

# Rajasthan Public Service Commission, Ajmer

## SYLLABI OF THE PAPER/SUBJECTS PRESCRIBED FOR THE MAIN EXAMINATION

### OPTIONAL SUBJECT

#### **BOTANY PAPER-I (Code No.04)**

(PLANT MORPHOLOGY, TAXONOMY AND ECONOMIC BOTANY)

1. Pattern of variation in morphology and life history, broad outline of classification and evolutionary trends in Algae with reference to Oscillatoria, Chlamydomonas, Volvox, Chara, Vaucharia, Ectocarpus and Ploysisiphonia, Economic importance of algae.
2. General characters, board outline of classification, mode of reproduction and economic importance of fungi with reference to the life histories of Sclerotinia, Morchella, Penicillium, Puccinia, Ustilago, Agaricus and Alternaria.
3. General account of structure, reproduction and economic importance of viruses, Mycoplasma and Bacteria. Introductory knowledge of symptoms, causal agent, etiology and control measures of following plant diseases. White rust of crucifers, Green ear disease of Bajra, Loose smut of wheat, Black stem rust of wheat, Citrus canker, Tobacco mosaic and Little leaf of Brinjal.
4. General characters, distribution, alternation of generations, evolutionary trends in Bryophyta with reference to the life cycles of Riccia, Marchantia, Porella Anthoceros, Sphagnum and Funaria.
5. Salient features of morphology and reproduction of pteridophytes with reference to Psilotum, Selaginella, Equisetum and Marsilea. Origin and evolution of stellar system and heterospory in pteridophytes.
6. General character, classification, distribution, morphology, reproduction and economic importance of gymnosperms with reference to the life histories of Cycas, Pinus and Ephedra.
7. Basic principles of the classification of angiosperms; Merits and demerits of Bentham and Hooker's system of classification: important Herbaria and Botanical Gardens of India and their role in plant systematic. Diagnostic characters and economic importance of angiosperms belonging to following families : Ranunculaceae, capparidaceae, caryophyllaceae, Malvaceae, Rosaceae, Fabaceae, Rutaceae, Apiaceae, Cucurbitaceae, Asteraceae, Apocynaceae, Asclepiadaceae, Convolvulaceae, Solanaceae, Acanthaceae, Lamiaceae, Euphorbiaceae, Liliaceae, Arecaceae and Poaceae.
8. Meristems - types, organization and functions; Normal and anomalous secondary growth in Monocot, Dicot and Liana stems; Ecological anatomy.

9. Development and structure of male gametophyte and Embryo sac; Double fertilization, sexual incompatibility; Development, structure and functions of endosperm and embryo; Experimental embryology; Methods and applications of anther and embryo culture; Parthenocarpy.
10. Origin, Botany, cultivation and improvement of wheat, rice, maize, pearl millet (Bajra), sugarcane, cotton and groundnut, Plants as sources of fiber, fuel and timber, beverages, drugs, fatty oils, paper, rubber and insecticides.

**BOTANY PAPER-II (Code No.04)**

(CELL BIOLOGY, GENETICS, EVOLUTION, PLANT BREEDING,  
PLANT PHYSIOLOGY AND BIOCHEMISTRY, BIOTECHNOLOGY AND  
ENVIRONMENTAL BIOLOGY)

1. Structure of prokaryotic and eukaryotic cells; Ultra structure and functions of cell membrane and organelles. Meiosis and its significance; Linkage and crossing over; Numerical and structural variation in chromosomes and their evolutionary significance.
2. Mendelism and Mendelian ratios (monohybrid, dihybrid and polyhybrid ratios), gene concept, interaction of genes-Epistasis, Inhibitory factor, complementary genes; Nucleic acids and their chemistry; Genetic code; Mutation; types and its significance.
3. Origin of life; chemical and organic evolution; evidences, mechanism and theories.
4. Principles of plant breeding with special reference to selection, hybridization and hybrid vigor; Induced mutation, polyploidy and speciation.
5. Water relations of a cell, transpiration, mineral nutrition and ion, transport; Mechanism of photosynthesis; Photorespiration; Aerobic and anaerobic respiration.
6. Nitrogen fixation and nitrogen metabolism; protein synthesis; Enzymes; Physiology of flowering : Photoperiodism and vernalisation; Growth and growth regulators; Physiology of dormancy and seed germination.
7. (a) Biochemistry of carbohydrates and fats; Brief account of secondary metabolites.  
(b) Biotechnology in agri-horticulture, medicines & industries.
8. Ecosystem - structure and function; Energy flow; Biosphere reserves; Environmental pollution, waste and reclamation, sewage disposal and recycling; Biomass as source of energy, Endangered and endemic taxa and their conservation with special reference to the plant wealth of Rajasthan.

\*\*\*\*\*