

## BIOLOGY

### CLASS XI

Note – In this only one paper of 100 marks in which 70 marks for theory written and 30 marks for practical examinations.

S.No.	Unit	Marks
1.	Diversity in Living World	07
2.	Structural Organisation in Animals and Plants	12
3.	Cell: Structure and Function	15
4.	Plant Physiology	18
5.	Human Physiology	18
	Total	70

As the regular teaching-learning in schools, during the session 2020-21, has widely been affected due to the COVID-19 pandemic, the subject experts committee, after due consideration, has recommended to reduce the syllabus by 30% in the following manner:-

#### Unit-I : Diversity of Living Organisms

##### Chapter-1: The Living World

Taxonomy and Systematics, tools for study of taxonomymuseums, zoological parks, herbaria, botanical gardens

##### Chapter 3 : Plant Kingdom

Angiospermae (three to five salient and distinguishing features and at least two examples of each category); Angiosperms - classification upto class, characteristic features and examples.

#### Unit II : Structural Organisation in Animals and Plants

##### Chapter 5 : Morphology of Flowering Plants,

Morphology of different parts of flowering plants: root, stem, leaf, fruit and seed and work.

##### Chapter 6 - Anatomy of Flowering Plants

##### Chapter 7 – Structural organisation in animals

Morphology, anatomy and function of different system (digestive, circulatory, respiratory, nervous and reproductive) of an insect (cockroach)

#### Unit III : Cell: Structure and Function

##### Chapter 8 - Cell-The Unit of Life

Nuclear membrane, chromatin, nucleolus

#### Unit IV : Plant Physiology

##### Chapter 11 – Transport in plants

##### Chapter 12 – Mineral Nutrition

## **Chapter 15 - Plant - Growth and Development ,**

Seed germination; phases of plant growth and plant growth rate; conditions of growth; differentiation, dedifferentiation and redifferentiation; sequence of developmental processes in a plant cell, seed dormancy; vernalisation; photoperiodism.

## **Unit V : Human Physiology**

## **Chapter 16 - Digestion and Absorption**

Alimentary canal and digestive glands, role of digestive enzymes and gastrointestinal hormones; Peristalsis, digestion, absorption and assimilation of proteins, carbohydrates and fats; calorific values of proteins, carbohydrates and fats; egestion; nutritional and digestive disorders - PEM, indigestion, constipation, vomiting, jaundice, diarrhoea.

## **Chapter 20 - Locomotion and Movement**

Types of movement - ciliary, flagellar, muscular; skeletal system and its functions; joints; disorders of muscular and skeletal system - myasthenia gravis, tetany, muscular dystrophy, arthritis, osteoporosis, gout

## **Chapter 21 - Neural Control and Coordination**

Sensory perception; sense organs; elementary structure and functions of eye and ear

### **Reduced practicals :**

#### **A – List of Experiments**

1. Preparation and study of T.S. of dicot and monocot roots and stems .
2. To study types of root (Tap and adventitious); stem (herbaceous and woody); leaf (arrangement, shape, venation, simple and compound).
3. Study of osmosis by potato osmometer.
4. Study of plasmolysis in epidermal peels (e.g. Rhoeo leaves).
5. Comparative study of the rates of transpiration in the upper and lower surface of leaves.
6. Test for the presence of sugar, starch, proteins and fats.
7. Test for presence of urea in urine.
8. Test for presence of bile pigment in urine.

#### **B – Study / Observation of the following (spotting)**

1. Study of tissues and diversity in shapes and sizes of plant cell (palisade cells, guard cells, parenchyma, collenchyma, sclerenchyma, xylem, phloem)
2. Study of different modifications in roots, stems and leaves.
3. Study and identification of different types of inflorescence.
4. Study of imbibition in seeds/raisins.
5. Observation and comments on the experimental set up for showing:
  - a) Anaerobic respiration
  - b) Photoperiodism
  - c) Effect of apical bud removal
  - d) Suction due to transpiration
6. Study of human skeleton and different types of joints with the help of virtual images/models only.

**In accordance to the above, the remaining 70 percent of the total syllabus is as follows:**

**Unit-I : Diversity of Living Organisms**

**07 marks**

**Chapter 1 : The Living World**

What is living? Biodiversity; Need for classification; three domains of life; concept of species and taxonomical hierarchy; binomial nomenclature;

**Chapter-2: Biological Classification**

Five kingdom classification; Salient features and classification of Monera, Protista and Fungi into major groups: Lichens, Viruses and Viroids.

**Chapter-3: Plant Kingdom**

Salient features and classification of plants into major groups - Algae, Bryophyta, Pteridophyta, Gymnospermae

**Chapter-4: Animal Kingdom**

Salient features and classification of animals, non-chordates up to phyla level and chordates up to class level (three to five salient features and at least two examples of each category). (No live animals or specimen should be displayed.)

**Unit-II Structural Organization in Animals and Plants**

**12 marks**

**Chapter-5: Morphology of flowering plants**

Morphology of inflorescence and flower, description of 01 family, solanaceae or liliaceae.(to be dealt along with the relevant experiment of the Practical Syllabus).

