

ZOOLOGY

Paper – II

Time Allowed : **Three Hours**

Maximum Marks : **200**

Question Paper Specific Instructions

Please read each of the following instructions carefully before attempting questions :

There are **EIGHT** questions in all, out of which **FIVE** are to be attempted.

Questions no. **1** and **5** are compulsory. Out of the remaining **SIX** questions, **THREE** are to be attempted selecting at least **ONE** question from each of the two Sections A and B.

Attempts of questions shall be counted in sequential order. Unless struck off, attempt of a question shall be counted even if attempted partly. Any page or portion of the page left blank in the Question-cum-Answer Booklet must be clearly struck off.

All questions carry equal marks. The number of marks carried by a question/part is indicated against it.

Neat sketches may be drawn, wherever required.

Answers must be written in **ENGLISH** only.

SECTION A

- Q1.**
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|-----|---|---|
| (a) | Illustrate the mechanism of initiation of DNA replication and formation of primosome in prokaryotes. | 8 |
| (b) | Diagrammatically compare paracentric and pericentric inversions. | 8 |
| (c) | Distinguish between sympatric and allopatric speciation. | 8 |
| (d) | Explain the inheritance pattern of an autosomal recessive congenital disease showing a three-generation pedigree. | 8 |
| (e) | Discuss the significance of cladistics in the field of taxonomy. | 8 |

- Q2.** (a) Explain the use of minisatellite DNA in the process of DNA fingerprinting. 15
- (b) Discuss the isolating mechanisms that prevent interspecific crosses. 15
- (c) Describe the composition of prokaryotic ribosomes and illustrate sequential assemblies of 30S and 50S subunits during the formation of translation initiation complex. 10
- Q3.** (a) Diagrammatically describe prophase stages and differentiate between anaphase I and II of meiotic cell division. 15
- (b) Describe the factors which are known to affect the Hardy-Weinberg equilibrium. 15
- (c) Explain the genic balance theory of sex determination in *Drosophila*. 10
- Q4.** (a) Illustrate fluid mosaic model of plasma membrane and explain the mechanism of active transport through the membrane. 15
- (b) Distinguish between founder effect and bottleneck effect. How do these forces affect gene frequency of a large population? 10
- (c) Describe the role of multiple alleles in the inheritance of ABO blood group system in humans. 15

SECTION B

- Q5.** (a) Explain the physiological role of cholesterol. 8
- (b) Compare the mechanism of osmoregulation in terrestrial and marine mammals with examples. 8
- (c) Describe the role of G protein-coupled receptors in the action of steroid hormone. 8
- (d) Justify the statement with examples "Coenzymes function as second substrate of concerned enzyme". 8
- (e) Discuss paedogenesis and neoteny with examples. 8
- Q6.** (a) Draw the structure of F_0F_1 -ATP synthase and explain the chemiosmotic concept of oxidative phosphorylation. 15
- (b) Illustrate actin myosin sliding mechanism of muscle contraction and relaxation. 15
- (c) Describe different types of placenta in eutherian mammals. 10
- Q7.** (a) Discuss the process of teratogenesis in animals. 15
- (b) Describe the structure of IgG and the process of generation of antibody secreting cells. 15
- (c) Explain the countercurrent mechanism operating at vasa recta and its role in urine formation. 10
- Q8.** (a) Describe hormonal regulation of menstrual cycle. 15
- (b) Explain the principle and protocol of *in vitro* fertilization in humans. 15
- (c) Describe alpha helix and tertiary structure of protein. 10

