

**CC/M/EXAM.
2020**

ZOOLOGY

PAPER—II

Time : 3 hours]

[Full Marks : 250

Note : 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.

SECTION—A

1. Answer *any five* of the following questions :

- (a) Outline the roles played by restriction enzymes and vectors in cloning DNA. 10
- (b) Contrast the overall roles of mitosis and meiosis in the life of an animal. How do the nuclei formed by these two processes differ from one another? 6+4=10
- (c) How do polytene chromosome of an insect differ from normal chromosome? 10
- (d) What are sex chromosomes? How do chromosomes contribute to the phenotypic differences between the sexes? 2+8=10
- (e) How does crossing-over recombine genes that are linked together on a chromosome? 10
- (f) Define genotype and phenotype, and describe how they are related. 10
- (g) What role does mutation play in the process of evolution? 10

2. Answer the following questions :

- (a) What do you understand by cell signaling? What are different modes of cell signaling? Discuss the role of different types of signaling molecules in signal transduction. 2+4+14=20
- (b) Describe in detail the process of DNA fingerprinting and write about its importances. 10+5=15
- (c) What is continental drift? Discuss the role of continental drift in distribution of animals with suitable examples. 5+10=15

3. Answer the following questions :

- (a) What do you understand by transgenesis? Discuss the principles and method of whole animal cloning with suitable example. 5+15=20
- (b) How does the process of mitosis facilitate the faithful transmission of genetic information from cell to cell during division? 15
- (c) What are the genetic differences between male and female determining sperm in heterogametic males? Discuss the mechanism of sex determination in human. 3+12=15

4. Answer the following questions :

- (a) Discuss the theories of origin of life. 20
- (b) What is speciation? Write an account on various types of species concepts along with their advantages and disadvantages. 2+13=15
- (c) What are the forces of evolution? Discuss mutation as a force and factor of evolution. 5+10=15

SECTION—B

5. Answer *any five* of the following questions :

- (a) Write the biological functions, sources and deficiency syndromes of vitamin A. 10
- (b) What are different types of muscles? Describe the mechanism of contraction of skeletal muscle. 10
- (c) What are the differences between spermatogenesis and oogenesis? 10
- (d) What do you understand by innate immunity? Discuss about different components of innate immune system. 2+8=10
- (e) Describe the properties of three different types of lipid molecules. What are their respective biological roles? 2+8=10
- (f) What do you understand by capacitation? What are the changes occurring in a mammalian sperm during capacitation and why is it necessary? 2+8=10
- (g) Describe the role of hormones as chemical messenger in cell signaling. 10

6. Answer the following questions :

- (a) What is the composition of haemoglobin? Discuss the role of haemoglobin in transport of oxygen and carbon dioxide. 4+16=20

(b) Describe the structure of a nephron with a suitable diagram. Add a note on the process of urine formation. 8+7=15

(c) Give a detailed description of the reactions of citric acid cycle with necessary illustration. 15

7. Answer the following questions :

(a) Describe in detail about hormonal control of metamorphosis in amphibian. 20

(b) What are the sources of embryonic stem cell? Discuss about different types of embryonic stem cells and their uses for human welfare. 3+12=15

(c) What is an action potential? Describe various steps of propagation of nerve impulse along a nerve fibre. 3+12=15

8. Answer the following questions :

(a) Describe the development of eye with necessary diagrams. 20

(b) Describe the menstrual cycle and hormonal profile during the cycle and functions of the hormones. 15

(c) What is ageing? Write about different causes of ageing. 3+12=15

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