Manipur Board Class 12 Biology Syllabus 2021-22

BIOLOGY

THEORY

COURSE STRUCTURE

CLASS-XII

One Paper **Time : 3 Hours** **70 Marks**

Unit	Title	Marks
VI.	Reproduction in Organisms	14
VII.	Genetics and Evolution	18
VIII.	Biology and Human welfare	14
IX.	Biotechnology	10
X.	Ecology	14
	Total =	**70**

UNIT VI:Reproduction **(35 periods)**

Chapter 1: Reproduction in Organisms

Reproduction, a characteristic feature of all organisms for continuation of species. Modes of reproduction – Asexual and sexual; Asexual reproduction – binary fission, sporulation, budding, gemmules formation, fragmentation, vegetative propagation in plants; Sexual reproduction - pre fertilization, fertilization and post fertilization events.

Chapter 2: Sexual Reproduction in flowering Plants

Flower; Pre-fertilisation: Structures and Events; Pollination-types, agencies and examples; Outbreeding devices; Pollen-pistil interaction; Double fertilization; Post fertilisation: structures and Events; Development of endosperm & embryo; Development of seed and formation of seed; Fruit formation; Parthenocarpy, apomixis and polyembryony.

Chapter 3: Human Reproduction

Male andfemale Reproductive systems; Gametogenesis-spermatogenesis & oogenesis; Menstrual cycle; Fertilization and Implantation; Pregnancy and Embryonic development; Parturition and Lactation.

Chapter 4: Reproductive Health

Reproductive Health – problems and strategies; Population Explosion and Birth control; Medical termination of Pregnancy; Sexually Transmitted Diseases; Infertility and Assisted reproductive technologies- assisted reproductive technologies - IVF, ZIFT, GIFT (elementary idea for general awareness).

UNIT VII: Genetics and Evolution **(45 Periods)**

Chapter 5: Principles of Inheritance and Variation

Mendel's Laws of Inheritance; Deviations from Mendelism: Incomplete dominance, Co-dominance, Multiple allelism; Chromosomal theory of Inheritance; Linkage and Recombination; Polygenic Inheritance; Pleiotropy; Sex Determination- in birds, humans and honey bee; Mutation; Pedigree analysis; Genetic Disorders: Mendelian disorders –Colour blindness,Haemophilia,sickle-cell anaemia, phenylketonuria, Thalassemia; Chromosomal Disorders – Down's syndrome, klinefelter's syndrome, Turner's syndrome.

Chapter 6: Molecular Basis of Inheritance

Structure of DNA and RNA; Packaging of DNA; The search for genetic material; RNA world; DNA Replication; Transcription; Genetic code; Translation; Regulation of Gene Expression; Human genome Project; DNA fingerprinting.

Chapter 7: Evolution

Origin of Life; Evolution of Life Forms; Evidences for Evolution; Adaptive radiation; Biological Evolution; Mechanism of Evolution; Hardy- Weinberg Principle; A brief account of evolution; Origin and Evolution of Man.

UNIT VIII: Biology in Human Welfare **(35 Periods)**

Chapter 8: Human Health and Disease

Common Diseases in Humans (typhoid, pneumonia, commoncold, malaria, amoebiasis, ascariasis, filariasis, ring worm);
Immunity (Innate, Acquired, Active and passive Immunity, Vaccination and Immunisation, Allergy, Auto Immunity); Immune System in the body;
AIDS, Cancer, Drugs and Alcohol Abuse.

Chapter 9: Strategies for Enhancement in food Production

Animal Husbandry; Animal Breeding; Bee Keeping; Fisheries; Plant Breeding; Single Cell Protein; Tissue culture.

Chapter 10: Microbes in Human welfare

Microbes in Household Products, Industrial Products,Sewage Treatment, and Production of biogas;
Microbes as Biocontrol agents and Biofertilisers.

UNIT IX: BIOTECHNOLOGY (30 Periods)

Chapter 11: Biotechnology: Principles and Processes

Principles of Biotechnology; Tools of Recombinant DNA Technology; Process of Recombinant DNA Technology.

Chapter 12: Biotechnology and Its Application

Biotechnological Applications in agriculture (GMO and Bt cotton) and medicine (genetically engineered insulin, gene therapy, molecular diagnosis);
Transgenic animals; Ethical Issues.

UNIT X: ECOLOGY (35 periods)

Chapter 13: Organisms and Populations

Organisms and its environment:abiotic factors, response to abiotic factors,Adaptations. Populations: Population Attributes; Population Growth, Life history variation; Population Interactions – Predation, Competition, Parasitism, Commenselism and Mutualism.

Chapter 14: Ecosystem

Structure and Function; Productivity; Decomposition; Energy Flow; Ecological Pyramids; Ecological Succession; Nutrient Cycling; Ecosystem Services.

Chapter 15: Biodiversity and Conservation

Biodiversity: Patterns of Biodiversity; Importance of Species diversity to the Ecosystem; Loss of Biodiversity; Biodiversity Conservation.

