

Botany

B.Sc.Part I

Paper I : Fungi and Microbiology

Unit - I Fungi

1. Outline classification of fungi with particular reference to Alexopolous & Mims classification.
2. Systematic position, occurrence, structure and mode of reproduction in fungi based on the following genera: Albugo , Aspergillus , Puccinia , Agaricus , Altemaria
3. Economic importance of fungi 4. Lichens - a general account.

Unit - II Microbiology

1. Classification and distribution of micro-organisms in nature.
2. Elementary knowledge of isolation and culture of micro-organisms.
3. Structure, nutrition and reproduction in Bacteria & Mycoplasma.
4. Structure and multiplication of viruses with particular reference to T.M.V. & Bacteriophage
5. Applications of Microbiology.

Practical

Fungi : Study of fungal types by preparing suitable slides of the materials prescribed in theory course. Microbiology: Study of types of bacteria with the help of prepared slides and photographs, Gram Staining technique of bacteria.

Paper II : Algae & Bryophytes

Unit - I (Algae)

1. Brief classification of algae with special reference to Fritsch.
2. Organisation of thallus in algae
3. Systematic position, occurrence, structure and mode of reproduction in the following genera : Chlamydomonas, Volvox, oedogonium, Vaucheria, Chara, Ectocarpus, Polysiphonia, Nostoc.
4. Economic importance of algae.

Unit - II (Bryophytes)

1. Outline classification of bryophytes with special reference to Rothmaler.
2. Systematic position, occurrence, morphology, anatomy and reproductive structures in : Riccia , Marchantia , Pellia, Anthoceros & Sphagnum
3. Evolution of sporophyte in bryophytes - a general account.
4. Economic importance of bryophytes.

Practical :

Algae : Study of algal types with the help of temporary preparations prescribed in the theory course. Bryophytes : Study of the types with the help of suitable preparation, section cutting and mounting based on theory syllabus.

Paper III : Pteridophytes, Gymnosperms & Palaeobotany

Unit : I (Pteridophytes)

1. Outline classification and importance of Pteridophytes with special reference to sporne's classification.

2. Systematic position, occurrence, morphology, anatomy and reproductive structures in the following genera : Rhynia , Selaginella , Equisetum & Marsilea.
3. Stele systems and its evolution in pteridophytes.
4. Heterospory and seed habit.

Unit : II (Gymnosperms)

1. General characteristics, affinities and classification of gymnosperms as given by Sporne.
2. Systematic position, occurrence, morphology, anatomy and structure of reproductive parts of the following genera : Cycas , Pinus , Ephedra.
3. Economic importance of gymnosperms.

Unit : III (Palaeobotany)

1. A general account of palaeobotany with special reference to types of fossils and methods of fossilization and geological time scale.

Practical : Study of the following types with the help of specimens, photographs, section cutting and temporary slide preparations ; Pteridophytes : Selaginella, Equisetum and Marsilea ; Gymnosperms : Cycas, Pinus, & Ephedra ; Palaeobotany : Study of the available specimens and fossil slides as prescribed in theory course.

B.Sc.Part II

Paper I : Plant Taxonomy and Economic Botany

Unit - I (Plant Taxonomy)

1. Binomial Nomenclature
2. Classifications of Bentham and Hooker and Hutchinson.
3. Preservation of Plant Material and Herbarium Techniques; Herbaria and Botanical Gardens
4. Systematic position, distinguishing characters and economic importance of the following families : (A) Dicotyledons :
 - (a) Polypetales : Ranunculaceae, Papaveraceae, Caryophyllaceae, Rutaceae, Rosaceae and Apiaceae.
 - (b) Gamopetales : Rubiaceae, Apocynaceae, Asclepiadaceae, Solanaceae, Convolvulaceae, Acanthaceae, Lamiaceae and Asteraceae.
 - (c) Monochlamydeae : Euphorbiaceae.(B) Monocotyledons : Arecaceae, Poaceae

Unit - II (Economic Botany)

