

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.

Question Nos. 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.

The number of marks carried by a question/part is indicated against it.

Neat sketches may be drawn, wherever required.

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.

Answers must be written in ENGLISH only.

SECTION—A

1. (a) Describe the structure of the mitotic spindle and the role of different types of fibres in chromosome movement. 8
- (b) What are the salient features of the genetic code? Write the nonsense codons and their theoretical anticodons. 8
- (c) Write the Urey and Miller experiment relating to the origin of life on the earth. 8
- (d) Give the salient features of International Code of Zoological Nomenclature. 8
- (e) Describe the genetics of ABO human blood groups. Can a man of blood group B be the father of the child of a woman of blood group A? The blood group of the child is O. Explain the genotypes. 8

2. (a) Explain the following about plasma membrane structure :
 - (i) Fluidity of the membrane
 - (ii) Functions of the membrane proteins
 - (iii) Selective permeability 15
- (b) How does sex determination take place in *Drosophila*? Add a note on genic balance theory. 10
- (c) Explain the Hardy-Weinberg law of genetic equilibrium and give its algebraic expression. At a locus with a dominant and a recessive allele in Hardy-Weinberg equilibrium, 16% of the individuals are homozygous for the recessive allele. What is the frequency of the dominant allele in the population? 15

3. (a) Explain with the help of diagrams, how the transport of electrons through the four complexes of the respiratory chain in mitochondria leads to the formation of a proton gradient and ATP synthesis. 15
- (b) What phenotypic ratio do you expect from the following crosses with reference to colour blindness in human beings?
 - (i) When a colour-blind woman marries a normal man
 - (ii) When a carrier woman marries a normal man
 - (iii) When a normal woman marries a colour-blind man 15
- (c) Explain continental drift and write the evidences in its support. 10

4. (a) Explain the role of transcription factors of RNA polymerase II in eukaryotes. 10
- (b) In a Mendelian cross, a round yellow pea plant (RRYY) was crossed to a wrinkled green pea plant (rryy). What will be the F₁ and F₂ offsprings? Give their genotypic and phenotypic ratios. 15
- (c) Describe the palaeontological evidences in favour of evolution of man. 15

SECTION—B

5. (a) What are the different types of coenzymes? Explain the action of any one. 8
 - (b) Describe chloride shift with reference to carbon dioxide transport. 8
 - (c) Describe aging process and explain the physiological basis of aging. 8
 - (d) Explain the role of ADH and juxtaglomerular complex in the regulation of kidney function. 8
 - (e) Describe the differences between α -helix and β -pleated sheet protein structures. 8
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6. (a) Give a detailed account of oxidation of lipids. 15
 - (b) What is binocular vision? Write the role of rods and cones in physiology of vision. 15
 - (c) Describe in vitro fertilization and add a note on embryo transfer techniques. 10
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7. (a) Explain the mechanism of peptide hormone action on a liver cell. 15
 - (b) Explain how action potential is generated and propagated in the nerve fibre. 10
 - (c) Describe the process of organogenesis of vertebrate eye. 15
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8. (a) Draw the structures of different types of immunoglobulins. Which type of immunoglobulin production is stimulated in case of allergic reactions? 15
 - (b) Describe the role of hormones in digestion. 10
 - (c) Describe the morphological and histological types of placenta in mammals. Explain the role of HCG in human beings. 15

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