetation mapping using satellite imagery; Forest
cover monitoring and damage assessment; GIS and conventional cartography. Spatial and non-spatial data.
12. Logging and Utilization of Timber

Logging in India and other countries, felling and conversion - implements
used. Season and method of felling. Safety measures in logging. Reduced
impact logging. Converted wood. Transportation of timber and firewood.
Extraction methods. Girdling. Modem methods of harvesting and transportation. Marketing and sales. Storage, management of depots. Non
wood forest produces.

4

13. Ecotourism and Urban Forestry

Ecotourism potentials of Kerala — management of eco-parks and ecotourists. Economics of ecotourism. Forest recreation. Principles and practices of landscaping - landscape ecology. Urban forestry, Management
of urban forest. Arboriculture.

14. Tree Breeding

Tree breeding. Quantitative inheritance. Hardy-Weinberg law - genetic drift.
Methods of breeding - heterosis breeding in trees. Types of genetic interactions - additive and dominance theories. Provenance testing and ecogeographic
surveys. Plus tree identification - establishment of seed orchards. Clonal propagation - second generation seed orchard.

15. Wood Science and Technology

Formation of wood - sapwood and heartwood, hardwood and softwood. Physical and mechanical properties of wood. Chemistry of wood. Seasoning.
Defects in timber Uses of wood. Primary conversion - sawing, veneering and
chipping. Composite wood. Improved wood. Pulp and paper manufacturing.
Wood bio-deterioration. Wood preservation. Fire retardant chemicals.

16. Wildlife Sciences

Animals in relation to man - free living, captive, domesticated and feral
animals. Habitat use concept. Role of wildlife management in conservation.
Wildlife management techniques. Wildlife census. Wildlife damage control -

capture, telemetry. Healthcare. Utilizational categorization of captive wildlife - taming and training of captive wildlife. Central Zoo Authority. Utilization of captive wildlife. Management of zoological gardens, deer parks and safari parks.

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