

B.Sc. (Ag.) Honours Semester-V Examination, 2016
Course No.: GPB-311
(Principles of Plant Biotechnology)
(New Syllabus)

<i>Signature of Centre Superintendent</i>

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 (any six): **0.5×4=2.0**

- i. Molecular marker cannot be utilized for identifying the expressed product.
- ii. Recombinant DNA molecules are called as cDNA.
- iii. IAA is not naturally occurring auxin.
- iv. Taq DNA polymerase is used for ligation of blunt ends of DNA.
- v. The term somaclonal variation was termed by Murashige and Skoog.
- vi. SSR stands for single sequence repeat.
- vii. Animal cells are totipotent.
- viii. RAPD is a codominant marker.

2. Underline the correct answer from the alternatives provided (any eight): **0.5×8=4.0**

- i. DNA gel is stained with
a) Coomassie brilliant blue, b) Ethidium bromide, c) Mercuric chloride,
d) Eriochrome black T
- ii. Basic tools of Genetic Engineering
a) Molecular scissors, b) plasmids, c) Both (a) & (b), d) None of the above
- iii. Which of the following is a genetic vector
a) Plasmid, b) Phase, c) Cosmid, d) All of these

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Part - II
(Descriptive Type)

Time: 100 Minutes

Full Marks: 30

Questions are of value or as indicated in the margin

Answer any three questions from the following:

4. (a) Why is maintenance of aseptic condition necessary for plant tissue culture operation? How can this be maintained?
(b) Mention the various applications of plant tissue culture. (1+4)+2.5=7.5
5. a) What are rDNA, gene cloning and genetic engineering?
b) Mention different steps involved in the construction of cDNA library. What is expression vector? 3+(3+1.5)=7.5
6. a) Describe PCR with requirements and principle.
b) Compare PCR and non-PCR based molecular markers with an example.
c) Focus on important areas of application of molecular markers. 3+1.5+3=7.5
7. a) What is culture medium and mention their major components?
b) State the major stages of micropropagation and its advantages in agriculture.
c) Mention the advantages of meristem culture. 2+(2+2)+1.5=7.5
8. a) Mention the various methods of selection of true somatic hybrids in a protoplast fusion experiment.
b) What is androgenesis? Mention the factors governing the success of androgenesis.
c) Describe the importance of androgenesis in plant breeding. 2+(1+2)+2.5=7.5
9. Write short notes on **any five** of the following: 5×1.5=7.5
- a) Embryo rescue technique
 - b) Totipotency
 - c) RAPD
 - d) *In vitro* packaging
 - e) SSR
 - f) Synseed
 - g) Cybrid
 - h) Southern blotting
 - i) Genomic Library
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- iv. Which is used to join the segments of DNA during genetic engineering
a) Lipase, b) Ligase, c) Gyrase, d) Helicase
- v. PCR was discovered by
a) Eithovan, b) Wilmut, c) Lamark, d) Kary Mullis
- vi. Genetically identical individuals are
a) Cybrid, b) Hybrids, c) Clones, d) Plasmids
- vii. Size of the DNA insert cloned through cosmid vector is
a) 10-12 kb, b) 40-45 kb, c) 20-23 kb, d) None of these
- viii. Haploid plants can be obtained by culturing
a) Young leaves, b) Endosperm, c) Pollen grains, d) Root tips
- ix. Somaclone has been released for commercial cultivation in
a) Carrot, b) Indian mustard, c) Tomato, d) Chick pea
- x. If isolated DNA is kept at 82-90°C
a) The two strands uncoil and separate, b) Fragmentation occur,
c) Thyamine is replaced by Uracil, d) The structure will be stabilized

3. Match Column 'A' with Column 'B' and jot down the 'number' of correct answer from Column 'A' in the space provided in Column 'C' .: **0.5×6=3.0**

Column A		Column B		Column C
1	Probe	a	rDNA technology	
2	Proteomics	b	Single nucleotide polymorphism	
3	DNA marker	c	mRNA content	
4	Genomics	d	Proteins	
5	Transcriptome	e	DNA sequencing	
6	Transgene	f	Gene isolation	