

U.G. 5th Semester Examination - 2020

ZOOLOGY

[HONOURS]

Course Code : ZOOL-H-CC-T-12

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 epistasis. Give an example of epistasis in human.
- b) What are sex-influenced and sex-limited inheritance?
- c) Briefly state the role of MSL complex in dosage compensation of *Drosophila*.
- d) What is meant by primary and secondary sex determination in mammals?
- e) Why *Paramoecium* strains possessing kappa particle are known as 'Killer *Paramoecia*'?
- f) How transduction plays a role in development of antibiotic resistance in bacteria?

[Turn over]

- g) What is hybrid dysgenesis?
- h) State the biological significance of transposons.

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

5×2=10

- a) What are the principles of inheritance? Define coupling and repulsion phases of linkage. State the significance of crossing over. 2+2+1
- b) How UV radiation causes DNA mutations? Write the names of two syndromes along with karyotype that are caused due to non-disjunction. 3+2
- c) What is extrachromosomal inheritance? Give an example. Mention the criteria for extrachromosomal inheritance. (1+1)+3
- d) Distinguish between composite and non-composite transposons with diagram. Add a note on SINEs. 3+2

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

10×2=20

- a) i) Compare multiple alleles, polygenic inheritance and pleiotropy.
- ii) What is coefficient of coincidence? State its relation with interference.

- iii) A cross is made between homozygous wild-type female *Drosophila* ($a^+ a^+ b^+ b^+ c^+ c^+$) and triple mutant male ($aa bb cc$) (the order here is arbitrary). The F_1 ($a^+ a b^+ b c^+ c$) females are test crossed back to the triplet mutant males and the F_2 phenotypic ratios are as follows:

$a^+ bc$	18
$ab^+ c$	112
abc	308
$a^+ b^+ c$	66
abc^+	59
$a^+ b^+ c^+$	321
$a^+ bc^+$	102
$ab^+ c^+$	15
	1000

From the above data draw a map segment showing order and distance among loci.

3+2+5

- b) i) How alternative splicing play a crucial role in genetic cascade for sex determination in *Drosophila*?

- ii) Elucidate the role of TDF in sex determination in human.

- iii) State the basic difference between dosage compensation mechanism of *Drosophila* and human. 5+3+2

- c) i) What are the different types of structural abnormalities of chromosomes? Give one suitable example of each type.

- ii) Write a short note on point mutation.

- iii) Give example of a chemical mutagen. Briefly describe the mechanism by which it induce mutation. 4+3+(1+2)

- d) i) Elucidate the mechanism of conjugation in bacteria with suitable diagram.

- ii) What is complementation test? What is it used for?

- iii) Diagrammatically represent Benzer's rII locus experiment in T4. 5+(1+1)+3
