

**BIOLOGICAL SCIENCE (BIOS)**

**CLASS – XI**

Full Marks - 100

THEORY - 70 Marks

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|---------------|--|-----------------|
| <b>Unit-1</b> | <b>DIVERSITY OF LIVING ORGANISMS</b>     | <b>07 marks</b> |
| <b>Unit-2</b> | <b>STRUCTURAL ORGANIZATION OF PLANTS</b> | <b>12 marks</b> |
| <b>Unit-3</b> | <b>CELL: STRUCTURE &amp; FUNCTION</b>    | <b>15 marks</b> |
| <b>Unit-4</b> | <b>PLANT PHYSIOLOGY</b>                  | <b>18 marks</b> |
| <b>Unit-5</b> | <b>HUMAN PHYSIOLOGY</b>                  | <b>18 marks</b> |

**UNIT – I    DIVERSITY OF LIVING ORGANISMS**

**1. Science of life**

- 1.1 Science of Life – Introduction
- 1.2 Characteristics of life
- 1.3 Definition and concept of biodiversity

**2. Taxonomy and Systematic**

- 2.1 Taxonomy and Systematics – Definition
- 2.2 Taxonomic hierarchy-(Linnaeus) with Example 1
- 2.3 Binominal nomenclature

### **3. Classification of Living Organisms**

- 3.1 What is classification (Definition)
- 3.2 Need for classification
- 3.3 Five kingdoms of life and the basis of classification of five kingdoms.
- 3.4 Salient features and classification of Monera, Protoctista (Protista), Fungi and Lichens into major groups.
- 3.5 Virus and virioids – a brief General account.
- 3.6 Salient features and classification of plant into major group – Algae, Bryophytes Pteridophytes, Gymnosperms and Angiosperms (three to five salient and distinguishing features of each category and at least two examples of each category)
- 3.7 Angiosperm – classification upto class, characteristic features (three to five) and examples.
- 3.8 Salient features and classification of Animals – major non chordata upto phyla And chordatas upto class level (three to five Salient features and at least two examples)
- 3.9 Tools for study of biodiversity – Museums, Zoos, Botanical Garden & Herberia.

## **Unit – II      STRUCTURAL ORGANISATION IN PLANTS AND ANIMALS**

### **4. Structural Organisation in Plants**

- 4.1 Tissues (Definition)
- 4.2 Tissues in plants – Meristematic and Permanent (Structure and function)
- 4.3 Morphology of Root, Stem and leaf (including modifications, microscopic

## SYLLABUS

Anatomy and functions)(To be dealt along with relevant practicals)

- 4.4 Inflorescences (Major types – Racemose And Cymose)
- 4.5 Morphology of flower (including aestivation And placentation), fruit and seed (one Monocot-Maize and one Dicot-Gram)

### **5. Structural Organisation in Animals**

- 5.1 Tissues in animals (structure, occurrence and function in brief).
- 5.2 Morphology, anatomy and functions of different systems (digestive, circulatory respiratory, nervous and reproductive) of an insect-cockroach.(brief account)

## **Unit-III**

### **CELL STRUCTURE AND FUNCTION**

#### **6. Cell**

- 6.1 Cell theory and cell as the basic unit of life
- 6.2 Cell and its major parts - cell membranes and protoplasm (cytoplasm and nucleus)
- 6.3 Structure of a prokaryotic and eukaryotic cell (in brief).
- 6.4 Structure of plant cell and animal cell (in brief).
- 6.5 Cell envelop - cell membrane and cell wall (ultrastructure and function)
- 6.6 Cell organelles-Ultrastructure and function; Mitochondria, golgi bodies, endoplasmic reticulum, ribosomes, lysosomes, vacuoles, plastids, micro bodies (peroxisomes, spherosomes and glyoxysomes).
- 6.7 Ultra structure and function of cytoskeleton, Cilia, flagella and centrioles.

