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 incorrect

- **A** Agar is 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 chloride
- **D** The PH of the culture medium is 7.0 to 8.0

1.1b The minimum time to induce callus in plant tissue culture

- **A** 2 to 3 days
- **B** 60 to 90days
- **C** 14 to 21 weeks
- **D** 2 to 3 hours

1.1c Secondary metabolite production is achieved through

- **A** Protoplast
- **B** Cell suspension
- **C** Meristem culture
- **D** Auxillary buds

1.1d Choose among the following which demonstrates totipotency

- **A** Xylem vessels
- **B** Sieve tube
- **C** Meristem
- **D** Cork cells

1.1e Typical characteristic of somatic embryogenesis

- **A** Formation of callus culture
- **B** Simultaneous induction of shoot and root from callus culture
- **C** Plantlet formation
- **D** None of the above

1.1f Optimum temperature suitable for callus culture

I to4

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

1.1g In 1904, embryo culture was carried out by
A Braun
B Hanning
C G. Haberlandt
D White

1.1h Which of following is highly used solidifying chemical for plant tissue culture
A Gelatin
B Starch
C Agar
D Clarigel

1.1i Transplanting *invitro* cultures in fresh medium is known as
A Inoculation
B Subculturing
C Incubation
D Biotransformation

1.1j Growth regulator used for induction of shoots
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 Who discovered kinetin

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

1.2d Name one highly used auxin for callus induction

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

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

A What are antibrowning compounds. Write their uses in plant tissue culture media

B Use of vitamins and myo-inositol in plant tissue culture media

C How seeds are cultured

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

A Plant tissue culture media constituents

B How protoplast is cultured. Explain in detail

C Write seed culture& embryo 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

2 TOH

D Making virus-free plants

1.1h Which of the following is developed through somaclonal variations

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

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