



B.E/B.TECH DEGREE EXAMINATIONS: APRIL /MAY 2024

(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 techniques.
- 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. Infer the importance of inverted microscope in a tissue culture lab. | CO1 | [K ₂] |
| 2. Justify the need for maintaining aseptic conditions in a mammalian tissue culture lab. | CO1 | [K ₃] |
| 3. Write the significance of passaging a cell line. | CO2 | [K ₂] |
| 4. Expand CIM and provide its importance. | CO2 | [K ₂] |
| 5. Under which stage of hardening, the <i>in vitro</i> grown plants are exposed for photo-autotrophic growth? Why? | CO3 | [K ₄] |
| 6. Identify a suitable test to assess the viability of plant protoplast. | CO3 | [K ₂] |
| 7. Can a finite cell line be converted into an infinite cell line? Justify your answer. | CO5 | [K ₃] |
| 8. Differentiate between Anchorage dependent and Anchorage independent cells with example. | CO5 | [K ₂] |
| 9. “Bt cotton and Dolly sheep”. Which of the above is an example for transgenic species? Why? | CO6 | [K ₃] |
| 10. State the principle behind Transfection process. | CO4 | [K ₂] |

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

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| 11. | a) | Classify the different biosafety levels employed in mammalian cell culture lab. | 8 | CO1 | [K ₃] |
| | b) | Illustrate the different types of major equipment's used in Plant tissue culture lab. | 8 | CO1 | [K ₂] |
| 12. | a) | Compare and contrast different types of media used in Mammalian tissue culture with its merits and demerits. | 10 | CO2 | [K ₄] |
| | b) | Narrate the steps involved in the cryopreservation of mammalian cell lines. | 6 | CO2 | [K ₂] |
| 13. | | Categorize the different types of plant culture techniques with neat labeled sketch. | 16 | CO3 | [K ₂] |
| 14. | a) | Detail the steps involved in establishing a primary chicken embryo cell line with neat flow sheet. | 8 | CO5 | [K ₃] |
| | b) | Tabulate the key parameters that should be considered in scaling up mammalian cell bioreactors and brief their significance. | 8 | CO5 | [K ₃] |
| 15. | a) | Exemplify the methodology to develop a drought resistant transgenic plant, with an example. | 8 | CO6 | [K ₂] |
| | b) | Emphasize the role of any ONE transgenic animal as bioreactor in the production of a therapeutic protein. | 8 | CO6 | [K ₂] |
| 16. | | Portray the success of Micropopagation technique in banana cultivation. | 16 | CO4 | [K ₂] |
