2025/11

SET A

M.Sc. BOTANY
THIRD SEMESTER
CYTOGENETICS, PLANT BREEDING AND MOLECULAR BIOLOGY
MSB-303(A)

[USE OMR FOR OBJECTIVE PART]

Duration: 1.30 hrs. **Full Marks: 35**

Objective

Time: 15 min. **Marks: 10**

Choose the correct answer from the following: *1X10=10*

1. Choose the incorrect statement for cDNA libraries.
   They constitute of DNA copies
   a. produced from the RNA sequences and usually mRNA
   b. They represent expressed sequences
   c. Introns are not represented
   d. Comparison of cDNA sequences with genomic sequences leads to the determination of polyadenylation sites

2. Which of the Arabinose operon regulation site is actually preventing RNA polymerase from binding and producing the Ara genes BAD?
   a. O1
   b. O2
   c. CAP
   d. P

3. What is used to transfer nucleic acid from gels to membranes for further analysis?
   a. Gel electrophoresis
   Blotting
   c. PCR
   PAGE

4. The LacI gene codes for:
   a. The inducer
   The repressor protein
   c. The operator
   The RNA polymerase

5. The splice site is found in .....
   a. 3′ end of exon
   b. 5′ end of intron
   b. Within the exon
   d. Within the intron

6. In Southern blotting, DNA fragments are usually separated by:
   a. SDS-PAGE
   b. Agarose gel electrophoresis
   c. Polyacrylamide gel electrophoresis
   d. Isoelectric focusing

7. The enzyme used to synthesize cDNA from mRNA is:
   a. DNA polymerase
   b. RNA polymerase
   c. Reverse transcriptase
   d. DNA ligase

8. Which of the following is an example of a transition mutation?
   a. Adenine → Cytosine
   b. Guanine → Adenine
   c. Adenine → Thymine
   d. Cytosine → Adenine

9. The structural genes of the arabinose operon are:
   a. araA, araB, araC
   b. araA, araB, araD
   c. araB, araC, araD
   d. araC, araD, araE

10. The basic principle of gel electrophoresis is:
   a. Separation based on charge and size
   b. Separation based on density
   c. Separation based on solubility
   d. Separation based on color

-- --- --

Descriptive

Time : 1 hrs. 15 min. **Marks : 25**

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

1. **Write short notes on (any two):** 2.5+2.5=5
   a. Agarose Gel Electrophoresis
   b. DNA probe
   c. Restriction enzymes

2. What is cDNA? Discuss the steps in the construction of cDNA library. 2+8=10

3. **Write short notes on (any one):** 10
   a. Lac operon concept
   b. Arabinose operon

4. What is point mutation? Discuss deamination and alkylation of transition mutation. 2+8=10

5. What is blotting technique in molecular biology? Explains the steps involved in Southern Blotting technique. 2+8=10

= = *** = =