B.Sc. 5th Semester (Honours) Examination, 2023 (CBCS)

Subject : Zoology

Course : CC-XII

(Genetics)

Time : 2 Hours **Full Marks : 40**

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

Group-A

1. Answer *any five* questions: 2×5=10

(a) What is a 'Holandric gene'?

(b) Which factors determine the types of shell spiralling in snail?

(c) State the genotype of a metafemale *Drosophila*. What is its reproductive fate?

(d) How does interference affect crossing over?

(e) What is pleiotropy?

(f) What is nullisomy?

(g) Which transposable element is most abundant in human genome? Write the full form of SINE.

(h) What is hybrid dysgenesis?

Group-B

2. Answer *any two* questions: 5×2=10

(a) Explain Lyon's hypothesis. State its significance. 3+2

(b) Draw and lebel a bacterial DNA transposon. Highlight on three major groups of retro-transposons. 2+3

(c) Define transduction in bacteria. Write in brief its difference from conjugation. 2+3

(d) Describe the mechanism of action of base analogs as chemical mutagen. 5

Group-C

3. Answer *any two* questions: 10×2=20

(a) Define extrachromosomal materials. What is paramecin? Explain its mode of inheritance with suitable diagrams. 1+1+2+6

(b) Write short notes on any two of the following: 5×2=10

(i) Frame shift mutation

(ii) P-elements in Drosophila

(iii) Robertsian translocation

(iv) Sex influenced and sex limitted inheritance

(c) What is the complementation test process in a bacteriophage? Differentiate between generalized and specialized transduction. What is a sex pilus? 5+4+1

(d) Female *Drosophila* sp. heterozygous for ebony (e^+/e), scarlet (st^+/st) and spineless (ss^+/ss) were testcrossed and the following progeny were obtained:

PROGENY PHENOTYPES	Number
Build type	67
Ebony	8
Ebony, scarlet	68
Ebony, spineless	347
Ebony, scarlet, spineless	78
Scarlet	368
Scarlet, spineless	10
Spineless	54

(i) With suitable reasons state whether these genes are linked.

(ii) Write the correct order of the genes.

(iii) Calculate the coefficient of coincidence and the coefficient of interference. Add a comment on the results obtained. 2+2+2½+2½+1