2021

ZOOLOGY

PAPER-II

Time Allowed — 3 Hours *Full Marks — 200*

If the questions attempted are in excess of the prescribed number, only the questions attempted first up to the prescribed number shall be valued and the remaining ones ignored.

*Answer may be given either in **English** or in **Bengali** but all answer must be in one and same language.*

Group-A

Answer *any ten* questions. 4×10=40

1. (a) Delineate the salient features of the fluid-mosaic model of plasma membrane structure.

   (b) Explain why lysosomes are called polymorphic cell organelles.

   (c) What are check points in cell cycle? What happens at each check point during the cell cycle?

   (d) Mention the characteristic features of autosomal recessive inheritance pattern in human with the help of a pedigree.

   (e) The father of two children is of blood type O and the mother is type A. The children are O and A. Given this information, what can you say about the genotypes of father and mother?

   (f) Define 'missense mutation' and briefly elaborate the involvement of such mutation in the development of sickle cell anaemia.

   (g) Distinguish between protooncogene, oncogene and tumour suppressor gene.

   (h) Briefly discuss the histological features of mammalian ovary.

   (i) Elaborate the concept of Michaelis – Menten constant (K_M) of an enzyme.

   (j) Write in brief about secondary structures of proteins.

   (k) State the similarities and dissimilarities between mammalian fauna of Oriental and Ethiopian realm.

   (l) What is meant by integrated fish culture and what are its advantages?

   (m) Draw and briefly describe the basic structure of an immunoglobulin molecule.

Group-B

Answer *any four* questions.

2. Distinguish between: 5×4=20

   (a) RER and SER

   (b) DNA polymerase and RNA polymerase

(c) Diabetes mellitus and Diabetes insipidus

(d) RAPD and RFLP

3. Write notes on the following: 5×4=20

(a) Electron transport chain

(b) Types of chemical mutagens

(c) Second messenger in signal transduction

(d) Synaptic transmission

4. (a) Discuss briefly how proteins are synthesized, modified and secreted through the GERL system.

(b) Compare and contrast euchromatin and heterochromatin.

(c) What happens during the S phase of the cell cycle? 10+6+4=20

5. (a) DNA replication is a semi-discontinuous process – explain.

(b) Distinguish between rho (ρ) – dependent and rho (ρ) – independent mechanisms of termination of transcription in *E. coli.*

(c) List the major post transcriptional modifications of eukaryotic pre-mRNA before it leave the nucleus. 8+8+4=20

6. (a) Compare and contrast the mechanism of action of peptide and steroid hormones with examples.

(b) Write in brief about the mechanism of hormonal control of insect metamorphosis.

(c) Mention the functions of Sertoli cells. 8+8+4=20

7. (a) Classify enzymes based on the reactions they catalyse. Give examples of each class.

(b) Briefly explain the mechanism of propagation of an action potential through myelinated nerve fibre.

(c) How does a spectrophotometer work? 8+8+4=20

Group-C

Answer *any four* questions.

8. Distinguish between: 5×4=20

(a) Spermatogenesis and Oogenesis

(b) Acrosome reaction and Cortical reaction

(c) Cryptic and Aposematic colouration

(d) T cell and B cell

9. Write notes on the following: 5×4=20

   (a) Types of eggs based on the amount of yolk with examples

   (b) Types of placenta based on the distribution of villi with examples

   (c) Neutral theory

   (d) Induced breeding of IMC

10. (a) Explain the role of yolk in cleavage.

    (b) Compare the process of cleavage in frog and chick.

    (c) Dorsal lip of blastopore is the primary organizer of amphibian embryo – discuss. 4+8+8=20

11. (a) State the hypothesis of 'Oparin - Haldane' to explain the prebiotic condition favourable for origin of life.

    (b) Delineate the basic tenets of evolution by natural selection as defined by Darwin.

    (c) 100 persons from a small town were tested for their MN blood types. The genotypic data are: MM 41; MN 38; and NN 21. Calculate the frequency of M and N alleles. Explain whether the population is in Hardy-Weinberg equilibrium or not.

    (d) Evolution of horse was triggered by a change in the climate and vegetation during lower cenozoic period – explain. 4+4+6+6=20

12. (a) What is a deep litter system for poultry farming? Mention the advantages of the system.

    (b) Write the scientific name of jute stem weevil. Mention the damage symptoms of the pest.

    (c) Comment on the advantages and disadvantages of IPM.

    (d) Write the scientific name of a mammalian pest and mention the extent of damage caused by it. 5+5+5+5=20

13. (a) Describe the life cycle of *Wuchereria bancrofti.* Add a note on its pathogenicity.

    (b) Classify immunoglobulin based on the following parameters: structure, number of antigen binding sites, H-chain type, distribution and function.

    (c) Add a note on retrovirus. (5+5)+6+4=20
