

2019

ZOOLOGY

[ Honours ]

PAPER – II

*Full Marks : 90*

*Time : 4 hours*

*The figures in the right hand margin indicate marks*

*Candidates are required to give their answers in their own words as far as practicable*

*Illustrate the answers wherever necessary*

GROUP – A

Answer **two** questions from the following : 15 × 2

1. (a) With a labelled diagram describe the ultra-structure of mitochondria. 2 + 8

- (b) Why mitochondria are often referred to as the powerhouse of the cell ? 5
2. (a) Write a note on physical structure and chemical nature of DNA. 6 + 5
- (b) Mention four important functions of DNA. 4
3. (a) Tomato plants having round, peach fruits were crossed with those having elongate smooth fruits; the  $F_1$  plants were test-crossed and yield the following data :
- | <u>Round, smooth</u> | <u>Round, peach</u> | <u>Elongate, smooth</u> | <u>Elongate, peach</u> |
|----------------------|---------------------|-------------------------|------------------------|
| 14                   | 133                 | 141                     | 12                     |
- (i) Test if the genes for round and peach fruits are linked. If so, in which phase ?
- (ii) Estimate the frequency of recombination between the two genes and prepare a linkage map for them. 3 + 5
- (b) Describe different types of linkage, and state the physical basis of linkage. 4 + 3

4. (a) Write a note on different types of cleavage observed in animals with examples. Explain the influence of yolk on cleavage. 7 + 2
- (b) Make a list of different types of morphogenetic movement along with proper examples. 6
5. (a) Compare allopatric and sympatric speciation. 5
- (b) Explain the concept of "Hot dilute soup" as described by Oparin-Haldane in the light of chemogeny. 4
- (c) Explain the terms : 2 + 2
- (i) agamo species
- (ii) sibling species.
- (d) What is index fossil ? Give example. 1 + 1
6. (a) What is estrus ? How would you distinguish between estrus from metestrus ? State the function of Corpus luteum. 2 + 2 + 1

- (b) Describe in brief the hormonal regulation of ovarian follicular phase with the help of suitable diagram. 5
- (c) Describe the uterine changes that take place during menstrual cycle. 5

GROUP – B

Answer **five** questions from the following : 8 × 5

7. What is Oparin and Haldane hypothesis ? How Miller experimentally prove their hypothesis in laboratory ? 2 + 6
8. Discuss the cryptic and warning colouration of animals with proper examples. State the adaptive values of such colouration. 6 + 2
9. Describe the sex determination process in *Drosophila* by the help of polygenic theory in reference to the "Genic Balance theory". 8
10. (a) Give the role of organizer in the development of eye in chick. 3

(b) Describe the process of development of eye in chick with special reference to lens formation. 5

11. The following are the genotypic frequencies for three hypothetical populations :

Population I : 10 AA 80 Aa 10aa = Total 100

Population II : 0 AA 150 Aa 100aa = Total 250

Population III : 2 AA 16 Aa 32aa = Total 50

which population among the above is in Hardy-Weinberg equilibrium ? 8

12. Briefly describe the cloverleaf structure of tRNA.

Write down the function of organizer. 4 + 4

13. Describe different types of fossils with suitable example. Write significance of fossil in evolution. 6 + 2

14. Briefly describe the major steps of chemical basis of origin of life. Distinguish between *sympatric* and *allopatric* speciation. 5 + 3

GROUP – C

Answer **five** questions from the following : 4 × 5

15. State the position and significance of Wallace's line. 4
16. Explain with example how aggressive colouration is helpful for animals. 4
17. Why lysosomes are called "suicidal bags of a cell" ? 4
18. Compare and contrast prokaryotic and eukaryotic mRNA. 4
19. Give a brief account of mechanism of continental drift. 4
20. Write the function of chorion and allantois. 2 + 2
21. What do you mean by fertilizine and antifertilizine molecule ? 2 + 2
22. Define Wallace's line and barriers of distribution. 2 + 2

23. (a) Why both strands of DNA in a given region cannot act as a template strand for transcription in eukaryotes ? 2
- (b) Mention the special features of RNA synthesis characteristically different from DNA synthesis. 2
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