

M.Sc. ZOOLOGY
FOURTH SEMESTER
CELL AND MOLECULAR BIOLOGY-IV
MSZ-402 A

**SET
A**

[USE OMR SHEET FOR OBJECTIVE PART]

Duration: 1hr. 30 mins.

Full Marks: 35

Time: 15 mins.

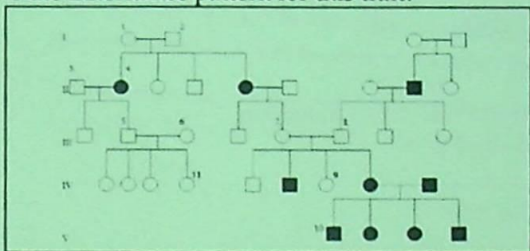
Marks: 10

(Objective)

Choose the correct answer from the following:

1 × 10 = 10

1. In the following pedigree, the affected individuals are shown shaded. None of the marriage partners from outside these two families are heterozygous for the trait. What is the inheritance pattern for this trait?



- Codominant Dominance
 - Autosomal recessive
 - Sex-linked dominance
 - X-linked dominance inheritance
2. Which of the following is not an example of aneuploidy?
- Turner's syndrome
 - Down's syndrome
 - Phenylketonuria
 - Klinefelter's syndrome
3. Which of the following best describes what is most needed for a genetic counselor to be successful in the field?
- A doctorate
 - A genuine desire to care for people
 - Strong math skill
 - A strong scientific background and counseling skills
4. What is gene imprinting?
- The process of copying genetic information from DNA to RNA
 - The phenomenon where certain genes are expressed in a parent-of-origin-specific manner
 - The process of gene editing using CRISPR technology
 - The transfer of genetic material between non-homologous chromosomes
5. What is the primary function of DNA methylation in gene regulation?
- To increase the rate of transcription
 - To decrease the rate of transcription
 - To stabilize mRNA molecules
 - To enhance protein translation efficiency
6. What are transposons?
- Non-coding RNA molecules
 - Regulatory elements in gene expression
 - Mobile genetic elements capable of moving within the genome
 - Chromosomal abnormalities

7. Which technique is commonly used for genetic linkage mapping?
 - a. Polymerase Chain Reaction (PCR)
 - b. Southern blotting
 - c. Fluorescence in situ hybridization (FISH)
 - d. Pedigree analysis
8. Which type of genetic variation is typically analyzed in somatic cell genetics?
 - a. Single nucleotide polymorphisms (SNPs)
 - b. Chromosomal rearrangements
 - c. DNA replication errors
 - d. Inheritance of mitochondrial DNA
9. In an experiment, you add the short arm of Y chromosome to a cell line with composition AA+ XX. What will you see?
 - a. The cell rejects the Y chromosome
 - b. The cell develop female character
 - c. The cell develop male character
 - d. The cell develop neuter gender character
10. Cdk2/cyclinE functions in.....
 - a. G2/M transition
 - b. G2
 - c. M
 - d. G1/S transition

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(Descriptive)

Time : 1 hr. 15 mins.

Marks : 25

[Answer question no.1 & any two (2) from the rest]

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| 1. Discuss how SRY gene determines sex in early embryonic stage. | 5 |
| 2. What are Cyclins? Describe the activation of Cdk in fission yeast cell with proper illustrative diagram. | 2+8=10 |
| 3. Write the limitations and significance of Pedigree Analysis. | 5+5=10 |
| 4. What is epigenesis? Describe the classification of transposons based on their structure and mechanism of transposition. | 2+8=10 |
| 5. What is somatic cell genetics? Discuss how somatic mutations contribute to the development of genetic disorders. | 2+8=10 |

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