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4 SEM TDC GEBTC (CBCS) 4

2024

(May/June)

BIOTECHNOLOGY

(Generic Elective)



Paper : GE-4

(Cell and Tissue Culture)

Full Marks : 53

Pass Marks : 21

Time : 3 hours

*The figures in the margin indicate full marks
for the questions*

1. Choose and write the correct answer from the following : 1×5=5

(a) Totipotency refers to ____.

- (i) development of fruits from flowers in a culture
- (ii) development of an organ from a cell in a culture medium
- (iii) flowering in a culture medium
- (iv) All of the above

(2)

(b) Which of the following chemicals is most widely used for protoplast fusion?

- (i) Mannitol
- (ii) Polyethylene glycol
- (iii) Sorbitol
- (iv) Mannol

(c) What is Callus?

- (i) Tissues that grow to form an embryoid
- (ii) An unorganised actively dividing mass of cells maintained in a culture
- (iii) An insoluble carbohydrate
- (iv) A tissue that grows from an embryo

(d) What does cryopreservation involve?

- (i) Rapid multiplication of cells
- (ii) Long-term storage of genetic material
- (iii) Inducing genetic mutations
- (iv) increasing cell metabolism

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(Continued)

(3)

(e) What does hybridoma technology involve?

- (i) Fusion of tumor cells and antibody-producing cells
- (ii) Fusion of stem cells and somatic cells
- (iii) Fusion of animal and plant cells
- (iv) Fusion of protoplasts

2. Write short notes on any *three* of the following : 4×3=12

- (a) Cryopreservation
- (b) Protoplast culture
- (c) Somatic embryogenesis
- (d) Germplasm conservation
- (e) Biotransformation

3. Answer any *three* of the following questions : 5×3=15

(a) What is artificial seed? Explain briefly a method to produce artificial seeds. 1+4=5

(b) What is a cell line? Describe briefly the applications of animal cell culture. 1+4=5

(c) What are stem cells? Write briefly the uses of stem cells in the field of medical sciences. 2+3=5

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(Turn Over)

(4)

- (d) What is endosperm culture, and how is it used in triploid production? $2+3=5$
- (e) What is somaclonal variation? How does it occur? $2+3=5$

4. Answer any *three* of the following questions :

$7 \times 3 = 21$

- (a) What is somatic hybridization? State the different applications of somatic hybridization. $2+5=7$
- (b) What is the importance of maintaining aseptic conditions in tissue culture? What are the measures to be followed to prevent microbial contaminants in culture? $2+5=7$
- (c) Explain the method of hybridoma technology for production of monoclonal antibodies. 7
- (d) Explain the process of protoplast isolation, culture and fusion in plant biotechnology. Discuss the applications of protoplast fusion in crop improvement. $2+1+2+2=7$
- (e) Write a note on the essential components of tissue culture media and their functions.

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