

Manipur Board Class 11 Biology Syllabus 2021-22

BIOLOGY

THEORY

COURSE STRUCTURE

CLASS : XI

Time : 3 Hours

One Paper

70 Marks

Unit	Topics	Marks
I.	Diversity of Living Organisms	07
II.	Structural Organisation in Plants and Animals	12
III.	Cell: Structure and Function	15
IV.	Plant Physiology	18
V.	Human Physiology	18
Total =		70

Unit-I: Diversity of Living Organisms

25 Periods

Chapter-1: The Living World

What is living? Biodiversity; Need for classification; three domains of life; taxonomy and systematics; concept of species and taxonomical hierarchy; binomial nomenclature; tools for study of taxonomy-museums, zoological parks, herbaria, botanical gardens.

Chapter-2: Biological Classification

History of biological classification; Five kingdom classification; Salient features and classification of Monera, Protista and Fungi, Plantae and Animalia into major groups; Viruses, Viroids, Prions and Lichens.

Chapter-3: Plant Kingdom

Salient features and classification of plants into major groups - Algae, Bryophytes, Pteridophytes, Gymnosperms and Angiosperms; Angiosperms - classification upto class, characteristic features and examples; Plant life cycles and Alternation of generations.

Chapter-4: Animal Kingdom

Basis of classification; Salient features and classification of animals: non-chordates up to phyla level and chordates up to class level.

Unit-II : Structural Organisation in Plants and Animals

22 Periods

Chapter-5: Morphology of Flowering Plants

Morphology and modifications of root, stem and leaf; Morphology of inflorescence, flower fruit and seed; semi technical description of a typical flowering plant; description of Fabaceae, Solanaceae and Liliaceae.

Chapter-6: Anatomy of Flowering Plants

Tissues and tissue system; anatomy of dicotyledonous and monocotyledonous root, stem and leaf; secondary growth in dicotyledonous stem and root.

Chapter-7: Structural Organisation in Animals

Animal tissues; organ and organ systems; morphology and anatomy of earthworm, cockroach and frog.

Unit-III: Cell- Structure and Function

40 Periods

Chapter-8: Cell-The Unit of Life

What is a cell? Cell theory; an overview of a cell; structure and function of prokaryotic and eukaryotic cell; plant and animal cell, cell membrane, cell wall, endomembrane system- endoplasmic reticulum, golgi apparatus, vacuoles, mitochondria, plastids, ribosomes; cytoskeleton - cilia and flagella, centrosome and centrioles; nucleus.

Chapter-9: Biomolecules

Analysis of chemical composition; Primary and Secondary Metabolites; Structure and function of Biomacromolecules: Proteins, Polysaccharides, Lipids and Nucleic acids.

Metabolism: Concept; metabolic basis for living; the living state.

Enzymes: Properties; mechanism of enzyme action; factors affecting enzyme activity; classification and nomenclature; co-factors.

Chapter-10: Cell Cycle and Cell Division

Cell cycle, mitosis, meiosis and their significance.

Unit-IV: Plant Physiology

45 Periods

Chapter-11: Transport in Plants

Means of different types of transport; Plant water relations: water potential, osmosis, plasmolysis, imbibition; long distance transport of water: types and mechanism of absorption of water; mechanism of movement of water up a plant; Transpiration and guttation; mechanism of uptake and transport of mineral nutrients and food.

Chapter-12: Mineral Nutrition

Essential minerals, macro- and micronutrients and their role; deficiency symptoms; mineral toxicity; elementary idea of hydroponics as a method to study mineral nutrition; nitrogen metabolism, nitrogen cycle, biological nitrogen fixation- symbiotic and non-symbiotic.

Chapter-13: Photosynthesis in Higher Plants

Photosynthesis as a mean 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_3 and C_4 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: characteristic; phases of plant growth; growth rate; conditions of growth; differentiation, dedifferentiation and redifferentiation; sequence of developmental processes in a plant cell; growth regulators - auxin, gibberellin, cytokinins, ethylene, ABA; seed dormancy; vernalisation; photoperiodism.

