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3 (Sem-5/CBCS) ZOO HC 2

2023

ZOOLOGY

(Honours Core)

Paper : ZOO-HC-5026

(Principles of Genetics)

Full Marks : 60

Time : Three hours

The figures in the margin indicate full marks for the questions.

1. Choose the correct answer : $1 \times 7 = 7$
- (a) In humans mechanism of sex determination is _____
- (i) XX-XY; male heterogamety
 - (ii) XX-XX; female heterogamety
 - (iii) XX-XO; female heterogamety
 - (iv) XX-XO; male heterogamety

Contd.

- (b) Kappa particles are responsible for extra chromosomal inheritance. *Say yes or no.*
- (c) A gene that affect more than one phenotype is called as _____.
- (d) Morphan's syndrome is as a result of
- (i) Polygene
 - (ii) Pseudogene
 - (iii) Modifier gene
 - (iv) Pleotropic gene
- (e) All genes on the sex chromosomes are gender specific. *Say true or false.*
- (f) Cytoplasmic inheritance is carried out by _____ genes.
- (g) A gene with a Y chromosome is expressed exclusively in man/in women.

2. Answer the following briefly : $2 \times 4 = 8$

- (a) What is three point test cross ?
- (b) Define induced mutation.
- (c) What are base analogues ?
- (d) What is transduction ? Who first describe this phenomenon ?

3. Answer **any three** questions from the following : $5 \times 3 = 15$

(a) Explain incomplete dominance and codominance with suitable example.

(b) Describe Mendel's monohybrid experiment and state the conclusion derived. $3 + 2 = 5$

(c) Describe the attached X method of mutation with suitable illustration.

(d) What is map unit ? Describe the coupling and repulsion hypothesis of linkage. $1 + 4 = 5$

(e) Define aneuploidy. Discuss about different conditions of aneuploidy. $1 + 4 = 5$

4. (a) What do you mean by interaction of gene ? Describe the supplementary gene interaction with suitable illustration. Add a note on lethal allele. $2 + 5 + 3 = 10$

Or

(b) What is synapsis ? Write about terminalization stage of crossing over. Explain the molecular mechanism of crossing over with suitable diagram.

$1 + 2 + 7 = 10$

5. (a) Define silent mutation. Explain the molecular basis of gene mutation. Write down the methods used to detect sex lethal mutation. $1+6+3=10$

Or

- (b) What is uniparental inheritance? How does it differ from Mendelian inheritance? Discuss the inheritance pattern of Kappa particles in paramoecium. $2+2+6=10$
6. (a) What do you mean by episome? Explain the conjugation process in bacteria with suitable illustrations. $2+8=10$

Or

- (b) What are insertion sequences? Give an account of different types of eukaryotic transposons. Add a note on genetic significance of transposons. $2+6+2=10$