

ZOOLOGY (Paper I)

Time Allowed : Three Hours

Maximum Marks : 300

QUESTION PAPER SPECIFIC INSTRUCTIONS

(Please read each of the following instructions carefully before attempting questions)

There are EIGHT questions divided in two Sections.

Candidate has to attempt FIVE questions in all.

Question Nos. 1 and 5 are compulsory and out of the remaining, any THREE are to be attempted choosing at least ONE question from each Section.

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

Wherever any assumptions are made for answering a question, they must be clearly indicated.

Word limit in questions, wherever specified, should be adhered to.

SECTION 'A'

1. Answer the following in about 150 words each: **12×5=60**
- (a) Draw labelled sketches of Alima and Phyllosoma larvae. Identify the neuroendocrine factors that cause metamorphic changes in them.
- (b) Compare the structure and function of uricotelic and ureotelic kidney with suitable examples and diagrams.
- (c) Differentiate between pheromones and hormones. How do they help in communication and behaviour?
- (d) What are the evidences against the traditional concept that pituitary gland is the 'master of endocrine orchestra'? Highlight the current concept on this endocrine gland.
- (e) "Birds are glorified reptiles." Justify the statement.
2. (a) Give an illustrated account of interaction of neuroendocrine secretions in promoting metamorphosis in an orthopteran and a lepidopteran insect. Mention the type of metamorphosis that these insects undergo. **20**
- (b) What is torsion? How does it occur in certain gastropods? Give an illustrated account of torsion and detorsion in this molluscan class. **20**
- (c) Enumerate the anatomical and physiological changes that occur in a venous heart during vertebrate evolution leading to emergence of heart with separate chambers for arterial and venous blood and a pacesetter mechanism. **20**
3. (a) Draw a labelled diagram of hypothalamohypophyseal ovarian axis, and comment on the following: (i) Effect of photoperiod (ii) Role of hormones in ovarian cycle (iii) Feedback regulation of hormonal cycle **30**
- (b) Compare the tornaria larva of Balanoglossus with bipinnaria larva of echinoderm. Give reasons for including Hemichordata as a distinct phylum of invertebrates. **30**
4. (a) Fasciola, Taenia and Ascaris are adapted to parasitic mode of life. Define the convergent and divergent strategies employed by these parasites for successful existence and propagation. **20**
- (b) Differentiate among anapsid, diapsid and synapsid reptiles. Give examples. **20**
- (c) Differentiate between structure and functions of parathyroid hormone and thyroid gland hormones. **20**

SECTION 'B'

5. Answer the following in about 150 words each:

12×5=60

- (a) Draw diagrams to differentiate between ecological pyramids based on predator-prey relationship and energy flow in an ecological niche.
 - (b) What are the merits of remote sensing in sustainable development? Give examples.
 - (c) With suitable examples and diagrams, explain the concept of ecological succession.
 - (d) How is the degree of freedom calculated in a chi-square analysis? Use a graph to convert χ^2 -values to p-values.
 - (e) Compare the social organization of termites and honeybees.
6. (a) Differentiate between conditioning and habituation with suitable examples from primates and rodents. **20**
- (b) What is biological clock and how does it function? Discuss the role of intrinsic and extrinsic factors in its entrainment. **20**
- (c) Delineate the principal steps in initiating sericulture. Add a note on various aspects of rearing techniques to get quality product in sericulture. **20**
7. (a) Discuss the role of biotechnology in forensic science giving suitable examples. **20**
- (b) Identify and write the characteristics of ectoparasites of cattles. Describe the symptoms of their infection and ways to treat them. **20**
- (c) How do animals navigate in the dark? Use owl and chiropterans as examples, and highlight the features of their navigational sensory equipment. **20**
8. (a) With suitable example(s), enumerate the method for conducting one-way and two-way F-tests. **15**
- (b) What is PCR? Give an illustrated account of various steps of this technique in DNA amplification. **15**
- (c) Tabulate the differences among prototherians, metatherians and eutherians with suitable examples. **15**
- (d) Describe the role of liver and endocrine pancreas in blood-glucose regulation. **15**