ZOO/VI/CC/17

Student's Copy

2025

(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 (\checkmark) the correct answer in the brackets provided :

 $1 \times 10 = 10$

- 1. In which stage are lampbrush chromosomes observed?
 - (a) Meiotic prophase I ()
 - (b) Meiotic prophase II ()
 - (c) Mitotic prophase I ()
 - (d) Mitotic prophase II ()
- 2. The different types of histone octamer in eukaryotic nucleosome's DNA are
 - (a) H1, H2, H3 and H4 () (b) H1, 2H2, H3 and 2H4 ()
 - (c) H2A, H2B, H3 and H4 (
 - (d) H1, H2A, H3 and H4 (

)

)

- 3. During DNA replication, repetitive nucleotide sequences at the end chromosomes are added by
 - (a) DNA polymerase III) (
 - (b) DNA polymerase I ()
 - (c) primase ()
 - (d) telomerase) (

4. DNA replication mechanism is

- (a) conservative ((b) semi-conservative () (c) dispersive () (d) semi-dispersive () 5. The start codon in prokaryotes translation always codes for (a) phenylalanine () (b) methionine () (c) N-formylmethionine (
 - (d) aspartic acid ()

6. The sequence of the structural genes in the lac operon is

)

- (a) lacA-lacZ-lacY() (b) lacA—lacY—lacZ) (c) lacZ—lacA—lacY)
- (d) lacZ—lacY—lacA)

7. In human ABO blood group system, AB represents

- (a) codominance ()
- (b) incomplete dominance ()
- (c) partial dominance ()
- (d) dominance ()
- 8. An example of inter-allelic interaction is
 - (a) pleiotropism and epistasis ()
 - (b) incomplete dominance and codominance ()
 - (c) epistasis only ()
 - (d) pleiotropism only ()

9. Synapsis between homologous chromosomes starts during

)

)

)

- (a) pachytene stage ()
- (b) diplotene stage (
- (c) leptotene stage (
- (d) zygotene stage ()

10. An example of X-linked recessive disorder is

- (a) Klinefelter's syndrome ()
- (b) hemophilia (
- (c) Down's syndrome ()
- (d) Turner's syndrome ()

(SECTION : B-SHORT ANSWERS)

(Marks: 15)

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

Unit—I

1. Explain nucleotide and nucleoside.

OR

- 2. Role of nucleosome in chromosome organization
 - Unit—II
- 3. DNA mismatch repair

OR

4. Origin of DNA replication

UNIT-III

5. Activation of tRNA in translation initiation

OR

6. Central dogma of molecular biology

UNIT-IV

7. Chromosomal theory of inheritance

OR

8. Mendel's law of independent assortment

Unit-V

9. Explain the significance of crossing-over.

OR

Explain non-disjunction.

(SECTION : C-DESCRIPTIVE)

(Marks: 50)

Answer the following :

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UNIT-I

1. Write a note on heterochromatin and euchromatin.

OR

2. Explain the structure and function of polytene and lampbrush chromosomes with suitable diagram.

Unit—II

3. Discuss different types of DNA damages and add a note on the mechanism of base excision repair and double-strand break repair.

OR

 Explain Okazaki fragments. Write a note on the enzymes involved in DNA replication of prokaryotes. 3+7=10

10×5=50

[Contd.

UNIT-III

Ģ Write a note on the properties of genetic code.

0R

ō, Describe the mechanism of transcription in prokaryotic cell.

UNIT-IV

? Explain in detail the concept of cytoplasmic inheritance.

QR

œ Define epistasis. Explain the different epistatic interaction with suitable examples.

UNIT-V

ø What is mutation? Explain different types of point mutation.

OR

- 10. Write notes on the following :
- (a) Hemophilia
- (b) Sex-linked inheritance

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