

BIOLOGY

Part – I	60 Marks
Part – II	60 Marks
Practical	30 Marks
Total	150 Marks

Part-I (Class-IX)	Marks: 60	Time: 2:00 Hours
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Chapter 1 : The Science of Biology

- 1.1 Biology and its Branches
- 1.2 Relation of Biology with Other Sciences
- 1.3 Careers in Biology
- 1.4 Quranic Instructions to Reveal the Study of Life
- 1.5 Science as a Collaborative Field
- 1.6 Scientific Method
- 1.7 Theory and Law/Principle
- 1.8 Malaria – An Example of Biological Method

Chapter 2 : Biodiversity

- 2.1 Biodiversity
- 2.2 Classification
- 2.3 Taxonomic Ranks
- 2.4 History of Classification
- 2.5 Domains of Living Organisms
- 2.6 Classification of Domain Eukarya
- 2.7 Status of Virus in Classification
- 2.8 Binomial Nomenclature

Chapter 3 : The Cell

- 3.1 Cell
- 3.2 Structure of Cell
- 3.3 Structural Advantages of Plant and Animal Cells
- 3.4 Cell Specialization
- 3.5 Stem Cells

Chapter 4 : Cell Cycle

- 4.1 Cell Cycle
- 4.2 Mitosis
- 4.3 Meiosis
- 4.4 Comparison between Meiosis and Mitosis

Chapter 5 : Tissues, Organs and Organ Systems

- 5.1 Levels of Organization
- 5.2 Organs and Organ Systems in Plants
- 5.3 Organs and Organ Systems in Humans
- 5.4 Homeostasis

Chapter 6 : Biomolecules

- 6.1 Biomolecules
- 6.2 Carbohydrates
- 6.3 Proteins
- 6.4 Lipids
- 6.5 Nucleic Acids
- 6.6 The Working of DNA and RNA

Chapter 7 : Enzymes

- 7.1 Metabolism
- 7.2 Enzymes

	7.3	Mechanism of Enzyme Action
	7.4	Factors that Affect the Activity of Enzymes
	7.5	Enzyme Inhibition
Chapter 8 :		Bioenergetics
	8.1	ATP : The Cell's Energy Currency
	8.2	Photosynthesis
	8.3	Cellular Respiration
Chapter 9 :		Plant Physiology
	9.1	Nutrition in Plants
	9.2	Transport in Plants
	9.3	Transpiration
	9.4	Transport of Water and Salts in Plants
	9.5	Translocation of Food in Plants
	9.6	Gaseous Exchange in Plants
	9.7	Mechanisms for Excretion in Plants
	9.8	Osmotic Adjustments in Plants
Chapter 10 :		Reproduction in Plants
	10.1	Types of Asexual Reproduction
	10.2	Artificial Propagation
	10.3	Sexual Reproduction in Plants
Chapter 11 :		Biostatistics
	11.1	Introduction of Biostatics
	11.2	Mean, Median and Mode
	11.3	Bar Chart
Prescribed Book:		Biology for Part – I (Class –IX) (9 th)
Authors:		Dr. Raheela Nadeem, Dr. Robeela Shabbir, Dr. Adnan Ahmad Rana, Mr. Zunnorain Ahmed, Muhammad Naveed Asghar
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Part-II (Class-X)	Marks: 60	Time: 2:00 Hours
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SECTION: 3 LIFE PROCESSES

Unit-10 :	GASEOUS EXCHANGE
10.1	Gaseous Exchange in Plants
10.2	Gaseous Exchange in Humans
	10.2.1 The Air Passageway 10.2.2 The Lungs
	10.2.3 The Mechanism of Breathing
10.3	Respiratory Disorders (Bronchitis, Emphysema, Pneumonia, Asthma, Lung Cancer, Bad Effects of Smoking)
Unit-11 :	HOMEOSTASIS
11.1	Homeostasis in Plants
	11.1.1 Removal of Extra Carbon Dioxide and Oxygen
	11.1.2 Removal of Extra Water
	11.1.3 Removal of other Metabolic Wastes
	11.1.4 Osmotic Adjustments in Plants

