

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

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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)

Contd.

(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 ?

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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

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Contd.