

M.Sc. Biotechnology
Second Semester
Plant and Animal Biotechnology
(MBT- 06)

Duration: 3Hrs.

Full Marks: 70

(PART-B: Descriptive)

Duration: 2 hrs. 40 mins.

Marks: 50

1. Answer any five of the following: -

2×5=10

- a) Phytohormone,
- b) Plasmid,
- c) Totipotency and pluripotency
- d) Embryogenesis,
- e) Bioreactor,
- f) Ethical issues in stem cell research
- g) Nutritional and physiological function of Nitrogen used in medium.

2. Write in brief on any five of the following: -

3×5=15

- a) Laminar Air Flow,
- b) Secondary metabolite,
- c) Therapeutic applications of stem cell technology
- d) Embryo rescue,
- e) Sterilization of tissue culture explant.
- f) Haematopoiesis,
- g) Selection strategies for somatic hybrids.

3. Answer any five of the following: -

5×5=25

- a) What is culture medium? State the basic composition of a general plant tissue culture medium. 2+3=5
- b) Explain somaclonal variation with its importance in plant improvement. 5
- c) What is primary cell culture? What is cell line? What criteria should be considered for efficient development of primary cell culture? 1+1+3=5
- d) Write precisely on the scope of commercial application of micropropagation technology with example. 5
- e) What is somatic hybridization? Discuss different techniques of protoplast fusion. 2+3=5
- f) Explain the technique of *in vitro* fertilization in animals emphasizing its application in human. 5
- g) What is haploid? Write the detailed methods of androgenesis with suitable diagrams. 1+4=5

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(The figures in the margin indicate full marks for the questions)

Duration: 20 minutes

Marks – 20

(PART A- Objective)

1. Give the answers - true or false (Tick):

1×10=10

- | | |
|------------------------------------------------------------------------------------------------------------------------|-------------------|
| i. Homogeneous plant populations can be developed through callus culture. | True/False |
| ii. All cells of a living organism are not totipotent | True/False |
| iii. Transposon is an immovable genetic element. | True/False |
| iv. Fetal bovine serum is used for animal cell culture. | True/False |
| v. Suspension culture technology provides scope of producing secondary metabolites from medicinal and aromatic plants. | True/False |
| vi. <i>Agrobacterium</i> mediated gene transfer is an example of natural gene transfer. | True/False |
| vii. Heart and pancreas have stem cells. | True/False |
| viii. Pectinase is an animal cell degrading enzyme. | True/False |
| ix. He La cell lines are infinite cell lines. | True/False |
| x. 'a ₁ ' is a genetic marker for haploid plants with brown coloured aleurone. | True/False |

2. Choose the appropriate answer.

1×10=10

- i. Bacterial _____ is utilized in gene transfer technology. (plasmid/plastid)
- ii. Sucrose is used as _____ source in plant tissue culture media. (hormone/carbon)
- iii. Enzyme _____ is used to dissolve plant cell walls in protoplast isolation.
(cellulase /chitinase)
- iv. Subculturing of primary cell lines gives rise to _____. (cell lines/ finite cell lines).
- v. Colchicine treatment results in production of _____. (diploids/ double haploids).
- vi. Embryonic stem cells are _____. (pluripotent/ totipotent).
- vii. Adult stem cells are _____. (unipotent/ pluripotent).
- viii. Endosperm transplant technique is used for culturing _____ embryos. (mature/
immature).
- ix. _____ is required for animal tissue culture. (Endosperm/ serum).
- x. For the first time _____ used cell wall degrading enzymes in protoplast isolation.
(Cooking/ Watson and Crick).
