

**B.Sc. (Semester – V) Examination, October/November 2016**  
**BOTANY (Paper – XII)**  
**Plant Biotechnology and Genetic Engineering**

Duration : 2 Hours

Total Marks : 80

- Instructions :** 1) **All questions are compulsory, however internal choice is available.**  
2) **Briefly answer the sub-questions in Question 1 and Question 2.**  
3) **Figures to the right indicate maximum marks per question.**  
4) **Draw appropriate labelled diagrams wherever necessary.**

1. Answer **any four** of the following. **16**
- i) What are plant growth regulators ? Explain the role of any 2 in tissue culture.
  - ii) What are haploids ? State their significance.
  - iii) Give an outline of PCR mechanism.
  - iv) Briefly describe the basic steps involved in genetic engineering.
  - v) What is the role of enzymes in protoplast isolation ?
  - vi) Give the applications of bioinformatics in plant genomics.
2. Answer **any four** of the following. **16**
- i) Write briefly on aseptic techniques in plant tissue culture.
  - ii) Comment on  $\lambda$  DNA as a cloning vector.
  - iii) Comment on production of hairy root cultures.
  - iv) Give an outline of the methods used for inducing fusion of protoplasts.
  - v) Write a note on production of cybrids.
  - vi) Describe the composition of biomass.
3. A) How is callus tissue formed ? Explain its characteristics. **6**
- OR
- A) Write a brief account on meristem culture. State its applications. **6**
- B) Describe the growth pattern of cells in a batch culture with the help of a graph. Add a note on types of continuous cultures. **6**

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4. A) Explain the role of restriction endonucleases and ligases in genetic engineering. 6

OR

A) Explain the Western blotting technique. 6

B) Explain the dideoxy method of DNA sequencing. 6

5. A) Describe any three methods employed for culturing protoplasts. 6

OR

A) Give the protocol for plant transformation using *Agrobacterium tumefaciens*.  
What is its limitation? 6

B) With the help of suitable examples of transgenic plants, explain any three  
achievements of crop biotechnology. 6

6. A) Describe the construction and operation of a biogas plant. Add a note on the  
microbial reactions involved in production of methane. 6

OR

A) What is bioremediation? Explain how plants are used in bioremediation? 6

B) Write briefly on the rice genome. Add a note on its significance. 6