

Question Paper

Exam Date & Time: 14-May-2022 (10:00 AM - 01:00 PM)



MANIPAL INSTITUTE OF TECHNOLOGY
MANIPAL
(A constituent unit of MAHE, Manipal)

SIXTH SEMESTER B.TECH END SEMESTER EXAMINATIONS, MAY 2022 **ANIMAL PLANT BIOTECHNOLOGY AND BIOETHICS [BIO 3251]**

Marks: 50

Duration: 180 mins.

Instructions to Candidates:

Answer ALL questions Missing data may be suitably assumed

- 1) Construct a working design of a plant mitochondrial genome. Justify your reasoning (3)
- A)
- B) Why in plants $3n$, $4n$, $7n$ etc are common compared to animals? How will you explain such a phenomenon? (3)
- C) What is the logic of using following chemicals in plant in vitro cultures? (4)
(i) Sodium alginate (ii) Phenylalanine (iii) Entrapped enzymes (iv) DMSO
- 2) You are in charge of an orchid propagation unit of a plant biotech company. What is your plan for mass propagation of a beautiful orchid found in your campus? Justify your reasoning (3)
- A)
- B) Provide a working plan for somatic cell hybridization (3)
- C) Explain the process of tDNA transfer and integration in plants? How will you utilize this logically for plant genetic engineering (4)
- 3) Complete the following table (5)
- A)
- | Sl. No | Description | Use | Logic |
|--------|---------------------|-----|-------|
| 1 | Helium pressure gun | | |
| 2 | Tungsten | | |
| 3 | PEG | | |
| 4 | Dendrimers | | |
| 5 | Carbide whisker | | |
- B) Dr. Neeta desired to set up an animal cell culture facility. She asked her student Mr. Sudesh, to make a list of all the instruments used in the cell culture lab. Assist him in compiling the same. List out all instruments and their use (mention at least one valid use/purpose of the instrument) in the cell culture laboratory. (3)
- | Sl. No | Name of the Instrument | Purpose/use |
|--------|------------------------|-------------|
| | | |
- C) Write applications of Intrinsic fluorophores in fluorescence microscopy (2)
- 4) Dr. Sridhar isolated the alkaloid "vincristine" from a medicinal plant *Catharanthus roseus*. This alkaloid compound is believed to be effective against Neuroblastoma (cancer of nerve tissue) by induction of programmed cell death. However, he wanted to test this hypothesis in the human neuroblastoma (SH-SY5Y) cell line. He treated the human neuroblastoma cells with 10 micrograms (5)
- A)

of the compound for 12 and 24 h. Upon treatment following assays were selected to test his hypothesis.

1. ATP bioluminescence assay 2. MTT assay 3. Annexin V-FITC and PI (dual) staining

a) If the hypothesis is true, which of the above-mentioned assay will be more appropriate? Justify.

b) Write the principle of the assay which you have suggested.

B) Mention the disadvantages (any six) of serum in a culture medium (3)

C) Write a note on Enzymatic tissue disaggregation (2)

5) Mention five different ways of protecting Intellectual Property rights. Write a note on each method highlighting its advantages and disadvantages. (5)

A)

B) Dr. Nitish asked his student Ms. Shruthi to prepare an SOP (standard operating procedure) to cryopreserve a cell line. Assist her in preparing a stepwise protocol for cryopreservation. (3)

C) List out all the potential reasons for the below-mentioned problem and suggest a suitable/appropriate remedy (2)

Nature of the problem with primary culture	Cause	Remedy
Floating cells are non-viable and few cells have attached		

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