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[64] SARDAR PATEL UNIVERSITY
M.Sc. (IV Semester- CBCS) Examination
Subject: Biotechnology
PS04CBIT01; Plant Biotechnology
Saturday; 02/04/2015
Time: 2.30 p.m. to 5.30 p.m.

Total Marks: 70

Note: **Figures in brackets indicate marks**
**Answer all the questions in the given answer book**

**Q1. Choose the appropriate answer for the following multiple choice questions: (8x1=8)**

i) What is the general photoperiod used for various culture systems
a) 24 hr light regime b) 12:12 hr Light: dark regime
c) 16:8 hr Light :dark regime d) 8:16 hr light : dark regime

ii) Which chemical treatment is most effective and widely used for obtaining diploid plants from *in vitro* raised haploid plants?
a) Colchicine b) Fluorodioxyuridine
c) Nitrous oxide d) Naphthalene acetic acid

iii) Production of dihaploids is possible through:
(a) Zygotic embryo cultures (b) Anther cultures
(c) Callus cultures (d) Meristem tip cultures

iv) Which explants are generally used to obtain disease free plants?
(a) Internode (b) shoot tip (c) Anther (d) leaf

v) Which of the following methods is suitable for the production of random sized DNA fragments for cloning?
(a)Ultrasonication (b) Needle (c) homogenizer (d) all of these

vi) Biolistics is a process in which
(a) DNA coated microprojectiles are allowed to pierce host cells
(b) DNA is directly injected into the host cells by a microcapillary
(c) Two protoplasts are fused
(d) A voltage is applied on host cells

vii) *Agrobacterium tumifaciens* is often used to transform plant cells. The T-DNA of *Agrobacterium* in plant cells is found in the form of
(a) An autonomously replicating plasmid
(b) a mitochondrial plasmid
(c) A chloroplast plasmid
(d) integrated into the plant genome

viii) Which of the following is NOT patentable?
(a)A novel process for protein purification (b) a new vector for cloning
(c) A new drug molecule (d) a surgical procedure

**Q2. Answer any SEVEN of the following in brief:** (7x2=14)

(a) Types of in vitro growth
(b) Synthetic seed
(c) Which in vitro culture system show maximum somaclonal variation? Give reasons.
(d) Nurse culture technique
(e) Biotransformation
(f) Co-integrative vectors
(g) Functions of vir D1 and vir D2
(h) Near Isogenic Lines
(i) Crt 1 gene and its role in Golden rice

**Q3.** (a) Explain the role of auxin and cytokinin for in vitro growth and development. (6)

(b) Discuss the *In vitro* morphogenetic potential of cell, tissue or organs for *in vitro* morphogenesis. What are the different pathways of in vitro morphogenesis? (6)

**OR**

(b) Explain the different stages of micropropagation in brief. (6)

**Q4** (a) Write a note on anther cultures and their importance in agriculture (6)

(b) Describe the method for isolation of protoplasts stepwise from leaf explants. (6)

**OR**

(b) Write note on strategies for in vitro germplasm storage. (6)

**Q5** (a) Describe the role of linkers and adopters in ligation of DNA in detail. (6)

(b) Write a note on in vitro production of secondary metabolites. (6)

**OR**

(b) Describe the methods for obtaining the somatic hybrids and any one method for their selection. (6)

**Q6** (a) Explain how Marker Assisted Selection is useful in crop improvement? (6)

(b) Explain the mechanism of T-DNA integration in plant chromosome from the Ti plasmid. (6)

**OR**

(b) Discuss the various issues associated with BT brinjal. Why such issues are not raised against BT cotton? (6)

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