

U.G. 5th Semester Examination - 2024**ZOOLOGY****[HONOURS]****Course Code : ZOOL-H-CC-T-12****(Principles of Genetics)****Full Marks : 40****Time : 2½ 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.***1. Answer any five questions of the following:****2×5=10**

- a) Define incomplete dominance.
- b) How multiple alleles interact with each other to express a trait? Give an example.
- c) Define sex-influenced inheritance. Give an example.
- d) What is point mutation? How it works in sickle cell disease?
- e) Define Genic Balance theory.
- f) Define holandric inheritance.
- g) State the role of LINE elements in genetic disorder.

[Turn Over]

- h) What is the structure and function of an Alu element?

2. Answer any two questions of the following:

$$5 \times 2 = 10$$

- a) Define complete and incomplete linkage. Why linked genes do not follow Mendelian inheritance pattern? Give example. $2+2+1=5$

- b) What are Kappa particles? Write about the occurrence and function of these particles.

$$2+1+2=5$$

- c) Differentiate between base substitution mutations and frameshift mutations. Explain the potential effects of each on protein function.

$$3+2=5$$

- d) Mention differences between generalized and specialized transduction in bacteria. Explain how these processes contribute to horizontal gene transfer.

$$3+2=5$$

3. Answer any two questions of the following:

$$10 \times 2 = 20$$

- a) What is trisomy? What are the mechanisms of the formation of trisomy? Write the cause and effect of Turner and Patau Syndrome.

$$2+3+2\frac{1}{2}+2\frac{1}{2}=10$$

- b) Define Transposons. What types of transposable elements are found in prokaryotes and eukaryotes? Explain the mechanism of action of base analogs as chemical mutagens.

$$2+4+4=10$$

- c) i) Define cistron. Explain the phenomenon of complementation with special reference to Benzer's rII locus. $1+4$

- ii) Elucidate the mechanism of conjugation in bacteria with suitable diagram. 5

- d) Write short notes on any two from the following: $5 \times 2 = 10$

i) Non-disjunction

ii) P-elements in *Drosophila*

iii) Dosage compensation

iv) SINE
