

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

- What is a 'Holandric gene'?
- Which factors determine the types of shell spiralling in snail?
- State the genotype of a metafemale *Drosophila*. What is its reproductive fate?
- How does interference affect crossing over?
- What is pleiotropy?
- What is nullisomy?
- Which transposable element is most abundant in human genome? Write the full form of SINE.
- What is hybrid dysgenesis?

Group-B

2. Answer any two questions:

5×2=10

- Explain Lyon's hypothesis. State its significance. 3+2
- Draw and label a bacterial DNA transposon. Highlight on three major groups of retro-transposons. 2+3
- Define transduction in bacteria. Write in brief its difference from conjugation. 2+3
- Describe the mechanism of action of base analogs as chemical mutagen. 5

Group-C

3. Answer any two questions:

10×2=20

- Define extrachromosomal materials. What is paramycin? Explain its mode of inheritance with suitable diagrams. 1+1+2+6
- Write short notes on any two of the following: 5×2=10
 - Frame shift mutation
 - P-elements in *Drosophila*
 - Robertsonian translocation
 - Sex influenced and sex limited inheritance

Please Turn Over

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- (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