1. Economic importance with special reference to plants yielding :
 - (a) Food : Cereals (Rice, Wheat, Maize) ; Millets (Pearl millet and Jowar) ; Potato ; Sugarcane ; Legumes (Soybean, Gram and Pea) ; Oil yielding plants (Mustard, Til, Groundnut and Cotton) ; Fruits - (Apple , Guava and Citrus)
 - (b) Common Fibre yielding plants : Cotton, Sunnhemp, Jute, Coir and Ramie
 - (c) Medicinal Plants : (Poppy, Serpgandha, Neem and Belladonna)
 - (d) Timber yielding plants : Shisham , Sal , Teak , Mahogany

Practical :

1. Taxonomy : (a) Detailed description and identification of locally available wild plants of the families as prescribed in course.
 - (b) Submission of Herbarium collection of at least 25 local wild plants.
2. Economic Botany : Identification and comment on the Plant products as prescribed in theory course.

Paper II : Plant Anatomy and Embryology

Unit - I (Plant Anatomy)

1. Tissues, meristems, structure and function of permanent tissues.
2. Primary anomalous structures in dicot stems.
3. Normal secondary growth in dicot stem and dicot root including abnormal behaviour in stems of (a) Bignonia (b) Boerhaavia (c) Salvadoria (d) Leptadenia.
4. Secondary growth in Dracaena (Monocot stem)
5. Leaf abscission and healing of wounds.

Unit - II (Embryology)

1. Structure of anther , microsporogenesis and development of male gametophyte.

2. Structure and forms of ovule , mega-sporogenesis and development of female gametophyte.
3. Pollination , adaptation for self-pollination (autogamy) and cross-pollination (allogamy) ; Fertilization and Double fertilization.
4. Endosperm and its types , development of nuclear endosperm haustoria , Xenia and metaxenia.
5. Development of Embryo : (a) Dicot (in Capsella sp.) (b) Monocot (in Sagittaria)
6. Apomixis(Non Recurrent and Recurrent) ; Polyembryony and Parthenocarpy.

Practical :

1. Plant Anatomy :Anatomy of the following stems: Nyctanthes, Bougainvillea, Capsicum, Bignonia, Boerhaavia, Salvadora, Lepadnia, Dracaena.
2. Embryology : (a) Study of pollinia in Calotropis flower
(b) Study of permanent slides - L.S. of ovule types. T.S. of anther ; Germinating pollen, Embryosac Polygonum type ; T.S. of Ovary showing placentation , Embryos.

Paper III : Plant Physiology

Unit : I (General Principles and Mechanisms)

1. Diffusion, Imbibition, Osmosis, Plasmolysis ; water relations of a plant cell with reference to diffusion pressure deficit (D.P.D.) and water potential.
2. Mechanism of active and passive water absorption. 3. Ascent of sap.
4. Transpiration:Mechanism of stomatal regulation significance , antitranspirants , guttation, Factors affecting transpiration.
5. Mechanism of absorption of Mineral salts.
6. Respiration : Aerobic and anaerobic ,Glycolysis , Krebs cycle , Electron Transport System(ETS), Factors affecting respiration , Respiratory quotient (RQ) and its measurement.
7. Mechanism of Translocation of solutes.

Unit : II (Growth and Nutrition)

1. Photosynthesis : Light and Dark reactions;Factors affecting photosynthesis ; C3 and C4 plants ; Photorespiration ; autotrophic bacteria (Photosynthetic and Chemosynthetic)
2. Nitrogen Metabolism : N₂ fixation (Symbiotic and Asymbiotic) ; Assimilation into Amino-acids.
3. Plant Growth Regulator : Auxins, Gibberellins, Cytokinins and abscisic acid (ABA).
4. Physiology of Flowering : Photoperiodism and Vernalization.
5. Seed Dormancy and Germination : Method of breaking dormancy such as scarification impact and stratification ; Photoblasticity ; Physiology of seed germination.
6. Mineral Nutrition : Macro and microelements and their physiological role ; Symptoms of mineral deficiency ; Hydroponics and Aeroponics.

Practicals :

1. Demonstration of Endosmosis,Exosmosis,Plasmolysis and imbibition.
2. Demonstration of root pressure and guttation,temporary and permanent wilting.
3. Measurement of transpiration.
4. Evolution of O₂ during photosynthesis under different conditions ; determination of starch.
5. Measurement of R.Q. of different seeds.
6. Effect of hormones & light on the germination of seeds.