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 The optimum pH range to express ß-glucuronidase enzyme is

- **A** 7-8
- **B** 4-5
- **C** 8-9
- **D** None of these

1.1b Hygromycin phosphotransferase gene (*hpt*) was originally derived from

- **A** *E. coli*
- **B** Streptomyces
- **C** Ascomycetes
- **D** Plants

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 confer resistance to

- **A** Herbicides
- **B** Insect
- **C** Cold
- **D** Heat

1.1f Glyphosate is a broad-spectrum herbicide that inhibits

- **A** Photosynthesis
- **B** Glycolysis
- **C** Gluconeogenesis
- **D** All of these

1.1g Which of the following statements are true for *Agrobacterium* mediated gene transfer

A *Vir* genes are essential for gene transfer
B T-DNA borders are essential for gene transfer
C Both a and b
D None of these

1.1h Which of the following bacterium is considered as 'nature's genetic engineer

A *Agrobacterium tumefaciens*
B *Agrobacterium radiobacter*
C *Pseudomonas putida*
D *Thermus aquaticus*

1.1i Which of the chemical enhances *vir* gene expression

A Cyanidin
B Glutenin
C Acetosyringone
D Dextran

1.1j The transformation method that uses tungsten or gold particle coated with DNA accelerated at high velocity is called

A Acceleration method
B High velocity method
C Particle gun delivery method
D DNA particle delivery method

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

1.2a Caulimoviruses are first plant viruses to be manipulated by the use of recombinant DNA technology-T/F

1.2b Viral infections are _____ so that gene can be introduced into all cells in a plant.

1.2c The DNA bearing tungsten or gold particles (1-3 μm in diameter) referred to as_____

1.2d _____is the injection of DNA solution by micropipettes into the developing floral side shoots (tillers) of plants.

1.2e What is PEG

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

A Write short note on reporter gene
B Write short note on herbicide resistance marker
C Write short note on Electroporation

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

A Explain in detail transgenic development of crops through *Agrobacterium* mediated transformation.
B Explain in detail transgenic development of crops through 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 Which of the following transgenic crop was released for commercial cultivation in India

A Cotton
B Potato
C Soybean
D None of these

1.1b Which of the following is related with abiotic stress tolerance?

A Proline
B Choline
C Phytoalexins
D None of these

1.1c Which of the following gene has been highly used for developing insect resistance in plants?

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 Which of the following's gene can be engineered for modification of flower color

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 Plantibodies are

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 Transgenic plants can be used as bioreactors 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 In which of the following crop PHA biosynthetic genes from Alcaligenes eutrophus are expressed

A Maize

B Arabidopsis

C Wheat

D Tobacco

1.1j In which of the following plant, the intensity of flower colour was modified using transgenic technology for the first time

A Petunia

B Rose

C Tulip

D Marigold

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

1.2a Define bioreactor

1.2b What is edible vaccine

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 Write one role of phytoalexins

B Transgenic plant development for insect resistance

C Edible vaccines

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

A Describe the role of bioreactors

B Transgenic plants for virus resistance

C Transgenic plants for abiotic stresses