- 11.2 Homeostasis in Humans
 - 11.2.1 Skin
 - 11.2.2 Lungs
- 11.3 Urinary System of Humans
 - 11.3.1 Structure of Kidney
 - 11.3.2 Functioning of Kidney
 - 11.3.3 Osmoregulatory Function of Kidney
- 11.4 Disorders of Kidney
 - 11.4.1 Kidney Stones
 - 11.4.2 Kidney Failure
- Unit-12 : COORDINATION AND CONTROL
 - 12.1 Types of Coordination (Coordinated Action)
 - 12.2 Human Nervous System
 - 12.2.1 Nerve Cell or Neuron
 - 12.2.2 Divisions of the Nervous System
 - 12.2.3 Reflex Action
 - 12.3 Receptors in Humans
 - 12.3.1 Eye
 - 12.3.2 Ear
 - 12.4 Endocrine System
 - 12.4.1 Important Endocrine Glands
 - 12.4.2 Feedback Mechanisms
 - 12.5 Disorders of Nervous System
 - 12.5.1 Paralysis
 - 12.5.2 Epilepsy
- Unit-13 : SUPPORT AND MOVEMENT
 - 13.1 Human Skeleton
 - 13.1.1 Role of Skeletal System
 - 13.1.2 Bone and Cartilage
 - 13.1.3 Components of Human Skeleton
 - 13.2 Types of Joints
 - 13.2.1 Roles of Tendons and Ligaments
 - 13.3 Muscles and Movement
 - 13.4 Skeletal Disorders
 - 13.4.1 Osteoporosis
 - 13.4.2 Arthritis

SECTION: 4 CONTINUITY IN LIFE

- Unit-14 : REPRODUCTION
 - 14.1 Reproduction
 - 14.2 Methods of Asexual Reproduction
 - 14.2.1 Binary Fission
 - 14.2.2 Fragmentation
 - 14.2.3 Budding
 - 14.2.4 Spore Formation
 - 14.2.5 Parthenogenesis
 - 14.2.6 Vegetative Propagation
 - 14.3 Sexual Reproduction in Plants
 - 14.3.1 Sexual Reproduction in Flowering Plants
 - 14.3.2 Pollination
 - 14.3.3 Development and Structure of Seed
 - 14.3.4 Germination of Seed
 - 14.4 Sexual Reproduction in Animals
 - 14.4.1 Formation of Gametes (Gametogenesis)
 - 14.4.2 Fertilization
 - 14.4.3 Reproduction in Rabbit
 - 14.4.4 Growth in Human Population and its Consequences
 - 14.4.5 Aids (A Sexually Transmitted Disease)
- Unit-15 : INHERITANCE
 - 15.1 Introduction to Genetics
 - 15.2 Chromosomes and Genes

- 15.3 Mendel's Laws of Inheritance
 - 15.3.1 Mendel's Law of Segregation
 - 15.3.2 Mendel's Law of Independent Assortment
- 15.4 Co-Dominance and Incomplete Dominance
- 15.5 Variations and Evolution
 - 15.5.1 Variations lead to Evolution
 - 15.5.2 Artificial Selection

SECTION: 5 ECOLOGY

- Unit-16 : MAN AND HIS ENVIRONMENT
- 16.1 Levels of Ecological Organization
 - 16.1.1 Components of Ecosystem
 - 16.2 Flow of Materials and Energy in Ecosystems
 - 16.2.1 Flow of Energy
 - 16.2.2 Flow of Materials
 - 16.2.3 Ecological Pyramids
 - 16.2.4 Biogeochemical Cycles
 - 16.3 Interactions in Ecosystems
 - 16.3.1 Raw materials
 - 16.3.2 Process
 - 16.4 Ecosystem Balance and Human Impacts
 - 16.4.1 Global Warming
 - 16.4.2 Acid Rain
 - 16.4.3 Deforestation
 - 16.4.4 Overpopulation
 - 16.4.5 Urbanization
 - 16.5 Pollution; Consequences and Control
 - 16.5.1 Air Pollution
 - 16.5.2 Water Pollution
 - 16.5.3 Land Pollution
 - 16.6 Conservation of Nature
 - 16.6.1 Plans for the conservation of Nature
- Unit-17 : BIOTECHNOLOGY
- 17.1 Introduction of Biotechnology Scope and Importance of Biotechnology
 - 17.2 Fermentation
 - 17.2.1 Fermentation in Biotechnology
 - 17.2.2 Fermenter
 - 17.3 Genetic Engineering
 - 17.3.1 Objectives of Genetic Engineering
 - 17.3.2 Basic Steps in Genetic Engineering
 - 17.3.3 Achievements of Genetic Engineering
 - 17.4 Single-Cell Protein
- Unit-18 : PHARMACOLOGY
- 18.1 Medicinal Drugs (Principle usage of important Medicinal Drugs)
 - 18.2 Addictive Drugs (Drug Addiction and associated problems)
 - 18.3 Antibiotics and Vaccines

LIST OF PRACTICALS FOR CLASS-IX (PART-I)

1. Study of different types of bacteria, Amoeba, Paramecium, Volvox with the help of prepared slides and from fresh culture /charts.
2. Study of external morphology of mustard plant and microscopic examination of root, stem, leaf, flower, fruit and seeds.
3. Identification of major organs and organ systems in a dissected frog (Dissection by demonstrator / teacher).
4. Recognition of different animals and plants from fresh and preserved specimens on the basis of apparent distinguishing taxonomic characters.

