

22/04/2026

[Time: 2 ½ Hours.]

[Marks: 75]

Please check whether you have got the right question paper.

- N.B: 1. All questions are compulsory and carry equal marks.  
2. Figures to the right indicate full marks.  
3. Draw neat and labelled diagrams wherever necessary.  
4. Answer the questions in proper order.

Q. 1 Multiple Choice Questions (MCQ) (Attempt any 15 out of 20) (1 Mark each) 15

- 1) The term "enzyme" literally means \_\_\_\_\_.  
a) in yeast  
b) in sugar  
c) in protein  
d) in nucleus
- 2) \_\_\_\_\_ catalyze the addition or removal of groups such as water, ammonia, or carbon dioxide without hydrolysis.  
a) Hydrolases  
b) Oxidoreductases  
c) Transferases  
d) Lyases
- 3) Any molecule that directly decreases the catalytic activity of an enzyme is called a \_\_\_\_\_.  
a) Activator  
b) Inhibitor  
c) Suppressor  
d) Cofactor
- 4) \_\_\_\_\_ is an inhibitor that exhibits anticancer activity.  
a) Penicillin  
b) Aspirin  
c) Disulfiram  
d) Fluorouracil
- 5) \_\_\_\_\_ are different molecular forms of the same enzyme that catalyze the same reaction.  
a) Apoenzymes  
b) Coenzymes  
c) Isozymes  
d) Holoenzymes
- 6) \_\_\_\_\_ refers to the maintenance of a stable internal environment in an organism.  
a) Adaptation  
b) Homeostasis  
c) Evolution  
d) Acclimatization

- 7) Adjustment to environmental changes under natural conditions is called \_\_\_\_\_.
- a) Acclimation
  - b) Acclimatization
  - c) Regulation
  - d) Migration
- 8) The biological clock that follows a 24-hour cycle is known as \_\_\_\_\_.
- a) Seasonal rhythm
  - b) Circadian rhythm
  - c) Lunar rhythm
  - d) Ultradian rhythm
- 9) Animals that maintain constant body temperature are called \_\_\_\_\_.
- a) Ectotherms
  - b) Endotherms
  - c) Poikilotherms
  - d) Conformers
- 10) Heat production through muscle activity is known as \_\_\_\_\_ thermogenesis.
- a) Non-shivering
  - b) Shivering
  - c) Passive
  - d) Radiative
- 11) Adenohypophysis is a large and compact part of pituitary gland derive from an outgrowth of oral ectoderm known as -----
- a) Rathke's pouch
  - b) Pituitocytes
  - c) Hillar cells
  - d) Median eminence
- 12) ----- is a disease developed in children as a result of hypothyroidism.
- a) Cretinism
  - b) Dwarfism
  - c) Addison's disease
  - d) Cushing's syndrome
- 13) ----- is a iodine containing hormone.
- a) Prolactin
  - b) Insulin
  - c) Relaxin
  - d) Thyroxine
- 14) The endocrine portion of pancreas contributes ----- of the weight of pancreas
- a) 20 %
  - b) 30 %
  - c) 50 %
  - d) 1 %

- 15) The steroid hormone responsible for balance of water and electrolytes in our body is -----
- Aldosterone
  - Glucagon
  - Secretin
  - LTH
- 16) Cells that require attachment for growth are called ----- cells.
- Suspension cells
  - Adherent cells
  - Stem cells
  - Floating cells
- 17) ..... is an inexpensive technique used for preparing a large number of cultures.
- Test tube culture
  - Micromanipulation
  - Protoplast culture
  - Embryo culture
- 18) ..... blocks the *de novo* synthesis of DNA.
- Thymidine
  - Hypoxanthine
  - Glycine
  - Aminopterin
- 19) ..... is the measure of solute concentration.
- Osmolarity
  - pH
  - Viscosity
  - Diffusion
- 20) ..... media are used for growth of pure batch culture.
- Solid media
  - Liquid media
  - Semi-solid media
  - Differential media

