

**M.Sc. BOTANY**  
**THIRD SEMESTER (SPECIAL REPEAT)**  
**BIOPHYSICAL INSTRUMENTATION, PLANT TISSUE CULTURE,**  
**PALYNOLOGY & DEVELOPMENTAL BOTANY**  
**MSB-302**

**SET**  
**A**

Duration: 3 hrs.

Full Marks: 70

Time: 30 mins.

Marks: 20

**(Objective)**

**Choose the correct answer from the following:**

**1 × 20 = 20**

- Which of the statement is true for pBR322?
  - It contains only an ampicillin resistance gene
  - It contains both ampicillin and tetracycline resistant gene
  - The cloning site is present only in the tetracycline resistant gene
  - It is a natural vector
- The transformation method that uses tungsten or gold particle coated with DNA accelerated at high velocity is called:
  - Acceleration method
  - Particle gun delivery method
  - High velocity method
  - DNA particle delivery method
- Western blotting is the technique for the detection of:
  - Specific DNA in a sample
  - Specific RNA in a sample
  - Specific protein in a sample
  - Specific glycolipid in a sample
- Which of the following bacterium is considered as natural genetic engineer?
  - Agrobacterium tumefaciens*
  - Agrobacterium aquaticus*
  - Pseudomonas putida*
  - Thermos Aquaticus*
- The process of binding of primer to the denatured strand is called:
  - Annealing
  - Denaturation
  - Renaturation
  - None of these
- Primer used for the process of PCR are:
  - Single stranded DNA oligonucleotide
  - Single stranded RNA oligonucleotide
  - Double stranded DNA oligonucleotide
  - Double stranded RNA oligonucleotide
- If a DNA fragment is cut by EcoRI at a specific recognition site then:
  - Blunt-end cannot be obtained
  - Sticky-ends cannot be obtained
  - Construction of rDNA would not be possible
  - The plasmid with one site get cut into two fragments
- Which of the four restriction enzymes given below cut the following DNA sequence?  
5'-CCGATATCTCGAGGGC-3'
  - P. BamHI (3'-CCTAG-G-5')
  - Q. EcoRI (3'-CTTAA-G-5')
  - R. XhoI (3'-GAGCT-C-5')
  - S. EcoRV (3'-CTA-TAG-5')
  - P & Q
  - P, R & S
  - Q & S
  - P & S

9. Select the correct statement.
- |   |   |
|---|---|
| a. A restriction exonuclease cuts both strands of foreign DNA as well as vector DNA at specific palindromic sequences             | b. A restriction endonuclease is named on the basis of scientific name and strain of bacteria from which it is isolated |
| c. All restriction enzymes cut the strands of DNA in the centre of palindromic site between the same two bases of opposite strand | d. When cut by same restriction enzyme, the resultant DNA fragments generate different kinds of sticky ends             |
10. Which of the following elements need not be present in an expression vector?
- |  |  |
|--|--|
| a. Unique restriction enzyme sites for insertional cloning         | b. Promoter sequence upstream of the cloned gene |
| c. Selection marker to select for host cells containing the vector | d. Two different origins of replication          |
11. If a restriction site is 6 nucleotides long, what are the chances of finding it in a vector?
- |                             |                             |
|-----------------------------|-----------------------------|
| a. Once every 16 base pairs | b. Once every 64 base pairs |
| c. Once every 24 base pairs | d. Once every 46 base pairs |
12. Who is known as the Father of tissue culture?
- |               |              |
|---------------|--------------|
| a. Bonner     | b. Laibach   |
| c. Haberlandt | d. Gautheret |
13. The virus mediated gene transfer using genetically modified bacteriophages is called:
- |                   |                 |
|-------------------|-----------------|
| a. Transfection   | b. Transduction |
| c. Transformation | d. Conjugation  |
14. Which technique separates charged particles using electric field?
- |                      |                       |
|----------------------|-----------------------|
| a. Hydrolysis        | b. Electrophoresis    |
| c. Protein synthesis | d. Protein denaturing |
15. Chemicals used for gene transfer methods include:
- |                         |                     |
|-------------------------|---------------------|
| a. Poly ethylene glycol | b. Dextran          |
| c. CaCl <sub>2</sub>    | d. All of the above |
16. The fusion of female reproductive nucleus with the male reproductive nucleus is known as:
- |                  |                 |
|------------------|-----------------|
| a. Adoption      | b. Excretion    |
| c. Fertilization | d. Regeneration |
17. First genetically modified plant produced in 1982 was:
- |                       |                      |
|-----------------------|----------------------|
| a. Transgenic tobacco | b. Transgenic maize  |
| c. Transgenic cotton  | d. Transgenic tomato |
18. Functional megaspore in an angiosperm develops into:
- |               |           |
|---------------|-----------|
| a. Endosperm  | b. Embryo |
| c. Embryo-sac | d. Ovule  |
19. In liposome-mediated direct gene transfer method genes are.....
- |                   |                             |
|-------------------|-----------------------------|
| a. Gene is stable | b. Gene is protected        |
| c. Both a and b   | d. Nor protected nor stable |
20. The production of secondary metabolites requires the use of.....
- |                  |                    |
|------------------|--------------------|
| a. Meristem      | b. Protoplast      |
| c. Axillary buds | d. Cell suspension |

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**( Descriptive )**

Time : 2 hr. 30 mins.

Marks : 50

[ Answer question no.1 & any four (4) from the rest ]

- |   |        |
|---|--------|
| 1. Describe the process of anther culture.  | 10     |
| 2. Write short notes on <i>any two</i> of the following DNA modifying enzymes:                                | 5+5=10 |
| a) Phosphatase  |        |
| b) Polynucleotide phosphorylase   |        |
| c) Polynucleotide kinase  |        |
| d) DNA Ligase   |        |
| 3. Describe the process of seed development and fruit growth.   | 10     |
| 4. Differentiate on <i>any one</i> of the following:  | 5+5=10 |
| a) Plasmid and Cosmid   |        |
| b) Shuttle and Binary Vector  |        |
| c) cDNA and genomic libraries   |        |
| 5. Define secondary metabolites. Describe the production of the secondary metabolites.                        | 2+8=10 |
| 6. Differentiate between the Northern and Western blotting techniques.  | 5+5=10 |
| 7. Write short notes on <i>any two</i> of the following:  | 5+5=10 |
| a) Density Centrifugation   |        |
| b) Spectrophotometers   |        |
| c) Paper Chromatography   |        |
| d) pH meter   |        |
| 8. Define transgenic plant. Describe the process of developing transgenic plant with Bt cotton as an example. | 2+8=10 |

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