Unit-V: Human Physiology

45 Periods

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-17: Breathing and Exchange of Gases

Respiratory organs in animals; 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- ABO and Rh, 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

Types of movement - ciliary, flagellar, muscular; skeletal muscle- contractile proteins and muscle contraction; 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

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; sensory perception; sense organs; elementary structure and functions of eye and ear.

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).



BIOLOGY
(PRACTICAL)
CLASS-XI

Time : 3 Hours

Marks : 30

Periods : 60

1.	Experiments and spotting	20 Marks
2.	Record of one investigatory Project and Viva based on the Project.	5 Marks
3.	Class-record and Viva based on the experiments.	5 Marks
Total =		30 Marks

A. List of Experiments.

1. Study and describe three locally available common flowering plants from each of the following families (Solanaceae, Fabaceae and Liliaceae) including dissection and display of floral whorls and anther and ovary to show number of chambers. Types of root (Tap and Adventitious); Stem (Herbaceous and woody); Leaf (arrangement, shape, venation, simple and compound).
2. Preparation and study of T.S. of dicot and monocot roots and stems (primary).
3. Study of osmosis by Potato osmometer.
4. Study of Plasmolysis in epidermal peels (e.g. Rhoeo leaves).
5. Study of distribution of stomata in the upper and lower surface of leaves.
6. Comparative study of the rates of transpiration in the upper and lower surface of leaves.
7. Tests for the presence of sugar, starch, proteins and fats. To detect them in suitable plant and animal materials.
8. Separation of plant pigments through paper chromatography.
9. To study the rate of respiration in flower buds/leaf tissues and germinating seeds.
10. To test the presence of urea in urine.
11. To detect the presence of sugar in urine/blood sample.
12. To detect the presence of albumin in urine.
13. To detect the presence of bile salts in urine.

B. Study/observation of the following (spotting)

1. Study parts of a compound microscope.
2. Study of the specimens and identification with reasons—Bacteria, *Oscillatoria*, *Spirogyra*, *Rhizopus*, Mushroom, Yeast, Liverwort, Moss, Fern, pines, one monocotyledonous plant and one dicotyledonous plant and one lichen.
3. Study of specimens and identification with reasons - *Amoeba*, *Hydra*, Liverfluke, *Ascaris*, leech, earthworm, prawn, silkworm, honeybee, snail, starfish, shark, Rohu, frog, lizard, pigeon and rabbit.
4. Study of tissues, and diversity in shapes and sizes of plant and animal cells (e.g. palisade cells, guard cells, parenchyma, collenyma, sclerenchyma, Xylem, Phloem, Squamous epithelium, muscle fibres and mammalian blood smear) through temporary/permanent slides.
5. Study of mitosis in onion root tip cells and animal cells (grasshopper) from permanent slides.
6. Study of different modifications in root, stem and leaves.
7. Study and identification of different types of inflorescences.
8. Study of imbibitions in seeds/raisin.
9. Observation and comments on the experimental set up for showing :
 - (a) Anaerobic respiration.
 - (b) Phototropism.
 - (c) Apical bud removal.
 - (d) Suction due to transpiration.
10. To study human skeleton and different types of joints.
11. Study of external morphology of earth worm, cockroach and frog through models.

PRESCRIBED TEXTBOOKS : CLASS XI

1. A Textbook of Biology for Class XI.
Published by : The Council of Higher Secondary Education, Manipur with copy right from the NCERT, New Delhi.

REFERENCE BOOKS :

1. Elementary Biology Vol. I
By : K.N. Bhatia and M.P. Tyagi
Published by : Trueman Book Company, Jalandhar - 144 008.
2. Companion Biology for Class XI
By : K. Bhatti.
Published by : S. Dinesh & Co. Jalandhar - 144 008
3. Frank Senior Secondary Biology Practicals for Class XI (New Edition)
By Y.P. Purang & Vinay Kumar
Published by : Frank Bros & Co., (Publishers) Ltd., New Delhi - 110 002
4. Comprehensive Laboratory Manual in Biology for Class XI
By : Dr. J.P. Sharma
Published by : Laxmi Publications (P) Ltd., New Delhi - 110 002.