**Q. 2 Describe Any One of the following:**

A) Derivation of Michaelis–Menten equation

07

**OR**

A) Classification of enzymes with examples

**B) Write short note on Any Two (4 marks each)**

08

- Concept of Activation Energy
- Non-competitive inhibitors
- Lock and Key model of enzyme action
- Active site of an enzyme

- Q. 3 Explain Any One of the following:** **07**  
A) Shivering and non shivering thermogenesis.  
**OR**  
A) Role of kidney in ionic regulation.
- B) Write short note on Any Two (4 marks each)** **08**  
a) Endothermy and ectothermy  
b) Heat loss  
c) Daily Torpor  
d) Metabolic water
- Q. 4 Give an account on Any One of the following:** **07**  
A) Mechanism of hormone action  
**OR**  
A) Hormones of Pancreas and its disorders
- B) Write short note on Any Two (4 marks each)** **08**  
a) Histology of Parathyroid gland  
b) Graves' disease  
c) Epinephrine  
d) Gigantism
- Q.5 Describe Any One of the following:** **07**  
A) Sterilization  
**OR**  
A) Types of culture Media
- B) Write short notes on Any Two: (4 marks each)** **08**  
a) Balanced Salt Solution  
b) Coverslip culture  
c) Established cell lines  
d) Limitations of tissue culture

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**Q1. Multiple Choice Questions (MCQ) (attempt any 15 out of 20) 15 Marks**  
(1 Mark each)

- i. 5-Bromouracil is a base analogue of which nitrogenous base?  
a) Adenine      b) Thymine      c) Cytosine      d) Guanine
- ii. Base substitutions that do not alter the purine-pyrimidine orientation are classified as which type of mutation?  
a) Transition      b) Transversion  
c) Insertion      d) Deletion
- iii. Fragile X syndrome is a genetic disease caused by the repetition of which trinucleotide sequence?  
a) CAG      b) CGG      c) CCG      d) CUG
- iv. In mismatch repair, which enzyme is responsible for distinguishing between the parental and the newly synthesized DNA strand?  
a) DNA glycosylase      b) AP endonuclease  
c) Dam methylase      d) Restriction endonuclease
- v. Which of the following steps is specifically involved in the mismatch repair pathway in eukaryotes?  
a) Nucleotide excision  
b) Base excision  
c) Strand-directed mismatch recognition  
d) Double-strand break repair
- vi. Enzymes that catalyse the hydrolysis of terminal nucleotides from the ends of a DNA or RNA molecule in the 5'→3' direction are called:  
a) Oxidoreductases  
b) Terminal transferases  
c) Exonucleases  
d) Endonucleases
- vii. What is the primary significance of restriction sites present in the pBR322 plasmid?  
a) They allow insertion of foreign DNA into the plasmid  
b) They prevent plasmid replication in bacteria  
c) They encode proteins for expression in bacterial cells  
d) They regulate antibiotic resistance genes
- viii. Which process describes the synthesis of DNA using an RNA molecule as a template?  
a) Genomic DNA library preparation  
b) Transcription  
c) Translation  
d) Reverse transcription
- ix. Which type of evolution occurs when two independent species, occupying the same ecological space, independently acquire similar characteristics over time?  
a) Divergent evolution  
b) Convergent evolution  
c) Parallel evolution  
d) Homologous evolution

