

Total number of printed pages-7

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*) $1 \times 7 = 7$

(a) no one is called "Father of Modern Genetics".

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

Contd.

- (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)**

- (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 : $5 \times 3 = 15$

- (a) Differentiate between back cross and test cross with suitable example. $2\frac{1}{2} + 2\frac{1}{2} = 5$
- (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. $2\frac{1}{2} + 2\frac{1}{2} = 5$
- (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** : $10 \times 3 = 30$

- (a) Explain the law of independent assortment with a suitable illustration. Describe the results obtained from a test cross of a hybrid F₁. $8+2=10$
- (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 retrotransposons move in the genome? Name some important eukaryotic transposons.

$$3+6+1=10$$