## SYLLABUS

- 6.8 Nucleus- nuclear membrane,nucleoplasm, Chromatin,nucleolus(ultrastructure and function)

### **7. Chemical constituents of living cell**

- 7.1 Chemical constituents of living cell  
7.2 Biomolecules-structure and function of protein, carbohydrate, lipid and nucleic acid.  
7.3 Enzyme-types,properties and enzyme action (lock and key, induced fit model and allosterism)

### **8. Cell Division**

- 8.1 Introduction  
8.2 Definition and types  
8.3 Cell cycle  
8.4 Mitosis- Definition and significance (process not required)  
8.5 Meiosis- Definition,types,process and Significance  
8.6 Difference between mitosis and meiosis

## **Unit- IV      PLANT PHYSIOLOGY**

### **9. Movement of Water, Food, Nutrition And Gases**

- 9.1 Introduction  
Absorption of water,gases and nutrients.  
9.2 Cell to cell transport- diffusion,facilitated diffusion,active transport  
9.3 Plant-water relation- imbibitions,water potential,osmosis and plasmolysis.  
9.4 Long distance transport-apoplast,symplast, root pressure transpiration pull, Uptake of mineral ions

## SYLLABUS

- 9.5 Transpiration and guttation, opening and closing of stomata
- 9.6 Translocation- transport through xylem and phloem, Mass flow hypothesis

### **10. Plant Nutrition And Minerals**

- 10.1 Introduction
- 10.2 Essential minerals-macro and micro nutrients, their roles and deficiency symptoms (in tabular form)
- 10.3 Mineral toxicity
- 10.4 Elementary idea of the Hydroponics
- 10.5 Nitrogen metabolism-nitrogen cycle, biological nitrogen fixation.

### **11. Respiration**

- 11.1 Introduction
- 11.2 Exchange of gases
- 11.3 Cellulare respiration-glycolysis, fermentation (anaerobic), T.C.A cycle and E.T.S (aerobic) Definition, process and significance
- 11.4 Energy relations-number of A.T.P molecules generated in respiration.
- 11.5 Amphibolic pathways
- 11.6 Respiratory quotient of nutrients

### **12. Photosynthesis**

- 12.1 Introduction-Autotrophic nutrition: photo and chemo-autotrophic, nutritions.
- 12.2 Definition and the site of Photosynthesis.
- 12.3 Photosynthetic pigments (elementary idea-structure not required)

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- 12.4 Photochemical and biosynthetic phases of photosynthesis.
- 12.5 Cyclic and non cyclic photophosphorylation.
- 12.6 Chemo osmotic hypothesis
- 12.7 Photo respiration
- 12.8 C<sub>3</sub> and C<sub>4</sub> pathways
- 12.9 Factors Controlling photosynthesis

### **13. Plant Growth And Development**

- 13.1 Introduction
- 13.2 Phases of plant growth and plant growth rate
- 13.3 Condition of growth.....(light, temperature, water,hormone,nutrients only)
- 13.4 Differentiation, De-differentiation, and Re-differentiation-definition and example only.
- 13.5 Sequence of developmental process in a plant cell through chart.
- 13.6 Growth regulations-auxin, gibberellins cytokinin, ethylene, A.B.A
- 13.7 Seed germination
- 13.8 Seed dormancy
- 13.9 Vernalisation
- 13.10 Photoperiodism-definition, types of plants on the basis of the length of the photoperiod.

## **Unit- V      HUMAN PHYSIOLOGY**

### **14. Digestion and Absorption**

- 14.1 Introduction
- 14.2 Structure (in brief) of human Alimentary canal including dental arrangement and digestive glands.

## SYLLABUS

- 14.3 Role of the digestive enzymes and the G -1 Hormone in digestion.
- 14.4 Peristalsis
- 14.5 Digestion, absorption and assimilation of protein, carbohydrate and fat
- 14.6 [Caloric value of proteins, carbohydrates and fats.] Box item-not to be evaluated.
- 14.7 Egestion
- 14.8 Nutritional and digestive disorders- PEM (protein energy malnutrition,) indigestion, constipation vomiting, jaundice, diarrhoea.