- x. Which technique is used for the separation and detection of proteins based on size and charge?  
a) Western blotting  
b) Polymerase chain reaction  
c) Northern blotting  
d) Southern blotting
- xi. Which type of chromosome is absent in the human karyotype?  
a) Acrocentric  
b) Submetacentric  
c) Telocentric  
d) Chromosomes without a satellite
- xii. Trisomy of which chromosome is responsible for Edwards syndrome?  
a) Chromosome 13  
b) Chromosome 18  
c) Chromosome 21  
d) Sex chromosomes (XXY)
- xiii. When a nullisomic gamete fuses with a normal gamete, which zygotic condition is produced?  
a) Disomic zygote with  $2n-1$  condition  
b) Monosomic zygote with  $2n-1$  condition  
c) Monosomic zygote with  $2n+1$  condition  
d) Disomic zygote with  $n-1$  condition
- xiv. The Guthrie test is a diagnostic screening test used to detect which condition?  
a) G6PD deficiency  
b) Phenylketonuria (PKU)  
c) Prader-Willi syndrome  
d) Klinefelter syndrome
- xv. In G-banding, chromosomes are treated with which agent prior to staining with Giemsa stain?  
a) Quinacrine  
b) Trypsin  
c) Trypsinogen  
d) Alkali
- xvi. Which field of study uses computational methods to extract meaningful knowledge from biological data?  
a) Biostatistics  
b) Biology  
c) Pharmacogenomics  
d) Bioinformatics
- xvii. What does the acronym BLAST stand for?  
a) Basic Local Alignment Search Tool  
b) Bioinformatics Local Alignment Sequence Test  
c) Biochemical Language and Sequence Transfer  
d) Biological Lookup for Alignment of Sequence Tools
- xviii. Which type of diagram depicts the evolutionary interrelationships of a group of organisms derived from a common ancestral form?  
a) Cladogram  
b) Phylogram  
c) Dendrogram  
d) Histogram

- xix. What type of database is Swiss-Prot classified as?  
a) Primary database  
b) Secondary database  
c) Composite database  
d) Protein sequence database
- xx. Who invented the technique of Polymerase Chain Reaction (PCR)?  
a) Boliver and Rodriguez  
b) Kary Mullis  
c) Frederick Sanger  
d) Arthur Kornberg
- Q2. A) Describe Helix-turn-helix and zinc finger motifs in DNA binding proteins. 7 Marks  
**OR**  
A) Describe excision repair in DNA.  
B) Write short note on ANY TWO. (4 marks each) 8 Marks  
a) SOS repair  
b) Non-ionizing radiation  
c) Huntington disease  
d) Types of substitution mutation.
- Q3. A) Describe preparation of genomic DNA library. 7 Marks  
**OR**  
A) Describe polymerase chain reaction.  
B) Write short note on ANY TWO. (4 marks each) 8 Marks  
a) Polynucleotide kinase  
b) DNA sequencing by chain termination method  
c) Northern blotting  
d) General properties of plasmid.
- Q4. A) Describe types of chromosomal deletion. 7 Marks  
**OR**  
A) Describe the process and application of amniocentesis.  
B) Write short note on ANY TWO. (4 marks each) 8 Marks  
a) Robertsonian disorder  
b) Aneuploidy  
c) Chorionic villus sampling  
d) Breast Cancer
- Q5. A) Describe proteomics. 7 Marks  
**OR**  
A) Describe application of NCBI.  
B) Write short note on ANY TWO. (4 marks each) 8 Marks  
a) Types of sequence alignment.  
b) EMBL  
c) PROSITE  
d) Metabolomics

