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Botany Syllabus for Uttarakhand State Civil Services Main Exam-2011

BOTANY

PAPER-I

Microbiology, Pathology, Plant Diversity, Morphogenesis

Microbiology: Microbial diversity, elementary idea of microbiology of air, water and soil; a general account of microbial infection and immunity; application of microbiology with reference to agriculture, industry, medicine and environment.

Plant Pathology: Important plant diseases caused by viruses, bacteria, algae, fungi and nematodes with special reference to root blot of crueifers, tabacco mosaic, leaf curl of papaya, citrus canker, leaf blight of paddy, rust of tea, rust of wheat, smut of barley, late blight of potato, red rot of sugarcane and wilt of arhar.

Plant Diversity: Classification, structure, reproduction, life cycles and economic importance of viruses, bacteria, algae, fungi, bryophytes, pterodophytes and gymnosperms including fossils; morphology of root, stem, leaf, flower and seed secondary growth; embryology-microsporogenesis and male gametophyte, megasporogenesis and female gametophyte, fertilization, embryo and endosperm development; apomixes and experimental embryology, principle of taxonomy, modern systems of classification of angiosperms, rules of botanical nomenclature, biosystematics; distinguishing features of the families-Ranunculaceae, Brassicaceae, caryophyllaceae, Malvaceae, Rutaceae, Fabaceae, Rosaceae, Apiaceae, Cucurbitaceae, Rubiaceae, Solanaceae, Asclepiadaceae, Acanthaceae, Verbenaceae, Lamiaceae, Asteraceae, Apocyanaceae, Euphorbiaceae, Arecaceae, Poaceae and Orchidaceae.

Morphogenesis: Correlation, polarity, symmetry, totipotency, differentiation and regeneration of tissues and organs; morphogenetic factors, methods and applications of cell, tissue, organ and protoplast cultures; somaclonal variations, somatic hybrids and cybrids.

PAPER-II

Cell Biology, Genetics, Physiology and Biochemistry, Ecology and Economic Botany

Cell Biology: Cell as structural and functional unit of life; ultrastructure of eukaryotic and prokaryotic cells, structure and function of plasmamembrane, endoplasmic reticulum, chloroplasts, mitochondria, ribosomes, golgi bodies and nucleus; cell cycle-mitosis and meiosis, chromosomal morphology and chemistry, numerical and structural changes in chromosomes and their cytological and genetical effects.

Genetics: Mendel's law of inheritance, interaction of genes, linkage and crossing over, genetic recombination in fungi, cyanobacteria, bacteria and viruses, gene mapping, sex linkage, determination of sex, cytoplasmic inheritance of plastids; development of genetics and gene concept, genetic code; molecular genetics-DNA as genetic material, structure and replication of DNA; role of nucleic acids in protein synthesis (transcription and translation) and regulation of gene expression; mutation and evolution; DNA damage and repair, gene amplification, gene rearrangement; oncogene; genetic engineering-restriction enzyme, cloning vectors (pBR 322, pTi, lambda phase), gene transfer, recombinant DNA, genomic libraries, application of genetic engineering in human welfare.

Physiology and Biochemistry: Water relations of plants-absorption, conduction of water and transpiration; mineral nutrition and ion transport, translocation of photosynthates, essential micro and macroelements and their function; chemistry and classification of carbohydrates; photosynthesis-mechanism and importance; factors affecting photosynthesis, C3 and C4 carbon fixation cycle, photo respiration; plant respiration and fermentation, Kreb's cycle; proteins and amino acids, enzymes and co-enzymes, mechanism of enzyme action; secondary metabolites (alkaloids, steroids, terpenes, lipids);

Ecology: Concept of ecology and environment, environmental factor including biotic and abiotic; population and community dynamics; structure and function of different ecosystems; Biogeochemical cycles, gaseous cycles, pollution and control, latitudinal and altitudinal variation in vegetation with special reference to the Himalaya; Applied ecology-soil and water conservation; management of agriculture and forests; role of remote sensing in ecology. Threatened plants and conservation of biodiversity. Convention of biological diversity.

Economic Botany: Centres of origin on some crop plants viz; maize, rice, wheat, sugarcane, potato, groundnut, mango, citrus etc.; cereals and legumes of economic importance, common fruits and vegetables, fibre, medicinal and timber yielding plant of western Himalaya; general account of medicinal and aromatic plants.

Ethnobotany: A general account, improvement of crops through plant breeding, hybridization, selection, mutations, transgenic seed etc.