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( Held in 2023 )

**ZOOLOGY**

Paper : ZOOHC5126

( **Principles of Genetics** )

Full Marks : 60  
Pass Marks : 24

Time : 3 hours

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

1. Choose the correct answer from the following : 1×5=5

(a) 9 : 7 ratio in the  $F_2$  generation represents

- (i) epistasis
- (ii) codominance
- (iii) pleiotropy
- (iv) incomplete dominance

( 2 )

- (b) Sex of an individual in human is determined by
- (i) X : Y ratio of X and Y chromosome
  - (ii) X-chromosome
  - (iii) Y-chromosome
  - (iv) None of the above
- (c) Linkage results in
- (i) formation of more wild phenotype
  - (ii) formation of more dominant phenotype
  - (iii) formation of more parental phenotype
  - (iv) formation of more recombinant phenotype
- (d) The substitution of a purine base with a pyrimidine base is known as
- (i) transition
  - (ii) deletion
  - (iii) transversion
  - (iv) addition

( 3 )

- (e) Which of the following is X-linked recessive disorder?

- (i) Syphilis
- (ii) Colour blindness
- (iii) Sickle-cell anaemia
- (iv) AIDS

2. Answer the following questions : 2×5=10

- (a) What is gene? Who coined the term 'gene'?
- (b) Define crossing-over. Give its significance.
- (c) Differentiate between autopolyploids and allopolyploids.
- (d) Why is extrachromosomal inheritance called maternal inheritance?
- (e) Define sex determination. Which character is sex-linked in *Drosophila*?

3. Answer any *five* of the following questions : 5×5=25

- (a) What do you mean by Mendelian principle? State any one principle of inheritance with suitable example.

( Turn Over )

( 4 )

- (b) Explain the mechanism of sex determination in human beings.
- (c) Write an essay on mitochondrial inheritance.
- (d) Write a short note on 'somatic cell hybridization'.
- (e) Describe molecular basis of spontaneous mutations.
- (f) Write a short note on 'chromosomal mapping'.
- (g) Briefly describe 'conjugation process' in bacteria.

4. Answer any two of the following questions :

10×2=20

- (a) Explain cytological basis of crossing-over with suitable examples.
- (b) Give an account on sex-linked and sex-limited characters of inheritance with suitable examples.
- (c) Explain about molecular basis of mutations in relation to UV light and chemical mutagens.

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