[This question paper contains 2 printed pages.]

Your Roll No.....

Sr. No. of Question Paper : 5505 **J**

Unique Paper Code : 2162013601

Name of the Paper : Plant Biotechnology

Name of the Course : **Botany: DSC 16**

Semester : VI

Duration : 2 Hours Maximum Marks : 60

Instructions for Candidates

1. Write your Roll No. on the top immediately on receipt of this question paper.
2. Attempt any **four** questions in all.
3 Question number **one** is compulsory.
4. Attempt all parts of a question together.

1. Answer the following questions (15)

(a) Expand the following **(any five)** (1×5=5)

(i) GUS (ii) TALEN

(iii) NIPGR (iv) CRISPR

(v) pUC (vi) IAA

(b) Match the following **(any five)** : (1×5=5)

(i) Androgenesis	a) Gottlieb Haberlandt
(ii) Enzymatic method for protoplast isolation	b) Anand Mohan Chakrabarty
(iii) Father of Plant Tissue Culture	c) E. C. Cocking
(iv) Scorable marker	d) Sipra Guha and S.C. Maheshwari
(v) Superbug	e) GFP gene
(vi) Selectable marker	f) *nptII* gene

(c) Define the following **(any five)** : (1×5=5)

(i) Explant (ii) Redifferentiation

(iii) Probe (iv) Alkaline Phosphatase

(v) Totipotency (vi) Protoplast

P.T.O.

2. Differentiate between the following **(any three)** : (5×3=15)

   (i) Direct gene transfer and Indirect gene transfer

   (ii) Cloning vector and Expression vector

   (iii) Blunt-end and Sticky-end restriction endonucleases

   (iv) Somatic hybrid and Cybrids

   (v) Selectable marker genes and Reporter genes.

3. Write short notes on the following **(any three)** : (5×3=15)

   (i) Edible vaccines

   (ii) Restriction endonucleases

   (iii) Agrobacterium-mediated transformation

   (iv) Somatic embryogenesis

   (v) Biosafety of transgenic plants

4. Discuss in detail. (15)

   (a) Give detailed account of the process involved in development of transgenic Bt-cotton with the help of suitable diagram. Discuss its advantages and limitations. (8)

   (b) Enumerate the detailed process of protoplast isolation and culture, along with its applications. (7)

5. Answer the following questions : (15)

   (a) A researcher working with a gene obtained the following DNA fragment sizes after digestion with the restriction enzymes EcoRI and HindIII:

   - EcoRI: 8.5 kb, 5.0 kb, 3.0 kb
   - HindIII: 9.5 kb, 6.0 kb, 1.0 kb
   - EcoRI + HindIII (double digestion): 6.0 kb, 4.0 kb, 3.0 kb, 2.5 kb, 1.0 kb

   Using the above data, construct a restriction map. (8)

   (b) Draw well-labelled diagram of **(any two)** : (3.5×2=7)

   (i) Biolistic gene gun

   (ii) Androgenesis

   (iii) YAC