

B.Sc.(Ag.) Honours Semester– VII Examination, 2014

**Course No. : GPB –411 (Introduction to Plant
Biotechnology)**

(Old Syllabus)

Signature of Centre Superintendent

Roll No.: (in figure) _____ (in words) _____
Student Index No. _____ Regn. No. _____ of _____

Time : Two hours

Full marks : 50

Questions are of value as indicated in the margin

Part-I

(Objective and Short Answer Type)

(Use only ball point pen)

Time : 30 minutes

Full marks : 20

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

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

1×10=10

- | | |
|---|--------------------------|
| (i) PCR is used for gene amplification | ☐ |
| (ii) Low concentration of auxin along with high concentration of cytokinin promotes root initiation | ☐ |
| (iii) Bunsen burner and alcohol are used for flame sterilization | ☐ |
| (iv) Macerozyme can degrade the cell wall of plants | ☐ |
| (v) Restriction enzyme cleaves DNA at or near the specific base sequences | ☐ |
| (vi) Vitamins and hormones are sterilized in autoclave at high temperature | ☐ |
| (vii) Root initiation in callus tissue is known as caulogenesis | ☐ |
| (viii) EcoRI is a Type I restriction endonuclease | ☐ |
| (ix) Sodium hypochlorite solution is used in Surface Sterilization | ☐ |
| (x) Cryopreservation is carried out at very high temperature | ☐ |
| (xi) 'In vivo' means biological activities and/or reactions carries out in the living cells or organism | ☐ |
| (xii) DNA contains Deoxyribose Sugar | ☐ |

2. Fill up the blanks with most appropriate words (*any ten*):

0.5×10=5

- | |
|---|
| (i) The full form of RFLP is _____. |
| (ii) The genetic potential of plant cell to produce entire plants is known as _____. |
| (iii) IAA is the derivative of _____. |
| (iv) _____ regarded as Father of Tissue Culture |
| (v) 'Taq' Polymerase is obtained from _____. |
| (vi) The DNA strand obtained from mRNA using reverse transcriptase is known as _____. |

- (vii) The unorganised and undifferentiated mass of proliferating plant cells is called _____.
- (viii) The extrachromosomal self replicating circular DNA molecule is referred to as _____.
- (ix) The naked plant cell without cell wall is termed as _____.
- (x) Encapsulated somatic embryo with supplemented nutrients is known as _____.
- (xi) The 'target gene' transferred from one organism to another for the development of transgenic organism is called _____.
- (xii) _____ is commonly used as carbohydrate source in culture media.

3. Tick (✓) the correct answer from the alternatives provided: (any ten) 0.5×10=5

- (i) A small piece of plants used in tissue culture is referred to as Explant / Sample tissue / Plantlets / Haploid
- (ii) PCR was invented by TH Morgan / Karry Mullis / J.D. Watson / F.H. Crick
- (iii) Haploid is denoted by 'n' / '2n' / '3n' / '4n'
- (iv) The special region of Ti plasmid used in gene transfer is A-DNA / β -DNA / C-DNA / T-DNA
- (v) Viability of cell or protoplast is assessed by IAA / Agar-agar / Fluorescein diacetate / Mannitol
- (vi) Ri plasmid is reported from *E. coli* / *Bacillus thuringiensis* / *Agrobacterium rhizogenes* / None
- (vii) The solidification of culture media is done by Yeast extract / Agar-agar / Hormone / Sucrose
- (viii) 5'...G[↓]AATTC...3'
3'...CTTAA[↑]G...5'
sequence is recognised and cleaved by EcoRI / Bam HI / Hae III / Hpa I
- (ix) The RNase cleaves and digests DNA / RNA / Both / None
- (x) The example of Type II restriction endonuclease is Ligase / Helicase / Reverse Transcriptase / EcoRI
- (xi) Na₂EDTA is used in MS culture media as cryoprotectant / growth regulator / chelating agent / vitamin
- (xii) Size of the DNA fragment that can be cloned by cosmid is 10kb / 20kb / 43kb / 80kb

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Part–II

(Descriptive Type)

Time : 1.5 Hours

Full marks : 30

Questions are of value as indicated in the margin.

Answer **any four** questions from the following.

4. Give a concise account on somaclonal variation. Point out the application of somaclonal variation.
4+3.5=7.5
5. What do you mean by restriction endonuclease? Cite an example of it. Mention the salient features of Type II restriction endonuclease.
2+2+3.5=7.5
6. What is micropropagation? Write down the different stages of micropropagation. Comment on the importance of micropropagation.
2+3.5+2=7.5
7. Mention the different methods of gene transfer in plants. Highlight the essential features of Ti plasmid with suitable diagram.
3.5+4=7.5
8. What do you understand by Protoplast Culture? How can you isolate the protoplasts in the laboratory? Define fusagen with an example.
2+4+1.5=7.5
9. Write short notes on the following (**any three**):
3×2.5=7.5
 - (i) Anther culture
 - (ii) Enzymes used in recombinant DNA Technology
 - (iii) Vector
 - (iv) PCR
 - (v) Synthetic seed
 - (vi) Molecular probe

(vi) The DNA strand obtained from mRNA using reverse transcriptase is known as
_____.