

## U.G. 5th Semester Examination - 2021

### ZOOLOGY

#### [HONOURS]

Course Code : ZOOOL-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

- i) Write two important features of multiple alleles.
- ii) What do you mean by inter-allelic genetic interactions?
- iii) Why did Mendel failed to detect linkage in his experiments with garden peas?
- iv) How many Barr bodies will be observed in the somatic cells of an individual with (a) Turner Syndrome and (b) Klinefelter syndrome?
- v) What are IS Elements?
- vi) Define phenotypic plasticity. Give one example.
- vii) What do you mean by cytoplasmic inheritance? Give one example.

[Turn over]

viii) What are the genotypic differences between F<sup>+</sup> and Hfr cells?

2. Answer any **two** questions of the following:

5×2=10

- i) Briefly discuss the molecular basis of crossing over. 5
- ii) Justify that “obesity is a polygenic and multifactorial disease”. 5
- iii) Why transposons are considered as natural mutagens? 5
- iv) Explain the role of ‘dsx’ gene in sex determination in *Drosophila*. 5

3. Answer any **two** questions of the following:

10×2=20

- i) a) Distinguish between incomplete dominance and co-dominance.
- b) What is pleiotropy? Give one example of pleiotropism.
- c) What is criss-cross pattern of inheritance? Give one example of holandric gene.
- d) Distinguish between cis-arrangement and trans-arrangement of linked genes.

2+(2+1)+(2+1)+2=10

- ii) a) Distinguish between cytological map and linkage map of chromosomes.
- b) What is meant by dosage compensation in sex determination? Elucidate the mechanism of dosage compensation in sex determination in human.
- c) Write a note on the inheritance of kappa particles in *Paramecium*.

$$2+(2+3)+3=10$$

- iii) a) What are the basic differences between generalized transduction and specialized transduction?
- b) How can genes be mapped by interrupted mating conjugation experiments?

$$4+6=10$$

- iv) Consider p, q and r to be three recessive mutations in *Drosophila*. An F<sub>1</sub> female, heterozygous for all three loci was test crossed and the following progeny obtained:

+++	344
++r	106
+q+	2
+qr	68
p qr	313
p+r	3
p q+	92
p++	72
Total	1000

- a) Are the above genes linked? Give reasons for your answer.
- b) Provide a diagrammatic representation of the cross.
- c) Construct a map of three genes.
- d) Calculate the interference.

$$2+2+4+2=10$$

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