

B.Sc. (Ag.) Honours Semester-V Examination, 2014
Course No: GPB-311 (Principles of Plant Biotechnology)
(New Syllabus)

Signature of Centre Superintendent

Roll No. : (in figure) _____ (in words) _____

Student Index No. _____ Regn. No. _____ of _____

Time : Two Hours

Full marks : 40

Questions are of value as indicated in the margin

Part - I

(Objective and Short Answer Type)

(Use only ball point pen)

Time : 20 minutes

Full marks : 10

- Note:** 1. Answer in question paper itself.
2. Striking, rewriting or overwriting are not allowed in the objective type questions.

1. State True (T) or False (F) in respect the following statements :

0.5×14=7.0

- (i) The plant part which is used for regeneration is called clone. ☐
- (ii) Reporter genes are used to transform the host cells. ☐
- (iii) Making a DNA copy of an RNA molecule is a function of reverse transcriptase. ☐
- (iv) CDNA library preparation is tissue dependent. ☐
- (v) Different restriction enzymes are used to cut the donor and vector DNA for preparation of a recombinant DNA. ☐
- (vi) The embryo that develops from any somatic tissue/cell is called somatic embryo. ☐
- (vii) Biolistic approach of gene transfer is more tissue specific. ☐
- (viii) Cosmids can accomodate larger DNA inserts than the λ phage vector. ☐
- (ix) More number of clones are required for construction of a cDNA library. ☐
- (x) EcoRI is an example of type II restriction endonuclease. ☐
- (xi) λ gt 10 is an expression vector. ☐
- (xii) GUS is a reporter gene while npt II is a selectable marker gene. ☐
- (xiii) Hybrids have nuclei and cytoplasm from both the parents. ☐
- (xiv) Guha and Maheshwari developed haploids from anther culture of *Nicotiana*. ☐

2. Fill up the blanks with most appropriate words.

0.5×6=3.0

- (i) Chemical substances, which promote cell division and shoot regeneration in tissue culture is _____.
- (ii) The DNA sequence responsible for transformation of plant cell through T_i plasmid is known as _____.
- (iii) Formation of emeryo from asexual cells is called _____.
- (iv) The DNA fragment (insert) carried by a cosmid vector is of the size _____.
- (v) In case of PCR, primer annealing is done at a temperature of _____.
- (vi) The set of cloned fragments in vectors representing the entire genome is known as _____.

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Part - II
(Descriptive Type)

Time : 100 Minutes

Full marks : 30

Questions are of value as indicated in the margin

Answer *any four* questions from the following :

3. Describe how anther culture is used for haploid development. What is embryo rescue technique?

5+2.5=7.5

4. What are the different methods of gene transfer into plant cell? Explain the Ti-plasmid based approach of gene transfer in plants.

3+4.5=7.5

5. What do you mean by somaclonal variation? How somaclonal variation is induced? Explain how synthetic seed is produced.

2+3+2.5=7.5

6. (a) What do you mean by cDNA library and genomic library? Mention the procedure of construction of cDNA library.

- (b) Write down the differences between vector based gene cloning and PCR based gene cloning.

2+3+2.5=7.5

7. (a) What do you mean by cloning vector? Write down the salient features of cloning vector used in gene cloning experiment

- (b) Why Type-II restriction endonuclease is used in rDNA technology? What is expression vector?

(1+2.5)+(1.5+2.5)=7.5

8. Write short notes on (**any three**) :

2.5×3=7.5

- (i) Protoplast fusion
 - (ii) Colony hybridization
 - (iii) *in-vitro* packaging
 - (iv) Meristem culture
 - (v) DNA modifying enzymes
 - (vi) Sub culturing
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