

BOTANY (HONOURS)**Paper III****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. **Plant water relations :**
 - (i) Osmosis & Diffusion; water potential and chemical potential
 - (ii) Absorption of water
 - (iii) Water transport through tracheids and vessels
 - (v) Transpiration and its significance, Mechanism of stomatal movement, Factors affecting transpiration
2. **Mineral Nutrition :**
 - (i) Criteria of essentiality of elements, macro & micro nutrient
 - (ii) Role of essential elements
 - (iii) Mineral deficiency symptoms and plant disorders
 - (iv) Nutrient uptake and transport mechanisms, Role of cell membranes, Ion pumps and carriers in transport of nutrients.
3. **Photosynthesis :**
 - (i) Historical background and significance; Photosynthetic pigments; Accessory pigments and the photoprotective carotenoids
 - (ii) Reaction centre complexes; Photochemical reactions; Photophosphorylation
 - (iii) Calvin cycle and Hatch & Slack pathway, CAM
4. **Transport of Organic Substances :**
 - (i) Transport of photosynthates; source sink relationship
 - (ii) The mechanism of translocation in phloem
5. **Respiration :**
 - (i) Glycolysis and TCA cycle and its regulation
 - (ii) Electron transport in mitochondria
 - (iii) Oxidative phosphorylation
 - (iv) Pentose phosphate pathway and cyanide-resistant respiration.
6. **Nitrogen Metabolism :**
 - (i) Biological N_2 -fixation; reduction of N_2 into ammonia

- (ii) Nif gene
- (iii) Regulation of nitrate reductase and nitrogenase
- (iv) Nitrate and ammonium assimilation

7. **Growth and Development :**

- (i) General aspects, Definition, Phase of growth, Kinetics of growth
- (ii) Physiology of seed dormancy and seed germination
- (iii) Concept of photoperiodism, Physiology of flowering, the florigen concept and role of hormones.
- (iv) Senescence and fruit ripening importance of respiratory climacteric

8. **Growth Hormones :**

- (i) Discovery, Physiological role and mechanism of the phytohormones; Auxins, Cytokinins, Gibberellines, Abscisic acid and Ethylene.
- (ii) Photomorphogenesis; Discovery of phytochromes and cryptochromes; their role and mechanism of actions.
- (iii) Signal transduction - basic concept
- (iv) Plant movements - tropic and nastic, biological clocks.

Group B

ECOLOGY AND ENVIRONMENT BIOLOGY

1. Holocenotic nature of environment, Limiting factors, Ecological amplitude, Triggering factors (Soil, water, atmosphere)
2. Ecological adaptations; Concept, Ecads, Ecotypes and Ecoclines, Adaptation in relation to soil oligotrophy.
3. Population : Concepts, Density and pattern, Population growth, Carrying capacity, Population regulation, r and k selection, Population interactions.
4. Community : Community characteristics (analytical and synthetic) and their measurement, Species diversity (alpha, beta and gamma); Ecological niche concept.
5. Ecosystem : Concept, Structure and functions of ecosystem, energy flow and its models, Ecological efficiencies, Cycling of C, N & P, Primary and secondary productivity.
6. Ecological succession : Types and modern concept of mechanism of succession.

7. Plant indicators and their role in environmental monitoring.
8. Phytogeography : General principles, Endemism, Vegetation of India.
9. Natural resources, types and their conservation.
10. Pollution of air, water and soil; Environmental toxicity; Prevention and control of pollution, global warming, Ozone depletion.
11. Environmental Impact Assessment : A brief account.

BOTANY (HONOURS)

Paper IV

Time - 3 hours

Full Marks - 75

Ten questions to be set (Three questions from Group A, B and C). Five questions to be answered at least one question from each group including Question No. 1 which will be objective and compulsory.

Group A

Meristems and Development : Shoot apical meristem, Root apical meristem, lateral meristem and their functions.

Secondary body of the Plant : Vascular cambium; Secondary xylem (basic structure of wood); Secondary Phloem and periderm, Abnormal Secondary growth, *Dracaena*, *Tecoma*, *Nyctanthes*, *Bignonia*.

Group B

Domestication of Plants : Primary and secondary centers of origin; Plant introductions, A general account and agronomy of *wheat*, *rice*, *maize*, *potato*.

Legumes : Chickpea (Bengal gram), Red gram (arhar) & Fodder legumes - a general account.

Vegetable Oil Sources : Mustard, Groundnut, Soybean - A brief account

Plant Fibres : Cotton, Jute and Coir.

Timber & Firewood species : A general account, use and properties of any ten plants of your region.

Medicinal Plants : A brief account of ten important plant drugs and their chief constituents used in indigenous and allopathic systems of medicine.

Natural rubber (*Hevea brasiliensis*), Essential Oils, Insecticides and Dyes : A concise account.

Ornamental plant : Familiarity with seasonals and perennials grown in your locality.

Group C

ANGIOSPERM SYSTEMATICS

Introduction :- Aims and components of systematics : Nomenclature, Phylogeny and classification

Systematics in Practice : Importance of Herbarium, Specimens and their preparation; Role of herbaria and botanical gardens.

Taxonomic hierarchy : Taxonomic category; Taxonomic groups, Concepts of species, Genus and family.

Botanical Nomenclature : ICBN, Principles and rules, Ranks and names, Type method, Principle of priority and its limitations, Names of hybrids and cultivars; Concept of biocode.

Systems of Classifications : Bentham and Hooker's system, Engler and Prantl's systems and Hutchinson's system.

Modern Taxonomy : Taxonomy in relation to Anatomy, Embryology, Cytology and Phytochemistry.

Diagnostic features, floral range & economic importance of the families : Ranunculaceae, Caryophyllaceae, Rosaceae, Cucurbitaceae, Apocyanaceae, Labiatae. (Lamiaceae), Orchidaceae and Cyperaceae.

BOTANY(HONOURS)

PRACTICAL

Time - 6 hours

Full Marks - 50

Physiology

- 10

Family Descriptions

- 10

Ecology

- 05

Anatomy

- 05

Economic Botany

- 05

Spotting

- 05

Class records

- 05

Viva voce

- 05

Total

50