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Time: 2.30 hours

Total Marks: 75

- Q1. Multiple Choice Questions (MCQ) (attempt any 15 out of 20) 15**
- i. Composting is used for \_\_\_\_\_ waste.  
A. Gas B. Nuclear C. Solid D. Liquid
  - ii. Pyrolysis occurs in absence of \_\_\_\_\_.  
A. Carbon B. Hydrogen C. Oxygen D. Nitrogen
  - iii. EIA stands for Environmental Impact \_\_\_\_\_.  
A. Analysis B. Assessment C. Approach D. Action
  - iv. Forest resources are \_\_\_\_\_ resources.  
A. Energy B. Biotic C. Mineral D. Abiotic
  - v. NGOs promote environmental \_\_\_\_\_.  
A. Cutting B. Awareness C. Pollution D. Mining
  - vi. A group of lions is called a \_\_\_\_\_.  
A. Flock B. Pride C. Pack D. Herd
  - vii. Zoonosis spreads from \_\_\_\_\_ to humans.  
A. Soil B. Plants C. Animals D. Water
  - viii. Camera traps help in wildlife \_\_\_\_\_.  
A. Feeding B. Monitoring C. Hunting D. Killing
  - ix. Niche is the \_\_\_\_\_ of an organism.  
A. Shape B. Role C. Size D. Place
  - x. Radio telemetry is used for \_\_\_\_\_ animals.  
A. Capturing B. Tracking C. Feeding D. Killing
  - xi. Bioprospecting refers to \_\_\_\_\_.  
A. conservation of endangered species  
B. exploration of biodiversity for drug development  
C. study of animal behaviour  
D. genetic modification of crops
  - xii. The famous biopiracy case involving Neem was related to \_\_\_\_\_.  
A. genetic modification B. use as food crop  
C. patent on its pesticidal properties D. medicinal use for cancer
  - xiii. Preclinical trials are conducted to \_\_\_\_\_.  
A. test drugs on humans B. advertise the drug  
C. sell the drug D. evaluate safety and efficacy of drugs
  - xiv. Zoopharmacognosy is the study of \_\_\_\_\_.  
A. animal classification B. animal self-medication behavior  
C. plant physiology D. microbial genetics
  - xv. Geophagy refers to \_\_\_\_\_.  
A. eating soil or clay B. eating plants  
C. drinking water D. eating insects
  - xvi. Land bridges help in \_\_\_\_\_.  
A. Growth B. Dispersal C. Isolation D. Extinction
  - xvii. Mountains act as \_\_\_\_\_ barriers.  
A. Biological B. Topographic C. Chemical D. Climatic
  - xviii. Continental drift theory was proposed by \_\_\_\_\_.  
A. Lamarck B. Wegener C. Darwin D. Mendel
  - xix. Zoogeography studies \_\_\_\_\_ distribution.  
A. Soil B. Animal C. Water D. Plant
  - xx. Oriental realm includes \_\_\_\_\_.  
A. Antarctica B. Europe C. India D. USA

- Q2. A) What are renewable resources? Give two examples of renewable resources. 7
- OR
- A) Explain any two traditional methods for solid waste management.
- B) Write a short note on **Any Two**. (4 marks each) 8
- a) E-waste  
b) Forest resources  
c) Anaerobic digestion  
d) Ice-stupa artificial glaciers by Sonam Wangchuk
- Q3. A) What is competition? Explain the types of competition with examples. 7
- OR
- A) Write a note on tourism and human animal conflict.  
B) Write short note on **Any Two**. (4 marks each) 8
- a) Pack and Herd  
b) Capture mark recapture method  
c) Forest (Conservation) Act, 1980  
d) Reforestation
- Q4. A) Explain the concept of bioprospecting and describe its types. 7
- OR
- A) Describe the mechanism of self-medication in animals with suitable examples.  
B) Write a short note on **Any Two**. (4 marks each) 8
- a) Write a note on the economic importance of bioprospecting.  
b) Write a short note on Neem case in biopiracy.  
c) Explain anting with examples.  
d) Write a short note on applications of zoopharmacognosy.
- Q5. A) Write a note on Patterns of animal distribution. 7
- OR
- A) Define realm. Write a note on the Palearctic realm.  
B) Write a short note on **Any Two**. (4 marks each) 8
- a) Topographic barrier of distribution.  
b) Natural raft and drift wood.  
c) Fauna of the Australian realm.  
d) Isolating mechanism.

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Time: 2 ½ Hours.

Total Marks-75

Please check whether you have got the right question paper.

- N.B:** 1. All questions are compulsory and carry equal marks.  
2. Figures to the right indicate full marks.  
3. Draw neat and labelled diagrams wherever necessary.  
4. Answer the questions in proper order.

