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[A-30] SARDAR PATEL UNIVERSITY
M.Sc. (IV Semester- CBCS) Examination
Subject: Biotechnology
PS04CBIT01; Plant Biotechnology
Tuesday, April 21, 2015
Time: 10.30 a.m. to 1.30 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) Callus induction in monocots occur due to the presence of _____ in nutrient medium
(a) High conc. of Auxins (b) High concentration of reduced nitrogen
(c) both (a) & (b) (d) Low concentration of auxin and reduced nitrogen

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) Mature zygotic embryos require low concentration of sucrose in nutrient medium due to their:
(a) Heterotrophic in nature
(b) Autotrophic in nature
(c) Hetrotrophic and autotrophic in nature
(d) Autotrophic and heterotrophic in nature

iv) *In vitro* production of disease free plants is achieved by using _____.
(a) Meristem tip cultures (b) Callus cultures
(c) Nodal cultures (d) All of them

v) The GFP reporter system is advantageous over other systems since
(a) It is a stand alone system
(b) it is non toxic
(c) It can be expressed in prokaryotic and eukaryotic cells
(d) all of these

vi) *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 nuclear plasmid
(b) a mitochondrial plasmid
(c) A chloroplast plasmid
(d) integrated into the plant genome

vii) Resistance to the herbicide glyphosphate in transgenic plants is obtained by
(a) Overexpression of ESPS synthase gene
(b) Overexpression of shikimic acid
(c) cloning a mutant pyruvate synthase gene
(d) overexpression of aromatic amino acids

viii) Induced resistance in plants against pathogens is a
(a) Energy requiring mechanism (b) gene mediated response
(c) both (a) and (b) (d) none of these

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

a) Distinguish between Organogenesis and embryogenesis

b) Distinguish between IEDCs and PEDCs

c) Distinguish between Macropropagation and micropropagation

d) Distinguish between Normal seed and synthetic seed

e) Depict frequency of somaclonal variation in various culture systems schematically.

f) Linkers and adopters

g) Role of vir D1 and D2 in *Agrobacterium* mediated transformation

h) Bulked Segregation Analysis

i) Two important properties of Systemic Acquired Resistance (SAR)

Q3. (a) How various tissue culture systems can be used in crop improvement? Discuss the applications and limitations of each culture system. (6)

(b) Write notes on *In vitro* production of haploids and their importance in agriculture (6)

OR

(b) Describe in detail various steps of *in vitro* clonal propagation and its applications (6)

Q4 Write notes on: (6)

(a) Methods for Protoplast isolation from leaf explant and its regeneration.

(b) Strategies for *In vitro* Germplasm conservation (6)

OR

(b) Factors controlling the biomass during the production of 2^0 metabolites (6)

Q5 (a) Describe the method, advantages and limitations of microinjection. (6)

(b) What are reporter genes? Explain **any one** in detail. (6)

OR

(b) Write notes on (6)

i) Cointegrative vectors ii) PR proteins

Q6 (a) Explain the role of Hypersensitive Response (HR) in plant defense. (6)

(b) What are QTLs? Explain how Marker Assisted Selection is used in QTL identification (6)

OR

b) Outline the strategy used for the production of transgenic "Roundup ready" plants (6)

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