

U.G. 5th Semester Examination - 2021**ZOOLOGY****[HONOURS]****Course Code : ZOOL(H)CC-P-12****[PRACTICAL]****[Principles of Genetics]**

Full Marks : 20

Time : 2 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. In fruit flies, gray body (G) is dominant over ebony body (g), and red eyes (R) are dominant over brown eyes (r). A fly heterozygous for both body color and eye color is mated with a fly heterozygous for body color and with brown eyes. The cross resulted in the following offspring:

ebony bodies, brown eyes – 15

gray bodies, brown eyes–31

ebony bodies, red eyes– 12

gray bodies, red eyes– 38

Do these genes assort independently? Support your

answer using Chi-square analysis. Given $\chi^2_{(0.05)} = 7.82$
at df = 3. 10

OR

2. C.B.Bridges and T.M.Olbrycht crossed wild-type *Drosophila* males to females homozygous for three recessive X-linked mutations—*scute*(*sc*) bristles, *echinus*(*ec*) eyes, and crossveinless(*cv*) wings. They then intercrossed the F1 progeny to produce F2 flies, which comprised eight phenotypically distinct classes, as below :

Class	Phenotype	Genotype of maternally inherited X chromosome			Number observed
1	Scute, echinus, crossveinless	sc	ec	cv	1158
2	Wild-type	sc ⁺	ec ⁺	cv ⁺	1455
3	Scute	sc	ec ⁺	cv ⁺	163
4	Echinus, crossveinless	sc ⁺	ec	cv	130
5	Scute, echinus	sc	ec	cv ⁺	192
6	Crossveinless	sc ⁺	ec ⁺	cv	148
7	Scute, crossveinless	sc	ec ⁺	cv	1
8	Echinus	sc ⁺	ec	cv ⁺	1
Total:					3248

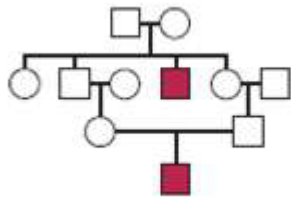
Determine the gene order and map distance between the loci. Calculate the coefficient of coincidence.

$$5+4+1=10$$

[Turn over]

OR

3. Explain the symbols and mode of inheritance shown in the following pedigree. Is the trait that is segregating in the given pedigree due to a dominant or a recessive allele? 10



4. Submission of Laboratory Notebook. 5
5. Viva voce. 5
