

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) Mandel is called "Father of Modern Genetics".

(b) The term 'gene' is coined by William Johannsen.

Contd.

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

(d) ABO system in human is controlled by _____ alleles. $\rightarrow (I^A, I^B, I)$

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

(f) The term 'mutation' was coined by _____: Hugo de Vries

(g) Genic balance theory was proposed by _____.

(h) SRY gene is located on Male Y chromosome.

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

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

(k) Aneuploidy is produced by _____.

When number of chromosome does not

(l) The enzyme responsible for equal 46 chrom 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.

21 - Down
18 - Edwards
13 - Patau

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 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 retrotransposons move in the genome? Name some important eukaryotic transposons. $3+6+1=10$
