

Sl. No.

3851

D-VSF-L-MBB

## ZOOLOGY

### Paper—II

Time Allowed : Three Hours

Maximum Marks : 200

### INSTRUCTIONS

Candidates should attempt Question Nos. 1 and 5 which are compulsory, and any THREE of the remaining questions, selecting at least ONE question from each Section.

The marks carried by each question are indicated at the end of the question.

Answers must be written in ENGLISH only.

Neat sketches may be drawn, wherever required, to illustrate the answers.

### Section—A

1. Answer any *four* of the following in not more than 100 words each :

- (a) List the structural components of DNA and the salient features of Watson and Crick model of DNA structure. Explain how the structure ensures its self-replicability.

3+5+2=10

- (b) Explain the experiment of Stanley and Miller with regard to the origin of life. 10
- (c) According to Mendel's second law, in a cross between homozygous individuals with two pairs of non-linked alleles,  $AAbb \times aaBB$ , what are the genotypical and phenotypical proportions in  $F_1$  and  $F_2$ ? 10
- (d) Differentiate between classification and systematics. 10
- (e) What is cDNA? How is it generated? Explain its significance.  $2+4+4=10$
2. (a) Give a diagrammatic representation of the organization of electron transport particles and components of oxidative phosphorylation on the mitochondrial membrane. 15
- (b) "A kinetochore is to a cell biologist, what a centromere is to a geneticist." Explain. 10
- (c) Write explanatory notes on :  $4+6+5=15$
- (i) Initiator tRNA
- (ii) Transcription terminator
- (iii) Elongation factor G

3. (a) Differentiate between primary and secondary messengers. Give schematic representation of a signal transduction pathway involving a second messenger.  $5+10=15$
- (b) Both *Drosophila* and humans show XX-XY mechanisms of sex determination. Explain whether the two mechanisms are same or different. 10
- (c) Discuss with examples how lysosomes are digestive organelles and/or suicide bags of cells.  $8+7=15$
4. (a) How will you explain the fact that fishes and dolphins have similar organs and similar general shape? 10
- (b) What is speciation? Explain with suitable examples why and how geographical isolation leads to speciation.  $3+12=15$
- (c) Describe the features of the Neanderthals and Cro-Magnon man. Explain their status and role in human evolution.  $9+6=15$

### Section--B

5. Answer any *four* of the following in not more than 100 words each :

(a) Starch and glycogen are both homopolymers of glucose. What are the differences, if any? Briefly give the functions. 6+4=10

(b) Define a nutrient and distinguish between macro- and micro-nutrients. With examples, explain their biological roles. 2+4+4=10

(c) Defining the terms ontogeny and phylogeny, explain the concept 'ontogeny recapitulates phylogeny'. 4+6=10

(d) Explain the (i) composition of cytoplasm and (ii) role of cytoplasm in development. 4+6=10

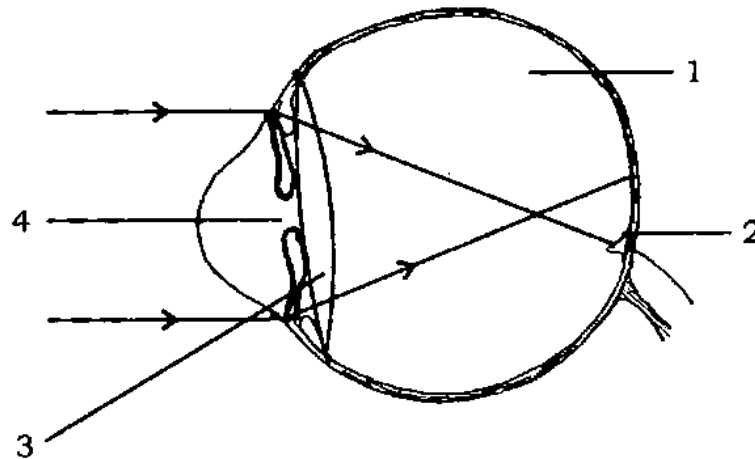
(e) Explain briefly the basis of erythroblastosis foetalis in human. 10

6. (a) All proteins have tertiary structure but only some proteins have quaternary structure. Explain with suitable examples. 10

(b) Explaining glycolysis, write the possible modes of reversing the irreversible steps of glycolysis. 3+12=15

(c) Explain the concept of humoral immunity. 15

7. (a) Given below is a diagram depicting a defect of the human eye. Study the same and answer the questions :



- (i) Name the defect shown in the diagram.
- (ii) Name two possible reasons for the defect.
- (iii) Name the parts labelled 1-4.
- (iv) Draw a labelled diagram to show how the above-mentioned defect can be rectified by using a lens.
- 1+2+4+3=10
- (b) Explain the mechanism in detail that leads to sealing of the haemorrhages in blood vessels. What would be the effect on this process in a person with low platelet count?
- 12+3=15
- (c) Differentiate between corpus luteum and corpus albicans. Discuss the role of corpus luteum as an endocrine structure detailing its formation and functions.
- 2+13=15

8. (a) Describe the process of vitellogenesis in frog and add a note on classification of eggs based on the content and distribution of yolk. 8+7=15
- (b) Metamorphosis involves biochemical and autolytic changes. Discuss them with reference to amphibians. 8+7=15
- (c) Discuss placenta as an interface between the foetus and the mother. 10

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