2020

ZOOLOGY (Honours)

Paper : ZOOL-H-DC-5-T

(Cell Biology and Principles of Genetics)

(CBCS)

Full Marks : 25 Time : Two Hours

The figures in the margin indicate full marks.
Candidates are required to give their answers in their own words as far as practicable.

1. Answer any *eight* questions from the following : ½×8=4

Group - A

[Cell Biology]

(Answer any *four* questions)

(a) The simplest and smallest known infectious agents are _____. (Fill in the blank)

(b) Abnormally folded infectious proteins are known as _____. (Fill in the blank)

(c) The direct cytoplasmic connection between the cells of animal tissue which allow movements of some cellular components through them is known as _____. (Fill in the blank)

(d) What is the most abundant lipid found in cell membranes?

(e) What is the main structural component of microfilament?

(f) The components of MPF are cyclin and _____. (Fill in the blank)

Group - B

[Principles of Genetics]

(Answer any *four* questions)

(g) Allele that can express itself in heterozygous condition is called _____ (Fill in the blank).

(h) A man has attached earlobes, whereas his wife has free earlobes. Their first child, a boy, has attached earlobes. If the phenotypic difference is assumed to be due to two alleles of a single gene, is it possible that the gene is X linked? (Yes/No)

(i) If you had a fruit fly (*Drosophila melanogaster*) that was of phenotype A, what cross would you make to determine whether the fly's genotype was A/A or A/a?

(j) Give an example of X-linked recessive trait of Human.

(k) 12:3:1 phenotypic ratio comes in case of _____. (Fill in the blank)

(l) Mendelian ratio of dihybrid cross is disturbed when two genes are _____. (Fill in the blank)

2. Answer any *two* questions from the following : 2½×2=5

Group - A

[Cell Biology]

(Answer any *one* question)

(a) Differentiate 70S and 80S ribosomes.

(b) What are the functions of cell membrane?

Group - B

[Principles of Genetics]

(Answer any *one* question)

(c) In corn, the allele f′ causes floury endosperm and the allele f″ causes flinty endosperm. In the cross f'/f'♀×f"/f"♂, all the progeny endosperms

are floury, but, in the reciprocal cross, all the progeny endosperms are flinty. What is a possible explanation?

(d) With a suitable cross explain incomplete linkage.

3. Answer any *four* questions from the following : 4×4=16

Group - A

[Cell Biology]

(Answer any *two* questions)

(a) With a neat diagram, describe the structure of mitochondria.

(b) Briefly describe how actin filament is polymerized.

(c) Write a short note on nucleosome.

(d) Briefly describe the structure and function of lysosome.

Group - B

[Principles of Genetics]

(Answer any *two* questions)

(e) Cross between yellow-coated mice and wild type grey-coated mice *always* produce 1:1 yellow-coated and Grey-coated mice. When two yellow-coated mice are crossed, it always produces 2:1 yellow-coated and grey-coated mice. Explain the result.

(f) The sleek, short-haired coat of Labrador retrievers can be black, chocolate brown, or yellow. When a true breeding black retriever is crossed with a true breeding yellow retriever, all puppies appeared in F1, are black. When F1 progeny are interbred, black, chocolate brown and yellow appeared in 9:3:4 ratio in F2. Explain the result.

(g) Briefly describe the genic balance theory of sex-determination of *Drosophila*.

(h) Explain maternal effect with an example.