**Student's Copy**

# 2024

( CBCS )

( 6th Semester )

## ZOOLOGY

NINTH PAPER

**( Molecular Biology and Genetics )**

*Full Marks* : 75

*Time* : 3 hours

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

**( SECTION : A—OBJECTIVE )**

*( Marks* : 10 )

Tick (✓) the correct answer in the brackets provided :                     1×10=10

**1.** Polyteny of giant chromosome is achieved by
   *(a)* mitosis   (  )     *(b)* repeated meiosis   (  )
   *(c)* endomitosis   (  )     *(d)* salivary glands   (  )

**2.** The 5′ end of tRNA always has a base
   *(a)* guanine   (  )     *(b)* cytosine   (  )
   *(c)* thymine   (  )     *(d)* adenosine   (  )

**3.** In DNA replication, the strand which is synthesized continuously is called
   *(a)* lagging strand   (  )     *(b)* Okazaki fragment   (  )
   *(c)* leading strand   (  )     *(d)* template strand   (  )

**4.** Pyrimidine bases fused by UV light are separated by which enzyme?
   *(a)* DNA ligase   (  )     *(b)* DNA polymerase   (  )
   *(c)* Photolyase   (  )     *(d)* Glycosylase   (  )

**5.** In *lac* operon, conversion of lactose into glucose and galactose is done by
   *(a)* β-galactosidase   (  )
   *(b)* galactoside permease   (  )
   *(c)* transacetylase   (  )
   *(d)* operator gene   (  )

                             1                        [ *Contd.*

**6.** Which one of the following is not a 'stop codon' ?

   (a) UAA     (   )        (b) UAG     (   )
   (c) UGA     (   )        (d) AUG     (   )

**7.** Dominant epistasis has a ratio of .

   (a) 9:3:3:1     (   )     (b) 9:7       (   )
   (c) 9:3:4       (   )     (d) 12:3:1    (   )

**8.** The example of cytoplasmic inheritance is

   (a) kappa particles in *Paramecium*     (   )
   (b) plastid inheritance in *Mirabilis*     (   )
   (c) shell coiling in snail     (   )
   (d) rRNA in eukaryotes     (   )

**9.** Which one of the following genetic disorders is due to sex-linked inheritance?

   (a) Down syndrome     (   )
   (b) Haemophilia     (   )
   (c) Turner syndrome     (   )
   (d) Klinefelter syndrome     (   )

**10.** The kind of mutation where purine base is substituted by pyrimidine base is called

   (a) transition     (   )        (b) transversion     (   )
   (c) translocation     (   )      (d) inversion     (   )

### ( SECTION : B—SHORT ANSWERS )

### ( Marks : 15 )

Write notes on the following in 5 to 8 sentences each :                    3×5=15

### UNIT—I

**1.** Functions of histone proteins

### OR

**2.** Polytene chromosome

## UNIT—II

**3.** RNA polymerase enzyme

**OR**

**4.** Semi-conservative DNA replication

## UNIT—III

**5.** Central dogma of molecular biology

**OR**

**6.** Termination of prokaryotic translation

## UNIT—IV

**7.** Incomplete dominance

**OR**

**8.** Alleles

## UNIT—V

**9.** Complete linkage

**OR**

**10.** Missense mutation

## ( SECTION : C—DESCRIPTIVE )

( *Marks* : 50 )

Answer the following questions :                                                        10×5=50

## UNIT—I

**1.** Discuss, in detail, the higher order of chromosome organization in the cell.    10

**OR**

**2.** Describe the double helical structure of DNA and the different forms of DNA.                                                                                          10

## UNIT—II

3. Describe the mechanism of DNA replication in prokaryotic cells.          10

**OR**

4. Explain the mechanisms of mismatch repair and nucleotide excision repair.          10

## UNIT—III

5+5=10

5. Write notes on the following :
   (a) Structure and role of tRNA in translation
   (b) The elongation process of translation

**OR**

6. Explain the term 'gene expression'. Also describe the *rho* dependent and *rho* independent forms of transcription termination in prokaryotes.          4+6=10

## UNIT—IV

7. Give a detailed account of Mendel's laws of inheritance giving suitable examples.          10

**OR**

5+5=10

8. Write notes on the following :
   (a) Multiple alleles
   (b) Chromosome theory of inheritance

## UNIT—V

9. Write a note on the mechanism of non-disjunction of chromosomes. Explain the effect of non-disjunction with suitable example taking human genetic disease as an example.          4+6=10

**OR**

5+5=10

10. Write notes on the following :
    (a) Crossing-over and recombination of genes
    (b) Numerical changes in chromosomes

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