Cluster University Srinagar

ENTRANCE TEST SYLLABUS FOR ADMISSION to 5-YEAR INTEGRATED, 3-YEAR HONOR'S & PROFESSIONAL PROGRAMMES SESSION 2019

BIOLOGY

Maximum Marks: 100

Theory: Marks 70 **Time: 3 hour**

Practicals: Marks 30

SECTION A (Botany) Marks: 35

Unit-I: Reproduction in Flowering Plants **Marks:07**

Asexual Reproduction: Vegetative propagation in plants, micropropagation.

Sexual Reproduction: Flower structure, Development of male & female gametophytes. Pollination: types, agencies & examples, Out breeding devices. Pollen- Pistil interaction, Double fertilization, Post fertilization events, Development of endosperm, embryo, seed and fruit. Special modes: apomixis and polyembryony, significance of seed & fruit formation.

Unit-II: Genetics **Marks 09**

- Heredity and variation
- Mendelian inheritance, Deviations from Mendelism: incomplete dominance, co-dominance, Multiple alleles, Pleiotropy, Chromosomal theory of inheritance, Elementary idea of polygenic inheritance, Chromosomes & genes,
- Search for genetic material & DNA as genetic material: Structure of DNA & RNA, DNA packaging, DNA Replication (Semiconservative), Central dogma, Protein Biosynthesis: Transcription, translation, genetic code, Gene expression and regulation (lac-operon).

Unit-III: Biology and Human welfare **Marks: 07**

- **Plant breeding:** Introduction, steps in plant breeding and application of plant breeding, and single cell protein, Biofortification.
- **Tissue culture:** Cellular totipotency, technique and application of tissue culture
- **Microbes in Human Welfare:** in household food processing, industrial production, sewage treatment, Production of energy (Biogas), biocontrol agent (Biopesticides) & Biofertilizers.
- Genetically Modified organism- Bt crops
- Biopiracy and patents.

Unit- IV: Ecology and Environment **Marks: 12**

Meaning of ecology, environment, habitat and niche: Organisms and environment.

Population and ecological adaptations: Population Interactions-mutualism, competition, predation, parasitism. Population attributes-growth, birth rate and death rate, age distribution.

Ecosystems: Patterns, Components, energy flow, nutrient cycling (carbon and phosphorus), decomposition and productivity. Pyramids of number, biomass, energy. Ecological succession. Ecological Services: Carbon fixation, Pollination, Oxygen release.

Biodiversity and its conservation: Threats to, and need for biodiversity conservation. Hotspots, endangered organisms, extinction, Red Data Book. Biodiversity conservation-biosphere reserves, national parks and sanctuaries.

Environmental Issues: Air and water pollution and their control, solid waste management, agrochemicals and their effects, Radioactive waste management, Green house effect and global warming, Ozone depletion in stratosphere, Deforestation, Any three case studies as success stories addressing environmental issues.

Code : 231

BIOLOGY

Maximum Marks: 100 **Time: 3hrs.**

Theory: 70 Marks
Practical: 30 Marks

SECTION A: (Botany) Marks: 35

Unit-I Diversity of Life 8 marks

Variety ofl iving organism Systematics, need, history and classification (Artificial, natural and Phylogenetic). **Biosystematics,** Binomial nomenclature, Two kingdom system, five kingdom system, their merits and demerits. (Detailed study of kingdom,: Monera Protista and fungi), status of some acellular organisms/Slime moulds like: viruses and viroids. Lichens taxonomic aids i.e. Botanical garden, herbaria, museum & keys.

Unit-II Kingdom Plantae 9 marks

Salient features of various plant groups for identification and their classes(Algae, Bryophytes, Pteridophytes, Gymnosperms and angiosperms). **Morphology of flowering plants and their function**. Morphology of root, stem, leaves, inflorescence, flowers, fruits and seed. Description of flowering plants of families Fabaceae, Solanaceae and Liliaceae.

Unit-III Anatomy of flowering plants 8 Marks

Tissues and tissue system, Types of Tissues, Meristematic and Permanent and their classification and functions.

Anatomy of Dicot and Monocot Root, Stem and Leaves, Secondary Growth in Dicot stems and roots.

Plant Physiology:

Transport in plants: means of transport, (diffusion, facilitated diffusion, Passive symports and anti ports, Active transport)

Plant water relations: water potential, osmosis, plasmolysis, imbibition, long distance transport of water- apoplast, symplast, pathways ascent of sap, Root pressure theory and transpirational pull theory (cohesion - tension theory).

Tranpiration: types & significance, mechanism of opening and closing of stomata, guttation, Phloem transport, flow from source to sink, (mass flow hypothesis)

Unit IV Mineral Nutrition

10 Marks

Methods to study mineral requirement (Hydrophonics). Essential mineral, elements criteria for essentiality of nutrients. Essential elements. Micro and Macro nutrients, their role and deficiency symptoms. Mechanism of absorption of elements, translocation of solutes, soil and reservoir of essential elements. **Nitrogen metabolism,** Nitrogen cycle- Biological nitrogen fixation, 'Photosynthesis, Historical background, site of photosynthesis. Various photosynthetic pigments, Mechanism, Light reaction including PS I, PS II and photophosphorylation (Cyclic and non-cyclic). Dark reaction or Biosynthetic phase, Calvin (C_3) cycle, C_4 cycle, factors effecting photosynthesis. Photorespiration.

Respiration:- Introduction mechanism- gycolysis, Kreb's cycle. Electron transport system,Aerobic and anaerobic respiration. Respiratory quotient.

Growth and Development:- Characteristics of plant growth, phases of growth, growth curve and its components- differentiation, dedifferentiation and redifferentation, **Development,** sequence of developmental processes in a plant cell, **plant growth regulators,** discovery and physiological effects (Auxins, Gibberellins, cytokinins, ethylene and IBA, Photoperiodism and vernalisation.

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