B.Sc. (Ag.) Honours Semester-V Examination, 2018

Course No: GPB-311 (Principles of Plant Biotechnology)

Signature of Centre Superintendent

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

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

Time : 2 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 of the following statements (any six):** 6×0.5=3

(a) The enzyme used for PCR is 'Taq' polymerase. ☐

(b) Tapetal layer of anther wall produce androgenic haploids in anther cultures. ☐

(c) Development of shoot and root in tissue culture is determined by cytokinin and auxin ratio. ☐

(d) ABA is used for development of synthetic seeds. ☐

(e) *vir* G is the receptor for acetosyringone. ☐

(f) NaCl is mostly used as a cryoprotectant. ☐

(g) The term totipotency was coined by Steward. ☐

(h) Pedifferantiatiation is the process of differentiation occurring in an undifferentiated tissue. ☐

2. **Underline the correct answer from the alternatives provided (any eight):** 8×0.5=4

(a) Pre-zygotic barriers to hybridization are

(i) Failure of pattern to germinate (ii) Poor pollen tube growth (iii) both (iv) None of these

(b) Which of the following is not a tool of genetic engineering?

(i) Vector (ii) Enzymes (iii) Foreign DNA (iv) GMO

(c) In recombinant DNA technology a plasmid vector is cleaved by

(i) Modified DNA ligase (ii) A heated alkaline solution (iii) The same enzyme that cleave the donor DNA (iv) The different enzyme other than that cleave the donor DNA

(d) The most common plasmid vector used in genetic engineering is

(i) PBR 328 (ii) PBR 322 (iii) PBR 325 (iv) PBR 330

(e) Which of the following restriction endonucleases is routinely used in genetic engineering

(i) Type I (ii) Type II (iii) Type IIII (iv) All of these

(f) DNA does not occur in

(i) Nucleus (ii) Ribosomes (iii) Mitochondria (iv) Plastids

P.T.O.

(g) Virus free plants can be obtained through

(i) Antibiotic treatment (ii) Bordeaux mixture (iii) Root tip culture (iv) Shoot tip meristem culture

(h) Genesis of shoot from the explant/calli is termed as

(i) Caulogenesis (ii) Rhizogenesis (iii) Xylogenesis (iv) None of these

(i) Preserving germplasm in frozen state is

(i) Cryopreservation (ii) Cold storage (iii) In situ preservation (iv) Vernalisation

(j) RFLP is

(i) Dominant marker (ii) Co-dominant marker (iii) Semi-dominant marker (iv) None of these

(k) PCR was discovered by

(i) Eithovan (ii) Wilmut (iii) Lamark (iv) Kary Mullis

3. **Define the following (any three)**: $1\times3=3$

(i) Molecular probe

(ii) Micropropagation stage 0

(iii) Linker

(iv) Organogenesis

(v) Shuttle vector

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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 where question no. ***9 is compulsory***.

4. (a) Plants regenerated from the tissue cultures of somatic cells of a single plant may show genetic variation. Why?
   (b) Describe briefly the various steps that are involved in production of somatic hybrids.
   (c) Discuss the application of plant cell, tissue and organ culture with examples. 1.5+3+3=7.5
5. (a) Why are aseptic conditions required in tissue culture laboratory? How do you maintain it?
   (b) Describe the different pathways of androgenesis. (1+3)+3.5=7.5
6. (a) What is recombinant DNA and how is it prepared?
   (b) Draw and describe the typical structure of a cloning vector.
   (c) Distinguish between cloning vector and expression vector.
   (d) What are the differences between cDNA aug genomic library? 2+2+2+1.5=7.5
7. (a) Mention the sequential steps of PCR reaction.
   (b) How will you judge the integration of foreign gene in transgenic plants?
   (c) Discuss in brief the pros & cons of transgenic plants in agriculture. 3+2+2.5=7.5
8. (a) What are molecular markers? State the important features of an ideal molecular marker.
   (b) Focus on the important areas of application of molecular markers in plant breeding.
   (c) Write down the different steps involved in RFLP and RAPD. (1+2)+2+2.5=7.5
9. Write short notes on ***any five*** of the following: 1.5×5=7.5
   (a) Ovule culture
   (b) Repors tergene
   (c) Synthetic seed
   (d) M13 phage
   (e) Meristem culture
   (f) BAC
   (g) Dihaploids
   (h) Characteristics of a cloning vector
   (i) Embryogenesis

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