

YVUCET - 2017: SYLLABUS
TEST- 102: Botany

SECTION-A

Microbial Diversity, Cryptogams and Gymnosperms

1. **Viruses:** Structure, replication and transmission; plant diseases caused by viruses and their control.
2. **Bacteria:** Structure, nutrition, reproduction and economic importance. An outline Of Plant diseases of important crop plants caused by bacteria and their control.
3. **Cyanobacteria:** Cell structure, thallus organisation and their prospecting (uses)– Biofertilizers
4. **Algae:** General account, thallus organisation, structure, reproduction, classification and economic importance.
5. **Fungi:** General characters, classification and economic importance. General account of plant diseases caused by Fungi and their control.
6. **Lichens:** Structure and reproduction; ecological and economic importance.
7. **Bryophytes:** General characters, classification and alternation of generations.
8. **Pteridophytes:** General characters, classification, alternation of generations and evolution of sporophyte. Evolution of stele, heterospory and seed habit in Pteridophytes.
9. **Gymnosperms:** General characters, structure, reproduction and classification. Distribution and economic importance; endangered Gymnosperms.
10. **Palaeobotany:** Introduction, Fossils and fossilization; Geological time scale; Importance of fossils.

SECTION-B

Anatomy, Embryology, Taxonomy and Medicinal Botany

1. **Meristems:** Types, histological organisation of shoot and root apices and theories.
2. **Tissues and Tissue Systems:** Simple and complex.
3. **Leaf:** Ontogeny, diversity of internal structure; stomata and epidermal outgrowths.
4. **Stem and root: Vascular cambium** - Formation and function. Anomalous secondary growth.
5. **Wood structure:** General account.
6. Introduction: History and importance of Embryology. Anther structure, Microsporogenesis and development of male metophyte.
7. Ovule structure and types; Megasporogenesis; types and development of female gametophyte
8. Pollination - Types; Pollen - pistil interaction. Fertilization.
9. Endosperm - Development and types. Embryo - development and types; Polyembryony and Apomixis - an outline.
10. Palynology: Principles and applications.

11. Introduction: Principles of plant systematics, Systematics vs Taxonomy, Types of classification: Artificial, Natural and Phylogenetic.
12. Systems of classification: Salient features and comparative account of Bentham & Hooker and Engler & Prantle. An introduction to Angiosperm Phylogeny Group (APG).
13. Current concepts in Angiosperm Taxonomy.
14. Nomenclature and Taxonomic resources: An introduction to ICBN, Vienna code - a brief account. Herbarium: Concept, techniques and applications.
15. Systematic study and economic importance of plants belonging to the following families: Annonaceae, Capparaceae, Rutaceae, Fabaceae (Faboideae/papilionoideae, Caesalpinioideae, Mimosoideae), Cucurbitaceae, Apiaceae, Asteraceae, Asclepiadaceae, Lamiaceae, Amaranthaceae, Euphorbiaceae, Orchidaceae and Poaceae.
16. Ethnomedicine: Scope, interdisciplinary nature, distinction of Ethnomedicine from Folklore Medicine. Outlines of Ayurveda, Siddha, Unani and Homeopathic systems of traditional medicine. Role of AYUSH, NMPB, CIMAP and CDRI. Traditional medicine vs Modern medicine. Introduction and scope of Pharmacognosy. Plant crude drugs.

SECTION-C

Cell Biology, Genetics, Ecology and Biodiversity

1. Plant cell envelopes: Ultra structure of cell wall, molecular organisation of cell membranes.
2. Nucleus: Ultrastructure, Nucleic acids - Structure and replication of DNA; types and functions of RNA, Chromosomes, Special types of chromosomes: Lampbrush, polytene and B - chromosomes.
3. Cell division: Cell cycle and its regulation; (mitosis, meiosis for practical observation)
4. Mendelism: Laws of inheritance. Genetic interactions - Epistasis, complementary, supplementary and inhibitory genes. Linkage and crossing over.
5. Mutations, Chromosomal aberrations - structural and numerical changes, Gene mutations, transposable elements.
6. Gene Expression: Organisation of gene, transcription, translation, mechanism and regulation of gene expression in prokaryotes (Lac. and Trp Operons). Extra nuclear genome: Mitochondrial and plastid DNA, plasmids.
7. Concept and components of Ecosystem. Energy flow, food chains, food webs, ecological pyramids, Plants and environment: Ecological factors - Climatic (light and temperature), edaphic. Ecological adaptations of plants.
8. Population ecology: ecotypes and ecads. Community ecology: Frequency, density, ecological succession (Hydrosere, Xerosere). Production ecology

9. Biodiversity: Concepts, Convention on Biodiversity - Earth Summit. Types of biodiversity. Levels, threats and value of Biodiversity. Hot spots of India – Endemism, North Eastern Himalayas, Western Ghats. Agro-biodiversity: Vavilov centres of crop plants.
10. Principles of conservation: IUCN threat-categories, RED data book - endangered plants of India. Role of organisations in the conservation of Biodiversity - IUCN, UNEP, WWF, NBPGR, NBD.

Physiology, Tissue Culture and Biotechnology.

1. *Water Relations*: Diffusion, Imbibition, Osmosis; water, osmotic and pressure potentials; ascent of sap; transpiration; Stomatal structure and movements.
2. *Mineral Nutrition*: Essential macro and micro mineral nutrients and their role; symptoms of mineral deficiency; absorption of mineral ions; passive and active processes.
3. *Enzymes*: mechanism and regulation of enzyme action, enzyme kinetics, factors regulating enzyme action.
4. *Photosynthesis*: Photosynthetic pigments, absorption and action spectra; Red drop and Emerson enhancement effect; concept of two photosystems; mechanism of photosynthetic electron transport and evolution of oxygen; photophosphorylation; Carbon assimilation pathways: C3, C4 and CAM; photorespiration.
5. *Translocation of organic substances*: Mechanism of phloem transport; source-sink relationships.
6. *Respiration*: Aerobic and Anaerobic; Glycolysis, Krebs cycle; electron transport system, mechanism of oxidative phosphorylation, pentose phosphate pathway.
7. *Nitrogen Metabolism*: Biological nitrogen fixation, nitrate reduction, ammonia assimilation, protein synthesis.
8. *Lipid Metabolism*: Structure and functions of lipids.
9. *Growth and Development*: Physiological effects of Phytochrome - auxins, gibberellins, cytokinins, ABA, ethylene and brassinosteroids; photoperiodism.
10. *Stress Physiology*: Concept and plant responses to water, salt and temperature stresses.
11. Tissue culture: Introduction, Callus culture; cell and protoplast culture, Somatic hybrids and cybrids. Applications of tissue culture: Production of pathogen free plants and somaclonal variants, secondary metabolites and synthetic seeds.
12. Biotechnology: Introduction, history and scope. rDNA technology: Vectors and gene cloning and transgenic plants.