5. Evaluation of graphs of a population of an insect (endangered due to excessive use of insecticides) and interpret the reasons for its endangered status.
6. Use of microscope to observe the movement of small objects.
7. Microscopic examination of an animal cell (e.g. from frog's blood) and a plant cell (e.g. from onion epidermis) using an appropriate temporary techniques such as iodine or methylene blue.
8. Identification of different parts of the cell from fresh preparations.
9. Preparation of the wet mounts of tissue from flowering plants and study of plant and animal tissues from charts and prepared slides.
10. Determination of the effect of tonicity on plasmolysis and deplasmolysis in plant cells or in red blood cell.
11. Data collection on the number of stomata per unit area on various plant leaves that grow in areas of differing humidity and compilation of data and graph it to determine whether there is a relationship between the variables.
12. Observation of various stages of mitosis and meiosis by slides, model and charts.
13. Preparations of root tip squashes and study stages of mitosis
14. To demonstrate working of an enzyme in vitro e.g. pepsin working on meat in test tube.
15. Experiment to test enzyme action by putting diastase in a starch solution in test tube at 37° C and after fifteen minutes performing iodine test for presence of starch.
16. To demonstrate the process of photosynthesis using aquatic plant, Hydrilla.
17. Identification and labeling of the cellular and tissue structure in the CS of a leaf through observation under the microscope.
18. To investigate the necessity of chlorophyll, light and carbon dioxide for photosynthesis.
19. To demonstrate the process of respiration in germinating seed by using limewater.
20. To investigate the release of carbon dioxide and heat during aerobic respiration in germinating seeds.
21. Food tests: Benedict's test for reducing sugar, iodine test for starch, spot test and emulsion test for fat, and Biuret test for protein in solution.
22. Microscopic examination of a transverse section of the small intestine to show the villi.
23. Measurement of differences in length / weight of raw potato strips in concentrated salt solution and water.
24. Observation of root hairs on growing root of onion, carrot etc.
25. Microscopic observations of the structure and number of stomata in the epidermal peel of a leaf.
26. To investigate the rate of water loss at the two surfaces of a leaf by using cobalt chloride paper.
27. To investigate transpiration in potted plant under a bell jar.
28. Identification of xylem and phloem tissues in the prepared slides of stem, root and leaf.
29. To investigate the pathway of water in parts of plant using a suitable stain and compare sizes of various types of cells.
30. Identification of red and white blood cells under the light microscope on prepared slides and in diagrams and photomicrographs.
31. To investigate the effect of physical activity on pulse rate.
Experiment to show the capillary flow in fishtail or fin or frog's web.

LIST OF PRACTICALS FOR CLASS-X (PART-II)

1. Activity to compare the breathing rate at rest and after exercise.
2. Experiment to find out how much air a person can take into his / her lungs.
3. Demonstration of the presence of carbon dioxide in the exhaled air.
4. Demonstration of the presence of tar in cigarette smoke and also showing by charts and pictures the difference of lungs of smokers and non-smokers.
5. Examination of the structure of the kidney (Sheep kidney / model).
6. Observation and recording of the difference in quickness of response of the two types of co-ordination (by asking a student to say few words in front of class and observe the changes in heart beat).

7. Experiment to observe the contraction in the shin muscle of frog in a petri dish filled with methylene blue and using 12V.DC current.
8. Identify the different parts and draw a labeled diagram of longitudinal of eye of a sheep or bull.
9. Investigation of the nature of bone (by putting three pieces of the bone of lamb in water, NaOH and dilute HCL).
10. Observation of binary fission in Amoeba by using slides, photomicrograph and charts.
11. Observation of budding in yeast from prepared slides.
12. Examination of a bulb (onion), corm (colocasia), rhizome (ginger) and stem tuber (potato) and their cultivation to get new plants.
13. Propagation by stem cutting (rose or any locally available plant) and bryophyllum leaf.
14. Examination of mustard flower, gram seed and maize grain.
15. Investigation of the conditions for seed germination.
16. Recording the heights of class fellows to predict which kind of variation is it and presentation of the data of class fellows height in graphical form (either histogram or bar chart).
17. Investigation of an ecosystem e.g. an aquarium or a pond.
18. Investigation about the role of yeast and bacteria in the fermentation of flour and milk.

Prescribed Book: Biology for Part – II (Class –X)

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