

BOTANY (HONOURS)

There shall be two theory and one practical paper in the 1st and 2nd year examination carrying 75 marks in each theory and 50 marks in each practical paper. In the 3rd year there shall be three theory and one practical paper carrying 100 marks each. Students of all the three parts are required to participate in botanical excursions organized by the department to enrich the laboratory and their knowledge.

Paper I**Time - 3 hours****Full Marks - 75**

Ten questions to be set. Five questions to be answered (taking not more than two from any group). Question No. 1 will be of objective type and compulsory.

Group A**1. Algae :**

- (i) General characters, occurrence and distribution, origin and evolution.
- (ii) Classification, ultrastructure of algal cell and economic importance.
- (iii) Thallus organization and evolutionary tendencies.
- (iv) Comparative account of morphology, anatomy and reproduction in *Volvox*, *Oedogonium*, *Coleochaete*, *Vaucheria*, *Ectocarpus*, *Sargassum*, *Polysiphonia* and *Rivularia*.

2. Fungi :

- (i) General characters, occurrence and distribution, origin and evolution.
- (ii) Classification, Ecological and economic importance.
- (iii) Important features and life history of : *Pythium*, *Phytophthora*, *Saccharomyces*, *Eurotium*, *Puccinia*, *Colletotrichum*.

Group B**3. Bryophytes :**

- (i) General characters, occurrence and distribution, origin and evolution.
- (ii) Classification, Ecological and economic importance.
- (iii) Evolution of sporophyte and gametophyte
- (iv) Comparative account of morphology anatomy, reproduction and broad relationship of : *Marchantia*, *Pellia*, *Anthoceros* and

Polytrichum.

4. **Pteridophytes :**

- (i) Salient features and classification, origin and evolution.
- (ii) Stelar evolution, Telome theory, Heterospory and Seed habit.
- (iii) Evolutionary significance of Psilophyta, Lycopsidea, Shenopsida and Pteropsida.
- (iv) Comparative account of morphology, anatomy, reproduction and broad relationships of *Rhynia*, *Psilotum*, *Lycopodium* *Selaginella*, *Equisetum*, *Marsilea* and *Ophioglossum*.

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Paper II

Time - 3 hours

Full Marks - 75

Ten questions to be set. (Four questions from Group A and Five from Group B). Two questions to be answered from each group. Question No. 1 will be of objective type and compulsory.

Group A

1. **The cell & cell division :**

- (i) Cell Theory and Cell Structure.
- (ii) Comparative account of prokaryotic and eukaryotic cell.
- (iii) Mitosis and Meiosis, mechanisms of cell cycle control, Apoptosis.

2. **Nucleus, Ribosomes, Mitochondria & Chloroplast :**

- (i) Ultrastructure of nucleus, nuclear envelope, nuclear pore complex, nuclear matrix, nucleoplasm, D.N.A. & nucleosome model.
- (ii) Ribosome structure and their functional significance.
- (iii) Structure of Mitochondria, variation in size, shape & number and its function.
- (iv) Types of plastids, structure and function of chloroplast.

3. (i) Structure and function of Golgi complex, endoplasmic reticulum and lysosomes.

- (ii) Structure and function of peroxisomes, glyoxysomes and Cytoskeleton.
- (iii) Ultrastructure, chemical constituents and functions of cell wall.
- (iv) Models of cell membranes organization, and role of membrane proteins, lipids, carbohydrates, ion channels & pumps in cellular transport and signalling.

4. (i) Principles of light and electron microscopy, phase contrast and fluorescence microscopy.
- (ii) Principles of various chromatography techniques - paper chromatography, TLC, GLC and HPLC.

Group B

5. (i) Classification and nomenclature of enzymes, physico-chemical properties.
- (ii) Kinetics of enzymes action; Michaelis & Mantene Constant and factors affecting enzyme activity, ie. temperature, pH, allosteric modification and feedback regulation.
6. Nucleic acids : D.N.A., R.N.A. and their types. Double helical structure of D.N.A, Replication of D.N.A., Transcription of R.N.A.
7. Amino acid and Protein metabolism : Structural characteristics and classification of amino acids, protein and non-protein amino acids; amino acid biosynthesis; transamination; peptide bond and polypeptide chain; primary, secondary, tertiary and quaternary structure of proteins; Protein biosynthesis & its regulation; post-translational modification of proteins targeting protein degradation
8. Carbohydrate : Classification, structure of some representative examples of monosaccharides, disaccharides, polysaccharides, stereoisomers, enantiomers and epimers, biosynthesis and degradation of sucrose and starch.
9. Lipid : Saturated and unsaturated fatty acids, fatty acid biosynthesis; oxidations of fatty acids; storage and mobilization of fatty acids and lipids.

Practical

Time - 6 hours

Full Marks - 50

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| a. Algae, Fungi, Bryophyta, Pteridophyta, Gymnosperm and Angiosperm | 6×4=24 |
| b. Detection of Carbohydrate, Proteins, Lipids & Alkaloids | - 05 |
| c. Study of Mitosis and Meiosis | - 05 |
| d. Spotting | 6×1 = 06 |
| e. Class records & field work | - 05 |
| f. Viva-voce | <u>- 05</u> |

Total 50