3 (Sem–5/CBCS) ZOO HC 2

2022

ZOOLOGY

(Honours)

Paper : ZOO–HC–5026

(Principles of Genetics)

Full Marks : 60

Time : Three hours

The figures in the margin indicate full marks for the questions.

1. Fill in the blanks : *(any seven)* 1×7=7

   (a) _____ is called "Father of Modern Genetics".

   (b) The term 'gene' is coined by _____ .

(c) The unit of measurement for genetic linkage is _____ .

(d) ABO system in human is controlled by _____ alleles.

(e) Crossing over take place in _____ stage of meiosis.

(f) The term 'mutation' was coined by _____ .

(g) Genic balance theory was proposed by _____ .

(h) SRY gene is located on _____ chromosome.

(i) In humans, sex of an individual is determined by the presence or absence of the _____ chromosome.

(j) _____ in Drosophila is a classical example of duplication.

(k) Aneuploidy is produced by _____.

(l) The enzyme responsible for transposition is the _____.

2. Answer the following briefly : *(any four)*

2×4=8

(a) Write down the salient features of multiple allele.

(b) Name the factors that affect the strength of linkage.

(c) Why is extra-chromosomal inheritance is maternal?

(d) What is tautomerization?

(e) What are sex-limited genes?

(f) What is cri-du-chat ? How does it occur ?

(g) Give *four* examples of trisomy in human beings.

(h) Explain Lyon hypothesis.

3. Answer **any three** questions from the following : 5×3=15

(a) Differentiate between back cross and test cross with suitable example.

2½+2½=5

(b) Define inversion. Explain different types of inversion and mention *one* genetic consequence of inversion. 1+3+1=5

(c) Distinguish between interference and coincidence. 2½+2½=5

(d) What is a mutagen ? How do they cause mutation ? Give example. 1+3+1=5

(e) Mention the characteristics of extra-chromosomal inheritance. Explain the role of mitochondrial DNA on inheritance. 3+2=5

(f) What is polygenic inheritance ? Explain with an example.

(g) How does recombination occur in phage virus ? Describe it with suitable example.

(h) What are Ac-Ds elements ? Explain with suitable examples.

4. Answer *any three* : 10×3=30

(a) Explain the law of independent assortment with a suitable illustration. Describe the results obtained from a test cross of a hybrid F_1. 8+2=10

(b) Define Epistasis. Explain *any two* of the gene interaction with the help of a suitable example. 2+4+4=10

(c) Write the chromosome theory of Linkage. Describe Morgan's experiment on Drosophila to illustrate complete and incomplete types of linkage.

2+4+4=10

(d) In which cellular process the synaptonemal complex is formed? Illustrate the structure of a synaptonemal complex and write its significance.   1+6+3=10

(e) Define translocation. Give its different types. Describe the cytogenetics of a reciprocal translocation with the help of suitable diagram.   1+3+6=10

(f) What is sex-linked inheritance? Explain the phenomenon by giving the examples of colour blindness and Haemophilia.

2+4+4=10

(g) What is F-factor? What is its role in conjugation in bacteria? What is HFR?

2+6+2=10

(h) What are transposons ? How retrotranspons move in the genome ? Name some important eukaryotic transposons.   3+6+1=10

———