P. P. SAVANI UNIVERSITY

Fifth Semester of B.Sc. Examination
December-2021
SSBT3010–Plant Biotechnology-I

07.12.2021, Tuesday Time: 12:30 p.m. to 3:00 p.m. Maximum Marks: 60

Instructions:

1. The question paper comprises of two sections.
2. Section I and II must be attempted in separate answer sheets.
3. Make suitable assumptions and draw neat figures wherever required.
4. Use of scientific calculator is allowed.

Section-I (Total Marks - 30)

Q.1 Short Questions **[10]**

1.1 Objectives **[05]**

1.1a Which of the following statement is correct

A Agar is not extracted from marine algae such as seaweeds.
B Callus undergoes differentiation and produces somatic embryoids
C Surface sterilization of explants is done by using mercuric bromide
D The PH of the culture medium is 5.0 to 6.0

1.1b Callus is obtained during which time in tissue culture

A 2 to 3 days
B 2 to 3 months
C 2 to 3 weeks
D 2 to 3 hours

1.1c The production of secondary metabolites requires the use of

A Protoplast
B Cell suspension
C Meristem culture
D Auxillary buds

1.1d Which of the following plant cell will show totipotency

A Xylem vessels
B Sieve tube
C Meristem
D Cork cells

1.1e In plant tissue culture, what is term ORGANOGENESIS mean

A Formation of callus culture
B Formation of root and shoot from callus culture
C Genesis of plants
D None of the above

1.1f Temperature suitable for callus culture

A 12°C—13°C
B 22°C—28°C
C 40°C—50°C
D 30°C—35°C.

1.1g Embryo culture is carried out in 1904 by

A Braun
B Hanning
C G. Haberlandt
D White

1.1h Commonly used solidifying chemical for plant tissue culture

A Gelatin
B Starch
C Agar
D Pectin

1.1i Process of transferring callus in fresh medium for the maintenance of its growth

A Inoculation
B Subculturing
C Incubation
D Biotransformation

1.1j Growth regulator used for induction of roots

A IAA
B BAP
C Picloram
D 2,4-D

1.2 Answer the Following: (MCQ/Short Question/Fill in the Blanks) [05]

1.2a Define organogenesis

1.2b Miller et al discovered kinetin -T/F

1.2c _____like structure produced by somatic cells *in vitro*

1.2d Name one naturally occurring cytokinin

1.2e Who for the first time used commercial enzyme preparation for isolation of protoplasts

Q.2 Short Notes (Attempt any two) [06]

A Antibrowning compounds used in plant tissue culture media

B Vitamins and myo-inositol used in plant tissue culture media

C Seed culture

Q.3 Explain in detail (Attempt any two) [14]

A Describe protoplast culture

B Write about (seed culture, embryo culture)

C Media constituents used in plant tissue culture

Section-II (Total Marks - 30)

Q.1 Short Questions [10]

1.1 Objectives [05]

1.1a Artificial seeds are

A Seeds produced in laboratory condition

B Seeds encapsulated in a gel

C Somatic embryos encapsulated in a gel
D Zygotic embryos encapsulated in a gel

1.1b Meristem culture helps in developing
A Hybrid plants
B Virus free plants
C Disease resistant plants
D Tall plants

1.1c Genetic variation observed in callus obtained from tissue culture is called
A Morphogenesis
B Rhizogenesis
C Callogenesis
D Somaclonal variation

1.1d Cybrids are produced by
A Fusion of two different nuclei from two different species
B Fusion of two same nuclei from same species
C Nucleus of one species but cytoplasm from both the parent species
D None of the above

1.1e Norstar winter wheat is developed through
A Somaclonal variation
B Somatic hybridization
C Plant breeding
D Transgenic technology

1.1f Which of the following is the main application of embryo culture?
A Clonal propagation
B Production of embryoids
C Induction of somaclonal variations
D Overcoming hybridization barriers

1.1g Which of the following is not related to embryo culture?
A Growth of embryos on culture medium
B Developing seedlings
C Multiplication of rare plants
D Making virus-free plants

1.1h Which of the following is developed through somaclonal variation
A Velvet Rose
B Pusa Jai Kisan
C CIMAP/Bio13
D All of these

1.1i PEG treatment method is widely used protoplast fusion as it-

A Results in a reproducible high-frequency of heterokaryon formation

B Has Low toxicity to cells

C Can be used for a wide range of plants

D All of the above

1.1j Which of the following plant's meristem has not been successfully cultured?

A Banana

B Apple

C Sugarcane

D Potato

1.2 **Answer the Following: (MCQ/Short Question/Fill in the Blanks)** **[05]**

1.2a Pomato is a somatic hybrid-T/F

1.2b What are somatic hybrids

1.2c The capacity to generate a whole new plant from any cell is known as micropropagation -T/F

1.2d What is an explant

1.2e Guha and Maheshwari developed plantlets from microspores of _____

Q.2 **Short Notes (Attempt any two)** **[06]**

A Anther culture.

B Embryo rescue procedures.

C PEG mediated fusion of protoplasts.

Q.3 **Explain in detail (Attempt any two)** **[14]**

A Describe artificial seeds.

B What is somatic hybridization. Discuss problem and limitations of somatic hybridization

C What is somaclonal variation. Discuss basis of somaclonal variation.