Total number of printed pages = 5

63/2(SEM-3) BIT-301

2022

(Held in 2023)

BIOTECHNOLOGY

(Theory Paper)

Paper Code : BIT-301

(Plant Biotechnology)

Full Marks – 80

Pass Marks – 32

Time – Three hours

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

PART – I

1. Choose the correct answers from the following : 1×6=6

(i) Which one of the following is not a molecular marker system ?

(a) Restriction Fragment length Polymorphism

(b) Amplified Fragment length Ploymorphism

(c) Random tagged sites

(d) DNA amplification finger printing

[Turn over

(ii) Which of the following gene is transferred to plants that detoxifies the herbicide atrazine?

(a) Nitrilase

(b) Glutathione-S-Transferase

(c) Phosphinothricin acetyltransferase

(d) Glutamine synthetase

(iii) Transfer of T-DNA is carried out by the products of

(a) Opine genes (b) Oncogenes

(c) Vir genes (d) Ori gene

(iv) Which of the following tissue culture media component should be filter sterilized instead of autoclaving ?

(a) Agar (b) Hormones

(c) Water (iv) Sucrose

(v) Which of the following methods should be adopted for obtaining haploid lines ?

(a) Embryo culture

(b) Pollen culture

(c) Meristem culture

(d) Nodal culture

(vi) The hybrid having genetic material of only one parent and cytoplasm of both the parent is known as

(a) Synkaryon

(b) Asymmetric hybrid

(c) Cybrid

(d) Symmetric hybrid.

2. Answer in brief the following questions : 2×5=10

(a) Which enzyme is blocked in Flavr Savr and why ?

(b) Differentiate between callus and suspension culture.

(c) What is somatic embryogenesis ? Show its stages.

(d) Define a single cell clone and mention its significance.

(e) How do you differentiate between a symmetic and assymmetic hybrid ?

3. Answer any *six* of the following questions: 5×6=30

(a) Define molecular marker-assisted breeding. Mention the criteria for ideal DNA markers. 1+4=5

(b) Write briefly on the shikimic acid pathway in plants and its importance. 5

(c) Write a brief note on the composition of plant tissue culture media. 5

(d) Discuss any three techniques for obtaining virus-free plants. 5

(e) Describe the *Agrobacterium* mediated gene transformation using neat amd labelled diagrams. 1+4=5

(f) Discuss any two direct DNA transfer methods with relevant diagrams. 2·5×2=5

(g) Briefly describe the approaches used for production of transgenic flowers with increased shelf life. 5

(h) Differentiate between foreground and background selection. 5

(i) What are binary vectors ? Explain with neat and labelled diagrams. 4+1=5

4. Answer any *two* from the following questions: 10×2=20

(a) What is Cryopreservation ? Explain in details the procedure of germplasm cryopreservation. Mention the application of germplasm cryopreservation technique. 1+6+3=10

(b) Discuss the significance of male sterility in agriculture. Explain two successful strategies for producing transgenic male sterlity. 2+8=10

(c) Draw a neat and labelled diagram of a Ti-Plasmid. Describe the mechanism of T-DNA transfer from Ti-Plasmid. 3+7=10

5. Answer any *one* of the following questions : 14×1=14

(a) Describe the production of insect resistant transgenic plants under the following heads :

(i) Cry proteins of B. thuringiensis

(ii) Toxic action of cry genes

(iii) Insect resistance in plants due to cry genes

(iv) Other transgenes for insect resistance 3+4+4+3=14

(b) What is micropropagation ? What are its stages ? Describe each of the stages of micropropagation. 2+2+10=14