Chapter 16:Environmental Issues

Air Pollution and Its Control; Water Pollution and Its Control; Solid Wastes; Agro –chemicals and their Effects; Radioactive Wastes; Greenhouse effects and Global Warming; Ozone depletion. Degradation by Improper Resource utilization and maintenance. Deforestation, Case Study of People's Participation in Conservation of forests.

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BIOLOGY

PRACTICAL

CLASS-XII

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 experiment.	5 Marks
	Total =	**30 Marks**

A. List of Experiments

1. Study of pollen germination on a slide.
2. Collect and study soil from at least two different sites and study them for texture, moisture contents, pH and water holding capacity of soil. Correlate with the kinds of plants found in them.
3. Collect water from two different. Water bodies around you and study them for pH, clarity and presence of any living organisms.
4. Study the presence of suspended particulate matter in air at the two widely different sites.
5. Study of plant population density by quadrat method.
6. Study of plant population frequency by quadrat method.
7. Prepare a temporary mount of onion root tip to study mitosis.
8. To study the effect of the different temperatures and three different pH on the activity of salivary amylase on starch.

B. Study/observation of the following (Spotting)

1. Flowers adapted to pollination by different agencies (wind, insects).
2. Pollen germination on stigma through a permanent slide.
3. Identification of stages of gamete development i.e. T.S. testis and T.S. ovary through permanent slide. (from any mammal)
4. Meiosis in onion bud cell or grasshopper testis through permanent slide.
5. T.S. of blastula through permanent slide.
6. Mendelian inheritance using seeds of different colour/size of any plant.
7. Prepared pediqree charts of genetic traits such as rolling of tongue, blood groups, widow's peak, colour blindness.
8. Exercise on controlled pollination–Emasculation, tagging and bagging.
9. Identification of common disease causing organism like *Ascaris*, *Entamoeba, Plasmodium*, Ringworm through permanent slides or specimens. Comment on symptoms of diseases that they cause.
10. Two plants and two animals found in xerophytic conditions. Comment upon their morphological adaptations.
11. Plants and animals found in aquatic conditions. Comment upon their morphological adaptations.

PRESCRIBED TEXTBOOKS : CLASS XII

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

REFERENCE BOOKS :

1. Elementary Biology Vol. II
By : K.N. Bhatia and M.P. Tyagi
Published by : Trueman Book Company, Jalandhar - 144 008.

2. Companion Biology for Class XII
By : K. Bhatti.
Published by : S. Dinesh & Co. Jalandhar-144008.

3. Frank Senior Secondary Biology Practicals for Class XII (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 XII
By : Dr. J.P. Sharma
Published by : Laxmi Publications (P) Ltd., New Delhi - 110 002.i.

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DESIGN OF QUESTION PAPER

Subject : **BIOLOGY**
Paper : Theory
Class : XII
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	Reproduction in Organisms	14	20
II	Genetics and Evolution	18	26
III	Biology and Human Welfare	14	20
IV	Biotechnology	10	14
V	Ecology	14	20
	Total:	**70**	**100**

IV — SCHEME OF SECTIONS: **NIL**

V — SCHEME OF OPTIONS: Internal option may be given in Essay Type Questions 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
QUESTION PAPER/UNIT TEST

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

MARKING SCHEME :

Section - A(Any two) **4 Marks**

Q. 1

(a) Item 1 : Pollen germination.

(i)	Slide Preparation	–	1
(ii)	Observations	–	1
(iii)	Diagram and labelling	–	1
(iv)	Comments	–	1
		Total =	**4**

(b) Item 7: Preparation of temporary slide of mitosis in Onion root tip cells.

(i)	Preparation of slide	–	2
(ii)	Labelled diagram	–	1
(iii)	Description	–	1
		Total =	**4**

Section - B (Any two) **4+4 = 8 Marks**

Q.2

(a) Item 2,3 & 4: Soil test, pH and water holding capacity, pH clarity and presence of any living organisms and presence of suspended particulate matter in air.

(i)	Experimentation/Setting of experiment	–	1
(ii)	Observations	–	1
(iii)	Inference and Result	–	2
		Total =	**4**

(b) Item 5 & 6 : Quadrate Method : Plant population density and plant population frequency

(i)	Setting of Field experiment	–	1
(ii)	Identification of Species	–	1
(iii)	Data and Comments	–	1+1
		Total =	**4**

(c) Item 8 : Effect of different temperatures on the activity of Salivary amylase on starch.
Effect of three different pH on the activity of Salivary amylase on starch

(i)	Experimentation/Setting of experiment	–	1
(ii)	Observations	–	1
(iii)	Inference and Result	–	2
		Total =	**4**

Section - C (Two spots each from plants and animals) **2x4=8 Marks**

Q.3

Item 1-11: Spotting

(i)	Identification	–	1
(ii)	Comment	–	1
		Total =	**2**

Section - D

Q. 4 **Investigatory Project** **5 Marks**

(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 Book** **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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