

M.Sc. BOTANY
THIRD SEMESTER
CYTOGENETICS, PLANT BREEDING AND
MOLECULAR BIOLOGY
MSB-303 A
[USE OMR SHEET FOR OBJECTIVE PART]

2025/12

**SET
A**

Duration: 1hr. 30 mins.

Full Marks: 35

Time: 15 mins.

(Objective)

Marks: 10

Choose the correct answer from the following:

1×10=10

1. DNA sequencing refers to the:
 - a. Technique used to determine the sugar sequence in a DNA molecule
 - b. Technique used to determine the phosphate sequence in a DNA molecule
 - c. Technique used to determine the base sequence in a DNA molecule
 - d. All of these
2. What is used to transfer nucleic acid from gels to membranes for further analysis?
 - a. Gel electrophoresis
 - b. PAGE
 - c. Blotting
 - d. PCR
3. Chain-termination is a type of:
 - a. Sequencing
 - b. Gene manipulation
 - c. Vector generation
 - d. Antibiotic production
4. *Thermus aquaticus* is the source of:
 - a. Vent polymerase
 - b. Primase enzyme
 - c. Taq polymerase
 - d. Both a and c
5. What is the main enzyme component of Sanger sequencing?
 - a. Helicase
 - b. Polymerase
 - c. Nuclease
 - d. Gyrase
6. Which of the following is the first and the most important step in the polymerase chain reaction?
 - a. Annealing
 - b. Primer extension
 - c. Denaturation
 - d. None of the above
7. Cdk2/cyclinE functions in:
 - a. G₂/M transition
 - b. G₂
 - c. M
 - d. G₁/S transition
8. Which membrane is used in blotting?
 - a. Agarose
 - b. Sucrose
 - c. Polythene
 - d. Nylon
9. The PCR technique was developed by:
 - a. Kohler
 - b. Altman
 - c. Milstein
 - d. Kary Mullis

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10. Chromosome structure can be observed best during:
- a. Anaphase
 - b. Metaphase
 - c. Prophase
 - d. None of the above

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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. Write short notes on: (<i>any two</i>) | 2.5×2=5 |
| a) DNA probe | |
| b) Physical mutagen | |
| c) PCR | |
| d) Ligation | |
| 2. Describe the process of RNA splicing with necessary diagrams. | 10 |
| 3. Describe the technique of Southern blotting with necessary diagrams. | 10 |
| 4. Discuss the process of <i>Agrobacterium tumefaciens</i> mediated gene transfer with proper diagrams. | 10 |
| 5. Describe in detail the Sanger sequencing method. | 10 |

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