



Name : .....  
Roll No. : .....  
Invigilator's Signature : .....

**CS/BSC (H)/BT/SEM-3/PBT-304/2012-13**

**2012**

**PLANT BIOTECHNOLOGY**

*Time Allotted : 3 Hours*

*Full Marks : 70*

*The figures in the margin indicate full marks.*

*Candidates are required to give their answers in their own words  
as far as practicable.*

**GROUP – A**

**( Multiple Choice Type Questions )**

1. Choose the correct alternatives for the *ten* of the following :

$10 \times 1 = 10$

- i) Which of the following is not an application of genetic engineer in plants ?
- a) Nitrogen fixation
  - b) DNA vaccines
  - c) Resistance to glyphosate
  - d) Production of insecticidal proteins in plants.
- ii) The new tools of genetic engineering allow us to manipulate ..... directly.
- a) Cell membranes
  - b) RNA
  - c) DNA
  - d) Bacteria.

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[ Turn over



- iii) Cutting certain genes out of molecules of DNA requires the use of special
  - a) Degrading nucleases
  - b) Restriction endonucleases
  - c) Eukaryotic enzymes
  - d) Viral enzymes.
- iv) Genetic engineering has been used to do all of the following except :
  - a) Make plant more resistance to frost
  - b) Make plants more resistance to disease
  - c) Make plant more resistance to herbicides
  - d) Improve the nutritional balance of plants.
- v) Engineering plants that are resistant to glyphosate was an important advancement because
  - a) Glyphosate promotes frost damage
  - b) Glyphosate encourages the production of fruit that is lower in protein
  - c) Glyphosate is the active ingredient of herbicide
  - d) Glyphosate prevents the transfer of genes into plants.



- vi) The regions of the world most likely to benefit from the promise of biotechnology are
- Warm climate regions
  - Cold climate regions
  - Developing nations
  - Developed nations.
- vii) Environmental concerns about genetic engineering technology focus on which three considerations ?
- Communication, labelling & transportation
  - Production rate, cost & marketing competition
  - Taste, odour & appearance
  - Environmental problems, food safety & access to the new techniques.
- viii) In 1981 the term somaclonal variation & somaclone were coined by
- Larkin & Scowcroft
  - Evans & sharp
  - Skirvin
  - Vasil.



- ix) Increased genetic diversity following extended time in a tissue culture is a problem
- a) Gene alteration
  - b) Temporal modification
  - c) Somachlonal variation
  - d) Culture shock
- x) Introduction of a tobacco mosaic virus transgenic into plants in 1986 was used to demonstrate
- a) Cross-expression      b) Co-inoculation
  - c) Co-transformation      d) Cross protection.
- xi) Which of the following is not correct ?
- Plant secondary metabolites
- a) Perform a vital physiological function
  - b) Ward off potential predators
  - c) Attract pollinators
  - d) Combat infections disarm.
- xii) Which of the following is present in a Ti plasmid, but not on any component of a binary system ?
- a) Vir genes      b) GUS genes
  - c) LB, RB      d) MCS
  - e) Opine genes.

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**GROUP – B**

**( Short Answer Type Questions )**

Answer any *three* of the following.  $3 \times 5 = 15$

2. Describe all the stages of a successful micropropagation. 5
3. Discuss hormonal regulation in the process of somatic embryo production. 5
4. Mention the methods and advantages of inducing haploids *in vitro* 5
5. Define organic food. What advantages are being offered by organic food ? 2 + 3
6. Discuss general mechanism of action of BT toxin. 5
7. What do you mean by gene flow ? What is horizontal gene transfer and how might it be dangerous in case of transgenic crops ? 1 + 4
8. What is suspension culture and what are the types ? 1 + 4
9. Write short note on any one
  - a) “Golden Rice
  - b) Virus free plants
  - c) Haploid culture5



**GROUP – C**

**( Long Answer Type Questions )**

Answer any *three* of the following.  $3 \times 15 = 45$

10. What are transgenic plants ? Write down the application of genetic engineering in crop improvement in production of insect resistance plants. Describe the process of particle bombardment and explain the advantages and disadvantages of this technique.  $3 + 6 + 6$
11. What is Crown gall disease ? how T-DNA transfer and integrated into a plant genome ? Explain the strategies to develop transgenic plants with viral resistance.  $2 + 7 + 6$
12. a) Discuss the utility Cointegrate and Binary vector in genetic transformation of plant.
- b) What is organized and non-organized organ culture ? Write down the short notes of Somatic embryogenesis mentioning both direct and indirect somatic embryogenesis.  $6 + 4 + 5$
13. Explain the term “Germplasm conservation”. Discuss in vitro and other ex-situ methodologies of plant conservation. Discuss in brief about the major ethical concerns about GM crops and GM foods ?  $2 + 8 + 5$



14. Explain how plant is important as bioreactor in production of medically related protein. Discuss any two.

- Antibodies.
- Vaccines
- Biopharmaceuticals.

Write a short note on Golden rice.

5 + 5 + 5

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