3 (Sem–5/CBCS) ZOO HC 2

2024

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. Answer the following questions as directed : 1×7=7

   (a) Which law of Mendel's is also known as 'purity of gametes' ?

   (b) Phenylketonuria is due to the presence of lethal gene/pleiotropic gene/ homeotic gene.

   (Choose the correct answer)

(c) Translocation involves exchange of segments between non-homologous chromosomes. *(State True/False)*

(d) The point at which homologous chromosome forms a cross is called _____. *(Fill in the blank)*

(e) The inactivation of X-chromosome by hyperproduction occur in _____. *(Fill in the blank)*

(f) 5-bromouracil is a base analogue of cytosine/adenine/thymine. *(Choose the correct answer)*

(g) The terminal inverted repeats are characteristic for each transposable elements. *(State True/False)*

2. Answer the following briefly : 2×4=8

(a) What is tautomerization ?

(b) Write the differences between transformation and transduction in bacteria.

(c) What do you mean by polygenic inheritance ?

(d) How can the mitochondrial DNA be distinguished from nuclear DNA ?

3. Answer the following questions : ***(any three)*** 5×3=15

(a) Illustrate the structure and function of synaptonemal complex. 5

(b) How can sex-linked mutations be detected in Drosophila ? Add a note on chemical mutagen. 2+3=5

(c) What is dosage compensation ? Discuss the 'Genic balance theory' of sex determination. 1+4=5

(d) Define cytoplasmic inheritance. Discuss the maternal effects with special reference to coiling of shell in snail. 1+4=5

(e) Explain the Mendel's law of Independent assortment with suitable illustration. 5

4. (a) Define linkage. How does linkage differ from independent assortment of genes ? Describe complete and incomplete linkage with suitable examples. 1+2+7=10

Or

(b) What is sex-linked inheritance ? Explain the X-linked inheritance phenomenon with suitable example. Add a note on sex-influenced and sex-limited traits. 1+5+4=10

Contd.

5. *(a)* Explain with suitable diagram the possible structural changes in chromosome due to which alteration in phenotypes occur. 10

Or

(b) What is epistasis ? Distinguish between recessive and dominant epistasis. Describe the complementary gene interaction with proper illustration. 1+3+6=10

6. *(a)* What are bacteriophages ? Describe the life cycle of lytic phage. Add a note on lysogenic cycle of a phage. 1+5+4=10

Or

(b) What are Ac-Ds elements ? Why transposons are sometimes referred to as "Jumping genes" ? Give an account of different types of Prokaryotic and Eukaryotic transposons. 1+1+8=10