### **15. Breathing and Respiration**

- 15.1 Introduction
- 15.2 Respiratory organs in animals (through chart, recall only)
- 15.3 Respiratory system in human (outline)
- 15.4 Mechanism of breathing and its regulation in human.
- 15.5 Exchange of gases, transport of gases and regulation of respiration.
- 15.6 Repertory volumes
- 15.7 Disorders related to respiration Asthma, emphysema, occupational respiratory disorders- (e.g. Silicosis, Asbestosis)

### **16. Body Fluids And Circulation**

- 16.1 Introduction
- 16.2 Composition of Blood (Tabular form)
- 16.3 Blood groups, ABO Blood groups
- 16.4 Coagulation of blood
- 16.5 Composition of lymph and its function
- 16.6 Human circulatory system-(outline idea)
- 16.7 Structure of Human heart and blood vessels.

## SYLLABUS

- 16.8 Cardiac cycle
- 16.9 Cardiac output (stroke volume and minute volume, determination of cardiac output- Fick's Principle)
- 16.10 E.C.G (brief idea, no analysis required)
- 16.11 Double circulation
- 16.12 Regulation of cardiac activity (neural and hormonal) including factors regulating Blood Pressure
- 16.13 Disorders of the circulatory system hypertension, coronary artery disease, angina pectoris, heart failure.

### **17. Excretory Products And their Elimination**

- 17.1 Introduction
- 17.2 Modes of excretion- Ammonotelism  
Ureotelism, Uricotelism  
(Definition and Examples)
- 17.3 Human excretory system- structure and function (Histology of nephron)
- 17.4 Urine formation and Osmo- regulation
- 17.5 Regulation of Kidney function, Renin, angiotensin, Antidiuretic factor A.D.H and diabetes insipidus
- 17.6 Role of other organs in excretion- Liver, skin , lung and salivary gland.
- 17.7 Disorders- Uraemia, renal failure, Renal calculi, Nephritis.
- 17.8 Dialysis and artificial kidney

### **18. Locomotion and Movement**

- 18.1 Introduction- What is locomotion and movement?
- 18.2 Types of movement ciliary  
Flagellar and muscular.



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- 18.3 Skeletal muscle- contractile proteins and muscle contraction.
- 18.4 Skeletal system and its function.  
(To be dealt with relevant portion of practical syllabus)
- 18.5 Joints
- 18.6 Disorders of muscular and skeletal system- Myasthenia gravis, tetany, Muscular dystrophy, arthritis osteoporosis and gout.

### **19. Neural control and coordination**

- 19.1 Introduction- what is neural control and co-ordination
- 19.2 Neurones and nerves (Revisionary)
- 19.3 Nervous system in human
- 19.4 Central Nervous System, Peripheral Nervous System (P.N.S), and visceral Nervous System. Brain and its major parts- cerebral cortex, thalamus, hypothalamus and limbic system, mid brain, pons, medulla, cerebellum and Spinal cord ( function only), Mode of distribution and function of P.N.S and autonomic nervous system.
- 19.5 Generation and Conduction of nerve impulse.
- 19.6 Reflex action and Reflex Arc
- 19.7 Sense Organs- sensory perception  
outline structure and function of eye and ear.

### **20. Chemical Coordination And Regulation**

- 20.1 Introduction- endocrine glands and hormones.
- 20.2 Human endocrine system- Hypothalamus, Pituitary, Pineal,

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- Thyroid, Parathyroid, Adrenal,  
Pancreas, Gonads  
(location and function only)
- 20.3 Mechanism of hormone action  
(elementary idea)
- 20.4 Role of hormones as messengers  
and regulators.
- 20.5 Hypo and Hyper activity of  
endocrine glands and related Disorders  
(common disorders e.g., Dwarfism  
Acromegaly Cretinism, Goiter,  
Exophthalmic goiter, Diabetes,  
Addison's disease.  
(Important diseases related to physiology  
of all Systems of human are to be  
taught briefly.)