M.Sc. BOTANY
Third Semester (Repeat)
BIOPHYSICAL INSTRUMENTATION, PLANT TISSUE CULTURE, PALYNOLOGY AND DEVELOPMENTAL BOTANY
(MSB - 302)

Duration: 3Hrs. **Full Marks: 70**

Part-A (Objective) =20
Part-B (Descriptive) =50

(PART-B: Descriptive)

Duration: 2 hrs. 40 mins. **Marks: 50**

Answer any *four* from *Question no.* 2 to 8
***Question no.* 1 is compulsory.**

1. Describe the different method of micropropagation in plant tissue culture. (10)
2. Write short notes on: (5+5=10)
   a) Shuttle vectors b) cDNA genomic library
3. What is gel electrophoresis? Describe the process of Southern Blotting with diagram. (10)
4. Write short notes on: (5+5=10)
   a) ELISA b) pH meter
5. Discuss the various steps for X-Ray diffraction study of protein. (10)
6. Write short notes on: (5+5=10)
   a) Hydroponics b) Cryopreservation
7. Discuss the different types of embryo sac in Angiosperms with diagram. (10)
8. Write with proper diagram the instrumentation of HPLC. What is the utility of HPLC in biological sciences? (8+2=10)

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Duration: 20 minutes **Marks – 20**

(PART A - Objective Type)

I. Choose the correct answer: **1×20=20**

1. In chromatography mass movement of substances is due to:
   a) Diffusion b) Electrophoresis
   c) Paper chromatograph d) Osmosis

2. DMSO is used as:
   a) Gelling agent b) Chelating agent
   c) All keying agent d) Cryoprotectant

3. The most widely used chemical for protoplast fusion, as fusogen is:
   a) Mannitol b) Sorbitol
   c) Mannol d) Poly Ethylene Glycol (PEG)

4. To obtain haploi plant we culture:
   a) Entire anther b) Nucleus
   c) Apical bud d) Embryo

5. Pollination by animals like slugs, snails, squirrels is known as:
   a) Malacophily b) Chiropteriphily
   c) Ornithophily d) Entomophily

6. Which of the following statements are true for Agrobacterium mediated gene transfer?
   a) Vir genes are essential for gene transfer.
   b) T-DNA borders are essential for gene transfer.
   c) Both a and b.
   d) None of these.

7. The transformation method that uses tungsten or gold particles coated with DNA accelerated at high velocity is called
   a) Acceleration method b) High velocity method
   c) Particle gun delivery method d) DNA particle delivery method

8. The vectors commonly used for sequencing human genome:
   a) Yeast artificial chromosome (YAC) b) Plasmid
   c) CMV vectors d) M13 vectors

9. The type of fruit in *Citrus aurantium* is:
   a) Pepo b) Pome c) Hisperidium d) Balausta

10. Bt cotton is not:
   a) A GM plant b) Insect resistant
   c) A bacterial gene expressing system d) Resistant to all pesticides

11. In Monoclinic unit cell of the crystal with three axes (a, b, c) and interaxial angles (α, β, γ)
   a) $a=b=c$ & $\alpha \neq \beta \neq \gamma \neq 90°$ b) $a \neq b \neq c$& $\alpha=\gamma=90° \neq \beta$
   c) $a \neq b \neq c$& $\alpha \neq \beta \neq \gamma \neq 90°$ d) $a \neq b \neq c$& $\alpha=\beta=\gamma=90°$

12. One of the following is the best tool to study the interacting residues in protein ligand interaction:
   a) X-Ray crystallography b) UV-visible spectroscopy
   c) CD- spectroscopy d) Fluorescence spectroscopy

13. A probe which is a molecule used to locate specific sequences in a mixture of DNA or RNA molecules could be:
   a) A single stranded RNA b) A single stranded DNA
   c) Either RNA or DNA d) Can be ss DNA but not ss RNA

14. Which is the most frequently used wavelength in UV region?
   a) 460nm b) 663nm c) 220nm d) 340nm

15. Separation of viruses is done by:
   a) Isopycnic ultracentrifugation b) Zonal ultracentrifugation
   c) Contrinuous flow centrifugation d) Refrigerated high speed centrifugation

16. The production of secondary metabolite require the use of:
   a) Protoplast b) Cell suspention
   c) Auxillary buds d) Meritem

17. Which of the following chemicals enhances vir gene expression?
   a) Cyanidin b) Glutennin
   c) Acetosyringone d) Dextran

18. Somaclonal variation are the one
   a) Caused by mutagen b) Produced during tissue culture
   c) Caused by gamma ray d) Induced during embryogeny

19. In genetic engineering, a DNA segment (gene) of interest is transferred to the host cell through a vector. Consider the following four agents (i –iv) in this regard and select the correct option about which one or more of these can be used as a vector/vectors.
   i) Bacterium ii) Plasmid iii) Plasmodium iv) Bacteriophages

   a) i, ii and iv b) ii and iv c) i and iv d) i only

20. A *Shine – Dalgarno* sequence is:
   a) RNA polymerase binding site b) DNA polymerase binding site
   c) tRNA binding site d) Ribosome binding site

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