**Q1** Multiple choice questions (MCQ) (Attempt any 15 out of 20)(1Mark each) 15 Marks

- i** Feeding in *Herdmania* is \_\_\_\_\_
- Holozoic
  - Parasitic
  - Filter feeding
  - Saprophytic
- ii** Cyclostomata are \_\_\_\_\_
- Jawed vertebrates
  - Jawless vertebrates
  - Protochordates
  - Nonchordates
- iii** The division of Vertebrata with jaws is \_\_\_\_\_
- Agnatha
  - Gnathostomata
  - Cyclostomata
  - Ostracodermii
- iv** \_\_\_\_\_ belongs to class Leptocardii
- Oikopleura*
  - Petromyzon*
  - Salpa*
  - Branchiostoma*
- v** In chordates, the nerve cord is \_\_\_\_\_
- Ventral and solid
  - Dorsal and tubular
  - Ventral and tubular
  - Ventral and hollow
- vi** Cyclostomates are the animals having \_\_\_\_\_
- feather
  - Mammary glands
  - Circular mouth
  - Four feet
- vii** Highly specialized parental care occurs in \_\_\_\_\_
- Lepidosiren*
  - Climatus*
  - Rhinobatos*
  - Exocetus*

- viii *Ichthyophis* belongs to class \_\_\_\_\_
- Placodermi
  - Chondrichthyes
  - Osteichthyes
  - Amphibia*
- ix Genus \_\_\_\_\_ includes aquatic salamanders of the United States.
- Ichthyophis*
  - Amphiuma*
  - Hyla*
  - Rhinobatos*
- x *Exocoetis* is \_\_\_\_\_
- Flying fish
  - Guitar fish
  - Australian lungfish
  - African lungfish
- xi The \_\_\_\_\_ is Arboreal reptile.
- Sphenodon
  - Chelonia
  - Chamaeleo
  - Ichthyosaurus
- xii \_\_\_\_\_ is called Wading bird.
- Fowl
  - Peacock
  - Ardeola (heron)
  - Emu
- xiii \_\_\_\_\_ is called the insect eating Mammal.
- Sorex
  - Sloth
  - Squirrel
  - Macaca*
- xiv Emu is \_\_\_\_\_ Bird.
- Arboreal
  - Swimming
  - Terrestrial
  - Flightless

- xv Most Mammals are \_\_\_\_\_
- Viviparous
  - Ovo-viviparous
  - Oviparous
  - None.
- xvi Shark belongs to phylum \_\_\_\_\_.
- Arthropoda
  - Mollusca
  - Chordata
  - Hemichordata
- xvii Sense organs in Shark include \_\_\_\_\_.
- Eyes only.
  - Internal ears only.
  - Ampullae of Lorenzini
  - All of the above
- xviii The caudal fin of Shark is of \_\_\_\_\_ type.
- Homocercal
  - Heterocercal
  - Diphycercal
  - Rounded
- xix Teeth in *Scoliodon* are of \_\_\_\_\_ type.
- Thecodont
  - Acrodont
  - Homodont
  - Pleurodont
- xx Posterior part of the cranium is known as \_\_\_\_\_.
- Rostrum
  - Orbit
  - Occipital region
  - Snout

Q.2 A Explain general characters of Protochordata with example.

7 Marks

OR

A Describe annelids as ancestor and affinities with Echinodermata

B Write a short note on Any Two (4 marks each)

8 Marks

- Herdmania*
- Cephalaspis*
- Oikopleura*
- Class Leptocardii

**Q.3** A Give the general characters of Euchordates and classification of Gnathostomata. **7 Marks**

OR

A Describe the general characters of class Amphibia,

**B Write short notes on Any Two (4 marks each)**

- a) Characters of *Rhinobatos*.
- b) *Exocetus*
- c) Parental care in lung fish
- d) Limbless amphibian

**8 Marks**

**Q.4** A Describe the general characters of class Mammalia with suitable example. **7 Marks**

OR

A Describe the Aquatic and Extinct Reptile.

**B Write short note on Any Two (4 marks each)**

- a) Arboreal bird
- b) Swimming bird
- c) Wading bird
- d) Birds of Prey

**8 Marks**

**Q.5** A Describe the Digestive System of *Scoliodon*. **7 Marks**

OR

A Describe the Peripheral Nervous System of *Scoliodon*.

**B Write short note on Any Two (4 marks each)**

- a) Habit and Habitat of *Scoliodon*.
- b) Exoskeleton of *Scoliodon*.
- c) Cardinal Venous System of Shark.
- d) Copulation and Fertilization in Shark.

**8 Marks**