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**NOIDA INSTITUTE OF ENGINEERING AND TECHNOLOGY, GREATER NOIDA**  
**(An Autonomous Institute Affiliated to AKTU, Lucknow)**

**M.Tech**

**SEM: II - THEORY EXAMINATION (2025 - 2026)**

**Subject: Cell & Tissue Culture Techniques**

**Time: 3 Hours**

**Max. Marks: 70**

**General Instructions:**

**IMP:** Verify that you have received the question paper with the correct course, code, branch etc.

1. This Question paper comprises of **three Sections -A, B, & C**. It consists of Multiple Choice Questions (MCQ's) & Subjective type questions.
2. Maximum marks for each question are indicated on right -hand side of each question.
3. Illustrate your answers with neat sketches wherever necessary.
4. Assume suitable data if necessary.
5. Preferably, write the answers in sequential order.
6. No sheet should be left blank. Any written material after a blank sheet will not be evaluated/checked.

**SECTION-A**

15

1. Attempt all parts:-

- (1.1) The optimum temperature for culturing mammalian cells is (CO1, K1) 1
- (a) 37
  - (b) 48
  - (c) 22
  - (d) 3
- (1.2) A cell line always requires enzymatic dissociation before it can be distributed between new culture vessels. (CO2, K1) 1
- (a) Trypsin
  - (b) Accutase
  - (c) None
  - (d) Both
- (1.3) The host cell line selected for pharmaceutical protein production must show a high (CO3, K1) 1
- (a) transformability
  - (b) contact inhibition
  - (c) transfectibility
  - (d) surface dependency
- (1.4) Plant biotechnology involves (CO4, K1) 1
- (a) production of valuable products in plants
  - (b) rapid clonal multiplication of desired genotypes
  - (c) production of virus free plants
  - (d) all of these

- (1.5) Explant is (CO2, K1) 1
- (a) any cut part of the plant used in tissue culture
  - (b) a plant extract used in tissue culture
  - (c) a source of growth regulators added to media
  - (d) solidifying agent

2. Attempt all parts:-

- (2.1) Give examples of two established cell lines. (CO2, K2) 2
- (2.2) What is cell line characterization? (CO2, K2) 2
- (2.3) What is suspension cloning? (CO3, K2) 2
- (2.4) Name the common methods of plant regeneration. (CO4, K1) 2
- (2.5) What is gynogenesis? (CO5, K2) 2

## **SECTION-B** 20

Answer any one of the following:-

- (3.1) Give a flow chart of explaining media preparation.(CO1, K2) 4
- (3.2) Write a note on serum containing media, discussing its advantages and disadvantages. (CO1, K2) 4

Answer any one of the following:-

- (3.3) What is the role of trypsin and EDTA in cell culture? How EDTA help trypsin in cell detachment? (CO2, K3) 4
- (3.4) Give some example of human cell lines and what are the characteristic of those cell lines? (CO2, K2) 4

Answer any one of the following:-

- (3.5) Differentiate between physical and chemical transformation procedure. (CO3, K3) 4
- (3.6) Describe different parameters used to assess the general cellular toxicity. (CO3, K2) 4

Answer any one of the following:-

- (3.7) Define callus and write the steps of suspension culture (CO4, K2) 4
- (3.8) How rooting and shooting growth is controlled by auxin concentration? (CO4, K2) 4

Answer any one of the following:-

- (3.9) How to get the somatic embryogenesis response? Give a detail account of the factors that affects this response. (CO5, K2) 4
- (3.10) Give the applications of callus culturing? How it can help in transgenic plant production? (CO5, K3) 4

## **SECTION-C** 35

4. Answer any one of the following:-

- (4.1) Discuss in detail various application of animal cell culture. (CO1, K2) 7
- (4.2) Explain the process of preparation and sterilization of cell culture media. (CO1,K2) 7

5. Answer any one of the following:-

- (5.1) Give a detailed note on embryo fibroblast culture and its applications. (CO2,K2) 7
- (5.2) Give a detailed account on Physical methods of cell separation (CO1,K2) 7

6. Answer any one of the following:-

- |       |                                                                                        |   |
|-------|----------------------------------------------------------------------------------------|---|
| (6.1) | Give a detailed account on stem cell, their types and applications. (CO3,K2)           | 7 |
| (6.2) | Write a note on biolistic approach used for transformation of cultured cells. (CO3,K2) | 7 |

7. Answer any one of the following:-

- |       |                                                                                                        |   |
|-------|--------------------------------------------------------------------------------------------------------|---|
| (7.1) | Briefly explain single cell culture. (CO4,K3)                                                          | 7 |
| (7.2) | Is somaclonal variation heritable? What are the causes that can affect somaclonal variations? (CO4,K3) | 7 |

8. Answer any one of the following:-

- |       |                                                                                              |   |
|-------|----------------------------------------------------------------------------------------------|---|
| (8.1) | How tissue culture technique is helpful in improving the plant nutritional quality. (CO5,K2) | 7 |
| (8.2) | How plant tissue culture can help in increasing the farmer's income? (CO5,K2)                | 7 |

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