



B.TECH DEGREE EXAMINATIONS: APRIL / MAY 2023

(Regulation 2018)

Sixth Semester

BIOTECHNOLOGY

U18BTT6002: Cell Culture Techniques

COURSE OUTCOMES

- CO1:** Outline and design model laboratory layout for setting up a plant tissue culture and animal cell culture lab.
CO2: Compare and illustrate plant and mammalian cell culture techniques and media for culturing of plant and mammalian cells
CO3: Elaborate and compare various plant tissue culture technique
CO4: Significant applications of tissue culture techniques in generating transgenic plants
CO5: Explain and illustrate techniques for development of primary and established cell culture and measurement of cell viability.
CO6: Illustrate the plant and mammalian cell techniques for economic importance

Time: Three Hours

Maximum Marks: 100

Answer all the Questions:-

PART A (10 x 2 = 20 Marks)

(Answer not more than 40 words)

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|---|-----|-------------------|
| 1. Differentiate primary and secondary containment in tissue culture laboratory. | CO1 | [K ₂] |
| 2. Mention a challengeable biological hazard in tissue culture laboratory. | CO1 | [K ₁] |
| 3. Give MS media stock solutions and their required volumes to prepare 1 Liter of MS media. | CO2 | [K ₂] |
| 4. Doubling time and generation time are same or different? – If so, justify. | CO2 | [K ₃] |
| 5. Why do we prefer shoot tip as explant to culture viral free plants? | CO3 | [K ₄] |
| 6. Differentiate primary and secondary hardening. | CO3 | [K ₂] |
| 7. Specify the name and concentration of dye used in cell viability and MTT assay. | CO4 | [K ₂] |
| 8. Give one example for anchorage dependent and independent culture. | CO4 | [K ₁] |
| 9. List any two-drought resistant plant produced by transgenic approach. | CO5 | [K ₂] |
| 10. What do you mean by transfection technology? | CO6 | [K ₂] |

Answer any FIVE Questions:-
PART B (5 x 16 = 80 Marks)
(Answer not more than 400 words)

11. a) Specify challenges associated with establishment of aseptic techniques and suggest possible solutions. 10 CO1 [K4]
- b) How is it important to study various biosafety level before handling of plant or animal cells/tissue inside the research laboratory? 6 CO1 [K4]
12. a) Dedifferentiation and redifferentiation is cooperative and integrated process in callus formation – Justify your answer with suitable example. 10 CO2 [K4]
- b) Why do we need to use serum and serum free media for culturing of mammalian cells – Justify your answer with suitable examples. 6 CO2 [K4]
13. a) Recommend plant tissue culture technique to produce any one low volume high value product. -Explain the process with suitable illustration. 10 CO3 [K2]
- b) List the merits and demerits of PEG mediated protoplast fusion techniques. 6 CO3 [K2]
14. a) Nowadays, primary culture system has gained greater attention as a tool in cellular and molecular biology, providing excellent model systems for studying physiology of cells and has limitless applications – Give your insight views with specific application to justify the above statements. 10 CO4 [K4]
- b) Suggest reactors with specifications to handle infinite cell lines for the production of metabolites. 6 CO4 [K3]
15. a) How will you apply knowledge on cell counting by using haemocytometer – Explain steps with suitable illustration. 10 CO5 [K2]
- b) Illustrate the steps involved in MTT assay to study cytotoxicity potential of cell line. 6 CO5 [K2]
16. a) How will you produce recombinant coagulation factors under *invitro* conditions- Suggest techniques and procedures with suitable illustration. 10 CO6 [K3]
- b) Tissue culture banana is one of the most successful plants obtained via micropropagation- however success rate is very low for other plants? – Give your comments. 6 CO6 [K3]
