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FOR MANIPUR CLASS 11 PREPARATION

Manipur Board Class 11 Syllabus 2027 Biology

EXAM	YEAR	TYPE	SUBJECT
Manipur Class 11	2027	Syllabus	Biology

BIOLOGY

THEORY
COURSE STRUCTURE
CLASS : XI

One Paper **Time : 3 Hours** **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

Biodiversity; Need for classification; three domains of life; taxonomy and systematics; concept of species and taxonomical hierarchy; binomial nomenclature; tools for study of taxonomy- herbaria.

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 and Gymnosperms.

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

Chapter-6: Anatomy of Flowering Plants

Permanent tissues simple tissues parenchyma, complex tissues, Tissue system; anatomy of dicotyledonous and monocotyledonous root, stem and leaf.

Chapter-7: Structural Organisation in Animals

Organ and organ systems; morphology and anatomy of 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.
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-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.

Unit-V: Human Physiology **45 Periods**

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 respiratorydisorders.

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.

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).

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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 locally available common flowering plants from the following family (Solanaceae) 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 distribution of stomata in the upper and lower surface of leaves.
4. Tests for the presence of sugar, starch, protiens and fats. To detect them in suitable plant and animal meterials.
5. Separation of plant pigments through paper chromatography.
6. To study the rate of respiration in flower buds/leaf tissues and germinating seeds.
7. To test the presence of urea in urine.
8. To detect the presence of sugar in urine/blood sample.
9. To detect the presence of albumin in urine.
10. 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 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, Xylem 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 and identification of different types of inflorescences.
7. Observation and comments on the experimental set up for showing :
   (a) Anaerobic respiration.
   (b) Phototropism.
   (c) Apical bud removal.
8. To study human skeleton and different types of joints.
9. Study of external morphology of frog through models.

PRESCRIBED TEXTBOOKS : CLASS XI

1. Biology
   Textbook for Class XI.
   Published by : 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. Saraswati Lab Manual Biology for Class-XI (NCF 2023 Aligned)
   By: Rajesh Kumar Srivastav
   Published by: New Saraswati House (India) Private Limited, New Delhi-110002

4. Comprehensive Laboratory Manual in Biology for Class XI (New Edition)
   By : Dr. J.P. Sharma
   Published by : Laxmi Publications (P) Ltd., New Delhi - 110 002.

5. A Textbook of Practical Biology for Class-XI
   By : Dr. N. Mohendra Singh
   Published by : Writers' Book Store, Pologround, Imphal.

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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)	10	15
Understanding (U)	35	50
Application (A)	21	30
Skill (S)	4	5
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)	6	37	18	26
Short Answer (SA-II)	10	40	20	29
Very Short Answer(VSA)	7	21	7	10
MCQ	10	22	10	14
Total:	**36**	**180**	**70**	**100**

III — WEIGHTAGE TO CONTENT:

Unit	CONTENTS	Marks	Percentage
I	Diversity of Living Organisms	**7**	**10**
II	Structural Organization in Plants and Animals	12	17
III	Cell Structure and Function	15	21
IV	Plant Physiology	18	26
V	Animal Physiology	18	26
	Total:	**70**	**100**

IV — SCHEME OF SECTIONS: **NIL**

V — SCHEME OF OPTIONS:
i) **Internal option will be given in Essay Type Questions.**
ii) **Internal option will be given in three questions of SA-I including one case study based question.**

VI — DIFFICULTY LEVEL :
Difficult : 35% of the total marks
Average : 50% of the total marks
Easy : 15% of the total marks

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

N.B.: Assertion and reasoning: 2(two) Questions in MCQ.
Source Based Question: 1(one) Question in SA-I

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 3 : 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 6 : Plant Physiology experiments : Respiration.

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

(b) Items 4 & 5 : 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 4,7,8,9,10 : 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- 8 : (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 projecrt 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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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 3 : 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 6 : Plant Physiology experiments : Respiration.

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

(b) Items 4 & 5 : 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 4,7,8,9,10 : 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- 8 : (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 projecrt 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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