P. P. SAVANI UNIVERSITY

Fifth Semester of B.Sc. Examination
December-2021
SSBT3030–Plant Biotechnology-II
08.12.2021, Wednesday 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 ß-glucuronidase enzyme is coded by

- **A** *uidA*
- **B** mtlD
- **C** *Cry1Ab*
- **D** None of these

1.1b Hygromycin phosphotransferase gene (*hpt*) interfers with

- **A** Protein synthesis
- **B** Carbohydrate synthesis
- **C** Fat synthesis
- **D** None of these

1.1c Luciferase genes are also used at times for detection. Choose the correct statement for them

- **A** They are obtained from fire flies only
- **B** The detection requires provision of substrate which produces light
- **C** Enzymes such as beta-galactosidase requires substrate X-gluc to produce light
- **D** Luciferase genes are preferred over fluorescent proteins

1.1d The usefulness of a particular resistance marker depends upon

- **A** The resistance gene
- **B** The plant material
- **C** The characteristics of selection agent
- **D** All of these

1.1e Bar gene cloned from

- **A** *Streptomyces hygroscopicus*
- **B** *Streptomyces viridochromogenes*
- **C** Bacillus sp
- **D** Both A & B

1.1f Bromoxynil inhibits

- **A** Photosystem II
- **B** Photosystem I
- **C** Gluconeogenesis
- **D** None of these

1.1g Which of the following statement is incorrect for *Agrobacterium* mediated gene transfer

A *Vir* genes are essential for gene transfer
B T-DNA borders are essential for gene transfer
C Agrobacterium is gram positive bacterium
D Vir genes of *Agrobacterium* is activated by acetosyringone

1.1h *Agrobacterium tumefaciens* belongs to

A Biotype I
B Biotype II
C Biotype IV
D None of these

1.1i *Vir* gene expression is activated by

A Sucrose
B Glutenin
C Acetosyringone
D Mannitol

1.1j The size range of gold particles used in particle bombardment is

A 1-3 µm
B 5-10 µm
C 6-9 µm
D 10-15 µm

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

1.2a Transgenic potato was first vegetable to be modified-T/F

1.2b What is systemic infection.

1.2c In suspension culture uniform suspension of separate cells grow in _____medium.

1.2d Define callus

1.2e What is PEG

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

A *GUS* expression
B GFP expression
C Write short note on Electroporation

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

A Describe *Agrobacterium* mediated transformation. Explain with diagram.
B Describe particle bombardment
C Explain in detail Caulimovirus mediated gene transfer.

Section-II (Total Marks - 30)

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

1.1 Objectives **[05]**

1.1a Choose among the following which describes characteristic of a transgenic crop

A Herbicide resistance
B Bt insect resistance toxin
C Increased methionine content
D All of these

1.1b Choose among the following which are implicated in stress tolerance?

A Proline
B Betaines
C Citrate
D Both A & B

1.1c Insect resistance in plants is achieved through?

A *Bt* gene
B *ipt* gene
C Cholestrol oxidase gene (*ChoM)*
D All of these

1.1d Resistance to glyphosphate in transgenic plants has been developed by the transfer of

A gene for EPSPS (5-enol-pyruvyl shikimat 3 phosphate synthase)
B gene for ALS (acetolactate synthase)
C gene for GS (glutamine synthase)
D any of the above

1.1e The modification of flower color can be achieved by engineering the gene of

A Chalcone synthase
B Glutamine synthase
C Catalase
D Peroxidase

1.1f The first modification of the flower colour intensity using genetic engineering was done in

A Petunia
B Rose
C Tulip
D Marigold

1.1g Choose among the following which defines 'Plantibodies'

A These are carbohydrates produced in plants
B These are polyclonal antibodies produced in plants
C These are proteins produced in plants
D These are monoclonal antibodies produced in plants

1.1h The bioproduction of human therapeutic agents in transgenic plants can be achieved due to

A Human pathogens cannot contaminate

B Conservation of eukaryotic cell machinery mediating protein modification

C Easy genetic manipulation

D All of the above

1.1i Choose among the following where PHA biosynthetic genes from Alcaligenes eutrophus are expressed in

A Rice

B Arabidopsis

C Brinjal

D Carrot

1.1j The flower colour intensity was modified using transgenic technology in first

A Petunia

B Rose

C Tulip

D Marigold

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

1.2a Define osmoprotectants

1.2b Coat protein mediated cross protection for virus resistance is based on _____

1.2c The transgenic tomato was the first to get commercial approval -T/F

1.2d Low molecular weight antimicrobially active secondary metabolites synthesized in plant in response to plant is called _____

1.2e _____gene isolated from *Bacillus thuringiensis*

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

A Phytoalexins

B Transgenic plant development for disease resistance

C Plantibodies

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

A How transgenic plants act as bioreactors

B Transgenic plants for insect resistance

C Transgenic plants for abiotic stresses