**Chapter-7: Animal tissues**

**Unit-III Cell: Structure and Function**

**15 marks**

**Chapter-8: Cell-The Unit of Life**

Cell theory and cell as the basic unit of life: Structure of prokaryotic and eukaryotic cells; Plant cell and animal cell; cell envelope; cell membrane, cell wall; cell organelles - structure and function; endomembrane system, endoplasmic reticulum, golgi bodies, lysosomes, vacuoles; mitochondria, ribosomes, plastids, microbodies; cytoskeleton, cilia, flagella, centrioles (ultrastructure and function), nucleus.

**Chapter-9: Biomolecules**

Chemical constituents of living cells: biomolecules, structure and function of proteins, carbohydrates, lipids, nucleic acids; Enzymes- types, properties, enzyme action.

**Chapter-10: Cell Cycle and Cell Division**

Cell cycle, mitosis, meiosis and their significance

**Unit-IV Plant Physiology**

**18 marks**

### **Chapter-13: Photosynthesis in Higher Plants**

Photosynthesis as a means of autotrophic nutrition; site of photosynthesis, pigments involved in photosynthesis (elementary idea); photochemical and biosynthetic phases of photosynthesis; cyclic and non-cyclic photophosphorylation; chemiosmotic hypothesis; photorespiration; C<sub>3</sub> and C<sub>4</sub> pathways; factors affecting photosynthesis.

### **Chapter-14: Respiration in Plants**

Exchange of gases; cellular respiration - glycolysis, fermentation (anaerobic), TCA cycle and electron transport system (aerobic); energy relations - number of ATP molecules generated; amphibolic pathways; respiratory quotient.

### **Chapter-15: Plant - Growth and Development**

Growth regulators - auxin, gibberellin, cytokinin, ethylene, ABA;

### **Unit-V Human Physiology**

**18 marks**

### **Chapter-17: Breathing and Exchange of Gases**

Respiratory organs in animals (recall only); Respiratory system in humans; mechanism of breathing and its regulation in humans - exchange of gases, transport of gases and regulation of respiration, respiratory volume; disorders related to respiration - asthma, emphysema, occupational respiratory disorders.

### **Chapter-18: Body Fluids and Circulation**

Composition of blood, blood groups, coagulation of blood; composition of lymph and its function; human circulatory system - Structure of human heart and blood vessels; cardiac cycle, cardiac output, ECG; double circulation; regulation of cardiac activity; disorders of circulatory system - hypertension, coronary artery disease, angina pectoris, heart failure.

### **Chapter-19: Excretory Products and Their Elimination**

Modes of excretion - ammonotelism, ureotelism, uricotelism; human excretory system – structure and function; urine formation, osmoregulation; regulation of kidney function - renin - angiotensin, atrial natriuretic factor, ADH and diabetes insipidus; role of other organs in excretion; disorders - uraemia, renal failure, renal calculi, nephritis; dialysis and artificial kidney.

### **Chapter-20: Locomotion and Movement**

Skeleton muscle, contractile proteins and muscle contraction.

### **Chapter-21: Neural Control and Coordination**

Neuron and nerves; Nervous system in humans - central nervous system; peripheral nervous system and visceral nervous system; generation and conduction of nerve impulse; reflex action;

### **Chapter-22: Chemical Coordination and Integration**

Endocrine glands and hormones; human endocrine system - hypothalamus, pituitary, pineal, thyroid, parathyroid, adrenal, pancreas, gonads; mechanism of hormone action (elementary idea); role of hormones as messengers and regulators, hypo - and hyperactivity and related disorders; dwarfism, acromegaly, cretinism, goiter, exophthalmic goiter, diabetes, Addison's disease.

**Practicals:**

**30 marks**

**A: List of Experiments**

1. Study and description of three locally available common flowering plants, one from each of the families Solanaceae, Fabaceae and Liliaceae (Poaceae, Asteraceae or Brassicaceae can be substituted in case of particular geographical location) including dissection and display of floral whorls, anther and ovary to show number of chambers (floral formulae and floral diagrams).
2. Study of distribution of stomata in the upper and lower surface of leaves. .
3. Separation of plant pigments through paper chromatography.
4. Study of the rate of respiration in flower buds/leaf tissue and germinating seeds.
5. Test for presence of sugar in urine.
6. Test for presence of albumin in urine.

**B. Study/observation of the following (spotting)**

1. Study of the parts of a compound microscope.
2. Study of the specimens/slides/models and identification with reasons - Bacteria, Oscillatoria, Spirogyra, Rhizopus, mushroom, yeast, liverwort, moss, fern, pine, one monocotyledonous plant, one dicotyledonous plant and one lichen.
3. Study of virtual specimens/slides/models and identification with reasons - Amoeba, Hydra, liverfluke, Ascaris, leech, earthworm, prawn, silkworm, honeybee, snail, starfish, shark, rohu, frog, lizard, pigeon and rabbit.
4. Animal cells (, squamous epithelium, muscle fibers and mammalian blood smear) through temporary/permanent slides.
5. Study of mitosis in onion root tip cells and animals cells (grasshopper) from permanent slides.
6. Study of external morphology of cockroach through virtual images/models. Practical Examination for Visually Impaired Students

Note : Practice note book and project work will be compulsory to submit at the time of Practical U.P. Board examination.

For Private Students : Which college will be decided as examination centre, the teacher/Principal of that college will be as internal examiner and will provide 50% marks to private students as internal examiner and remaining 50% marks will be given by external examiner.