RAJASTHAN PUBLIC SERVICE COMMISSION, AJMER

SYLLABUS FOR SCREENING TEST FOR THE POST OF BOTANIST (BOTANY) (AYURVEDA DEPARTMENT)

1. Classification, Thallus organization, structure, reproduction and life cycle of important groups of algae (protochlotophyta, charophyta, xanthophyta, Bascillariophyta, Phaeophyta and Rhodophyta). Economic importance of algae.

2. Recent trends in classification, cell ultrastructure, nutrition and reproduction of important groups (Mastigomycotima, Zygomycotima, Ascomycotima, Basidiomycotima). Fungal diseases in humans. Economic importance of fungi. Fungi as biocentral agents.

3. Classification, morphology, structure, reproduction and life history of important groups (Marchantiales, Jungermaniales, Anthocerotales Sphagnales, Funarials and Polytrichales). Economic and ecological importance of Bryophytes.

4. Classification, morphology, anatomy and reproduction of important groups (Psilopsida, Sphenopsida & Pteropsida). Evolution of stele in Pteridophytes. Heterospory and origin of seed habit.

5. Classification, distribution, structure, reproduction in Cycadales, Ginkgoales, Conferales & Ephedrales. Economic importance of Gymnosperms.

6. Taxonomy of angiosperms- Taxonomic hierachy (species, genus, family and other categories). International code of botanical nomenclature. Ecades, ecotypes, evolution and differentiation of species in relation to environment. Taxonomic evidences-morphology, anatomy, palynology, embryology, cytology, phytochemistry, genomic analysis and nucleic acid hybridization. Biochemical and molecular techniques in taxonomy.

7. Reproduction and life cycle of angiosperms. Male gametophyte. Pollen allergy, pollen embryos and male sterility. Structure and types of embryo sac. Pollination, pollen pistil interaction,fertilization, double fertilization and in vitro fertilization. Embryogenesis, polyembryony, apomixis, embryo culture.

8. Development, organization and differentiation of shoot, leaf and root. Wood development in relation to environment.

9. Ecological factors and interactions, holistic environment. Types of biotic interactions. Population characteristics, ecological succession, changes involved in succession, concept of climax. Structure and function of ecosystem. Forest, grassland, aquatic, marine and eustarine ecosystems. Biogeographic zones of India. Environmental pollution, global environmental

change. Biodiversity in ecosystem stability. Principles and strategies of conservation, National parks, sanctuaries and biosphere reserve.

10. Origin, evolution, botany, cultivation and uses of food, fodder, fibre crops. Medicinal and aromatic plants, vegetable and Oil-yielding crops.

11. Uptake, transport and translocation of water, ions, solutes and macromolecules from soil. Transpiration, mechanisms of loading and unloading of photoassimilates. Photosynthesis, C3, C4 and CAM pathways. Respiration and photorespiration. Nitrogen metabolism, plant hormones (physiological effects and mechanism of action). Sensory photobiology, stomatal movement, photoperiodism and biological clock. Secondary metabolites- biosynthesis and roles in pharmaceutical applications.

12. Plant tissue culture and its application in production of secondary metabolites/natural products. Identification and separation of secondary plant products using HPLC and GLC. Determination of molecular markers using RFLP, RAPD & APLP techniques. Recombinant DNA technology and its uses in DNA finger printing gene amplification and genecloning through Agrobacterium. Transgenic plants. Ecological risks and ethical concerns of transgenics. Genetic improvement of industrial microbes and fermentation technology.

13.Isolation, purification and quantification of nucleic acids and proteins. One and two dimentional gel electrophoresis. Isoelectric focussing. Methods of protein and DNA sequencing. PCR and RT-PCR. Detection of molecules using ELISA, RIA, Western blot, Immunoprecipitation. FISH and GISH. Principles and application of UV/visible spectrophotometer, NMR and ESR.

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Pattern of Question Papers:

1. Objective Type Paper
2. Maximum Marks : 100
3. Number of Questions : 100
4. Duration of Paper : Two Hours
5. All Questions carry equal marks
6. There will be Negative Marking

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