DESIGN OF QUESTION PAPER

Subject : **BIOLOGY**
 Paper : Theory
 Class : XI
 Full Mark : 70
 Time : 3 Hours

I	WEIGHTAGE TO OBJECTIVES:					
	Objectives			Marks	Percentage	
	Knowledge(K)			14	20	
	Understanding (U)			32	46	
	Application (A)			21	30	
	Skill (S)			3	4	
	Total:			70	100	
II	WEIGHTAGE TO FORMS OF QUESTIONS:					
	FORM OF QUESTIONS		No. of questions	Time(in minutes)	Marks	Percentage
	Essay/Long Ans: (E/LA)		3	60	15	21
	Short Answer (SA-I)		7	56	21	30
	Short Answer (SA-II)		10	40	20	29
	Very Short Answer(VSA)		10	20	10	14
	MCQ		4	4	4	6
	Total:		34	180 m	70	100
III	WEIGHTAGE TO CONTENT:					
	Unit	CONTENTS			Marks	Percentage
	I	Diversity of Living Organisms			7	10
	II	Structural Organisation in Plants and Animal			12	17
	III	Cell : Structure and Function			15	21
	IV	Plant Physiology			18	26
	V	Human Physiology			18	26
	Total:			70	100	
IV	SCHEME OF SECTIONS: NIL					
V	SCHEME OF OPTIONS: Internal option may be given in Essay Type question only.					
VI	DIFFICULTY LEVEL : Difficulty : 30% Average : 50% Easy : 20%					

Abbreviation: K(Knowledge), U(Understanding), A(Application),S(Skill), E(Essay Type),
 SA(Short Answer Type), VSA(Very Short Answer Type), O(Objective Type).
 MCQ (Multiple Choice Question).

DESIGN OF QUESTION PAPER

Subject : BIOLOGY
Unit/Paper : Practical
Class : XI
Time : 3 Hours
Full Marks : 30

MARKING SCHEME :

SECTION - A (Any one)

4 marks

Q. 1

(a) Item 1 : Description of a flowering plant.

(i)	Dissect and Display	–	1
(ii)	Diagram and labelling	–	2
(iii)	Comments on Floral Characters	–	1
Total =			4

(b) Item 2 and 5 : Preparation of Slide of Transverse Section of dicot and monocot roots and stems (primary) and observation of distribution of Stomata

(i)	Preparation of slide	–	1
(ii)	Diagram and labelling	–	2
(iii)	Comments - 2 points	–	1
Total =			4

SECTION - B (Any two)

4+4 = 8 marks

Q.2

(a) Item 3,4,6 & 9 : Plant Physiology experiments : Potato Osmometer, Plasmolysis, Transpiration and Respiration.

(i)	Experimentation/Setting of experiment	–	1
(ii)	Observations	–	1
(iii)	Inference and Result	–	1
(iv)	Precautions	–	1
Total =			4

(b) Items 7 & 8 : Tests for presence of Sugar, Starch, Proteins and Fats in suitable plant materials, paper chromatography of plant pigments.

(i)	Experimentation/Setting of experiment	–	1
(ii)	Observations	–	1
(iii)	Inference and result	–	1
(iv)	Precautions	–	1
Total =			4

(c) Item 7,10,11,12&13 : Test for presence of sugar, starch, proteins and fats in animal materials, urine test for urea, presence of sugar in urine/ blood, presence of albumin and bile salts in urine.

(i)	Experimentation	–	1
(ii)	Observations	–	1
(iii)	Inference and Result	–	1
(iv)	Precautions	–	1
Total =			4

SECTION - C (Spotting)

4+4 = 8 marks

Q.3 Item 1-11 : (Two spots each from plants and animals)

(i)	Identification	–	1
(ii)	Comments - 2 points	–	1
Total =			2

SECTION - D

5 marks

Q.4 Investigatory Project :

(i)	Aim and object	–	1
(ii)	Materials and Methods	–	1
(iii)	Summary of the project	–	1
(iv)	Viva Voce on project record	–	2
Total =			5

Q.5 Laboratory Record

5 Marks

(i)	Completeness of practical work	–	1
(ii)	Regularity in submitting record	–	1
(iii)	Neatness and accuracy of record	–	1
(iv)	Viva Voce on laboratory record	–	2
Total =			5

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