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SEAT No. _____

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SARDAR PATEL UNIVERSITY
M.Sc.(IV Semester) Biochemistry External Examinations
26th March, 2019 (Tuesday)
10.00 a.m. To 1.00 p.m.
Paper: PS04EBIC24 - Plant Biotechnology

I. Choose the most appropriate answer:

(8 marks)

- (i) The process in which new meristems arise from callus under *in vitro* conditions is known as:
(a) Differentiation (b) Redifferentiation
(c) Dedifferentiation (d) None of these
- (ii) Mature zygotic embryos require high concentration of sucrose whereas young embryos require low concentration of sucrose in nutrient medium due to their
(a) Heterotrophic in nature
(b) Autotrophic in nature
(c) Heterotrophic and autotrophic in nature
(d) Autotrophic and heterotrophic in nature
- (iii) Anther cultures are used to produce
a) Homozygous plants b) Heterozygous plants
c) Double Haploids plants d) Both a and b
- (iv) Among different culture systems used to generate *in vitro* plants which culture system shows the maximum frequency of somaclonal variation:
(a) Zygotic embryo cultures (b) Organ cultures
(c) Protoplast cultures (d) Meristem tip cultures
- (v) Which of the following plasmids induces hairy roots in plants?
a) Ti plasmid b) Ri plasmid
c) pUC plasmid d) pBR 322 plasmid
- (vi) Golden rice consists of _____ which is absent in normal rice
a) Phenols b) vitamins c) Beta carotene d) flavanoids
- (vii) The GFP protein can be used as a tag as well as a reporter since
a) It is a non analyte c) it is non toxic
b) It does not require a substrate d) all of these properties
- (viii) Marker Assisted Selection is advantageous over conventional breeding in terms of
a) Less time b) absence of unwanted gene transfer
c) Cost effectiveness d) All of these

II. Answer briefly on any seven

(14 marks)

- (i) Criteria for selection of explant/s for culture initiation
(ii) Distinguish between Somatic embryo and zygotic embryo

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- (iii) Types of In vitro morphogenesis
- (iv) Why cultured anthers will permit pollen to develop into pollen embryos where as cultured isolated pollen grains may not form embryos? Give reasons.
- (v) Why *in vitro* developed plantlets have high mortality when transferred to soil than *in vivo* developed seedlings. Give reasons.
- (vi) Define induced defense mechanism
- (vii) Type II restriction enzymes
- (viii) Co integrative vectors
- (ix) PR proteins

- Q1. (A) Identify the various tissue culture systems based on in vitro growth and development. Give briefly the applications of each culture system. (6)
- (B) Differentiate between Macropropagation and Micropropagation. Write notes on micropropagation. (6)

OR

- (B) Write notes on somatic embryogenesis and it's in vitro applications (6)
2. (A) Write notes on androgenesis and factors affecting the anther cultures (6)
- (B) Write notes on meristem tip cultures and its use in production of disease free plants (6)

OR

- (B) Write notes on *In vitro* production of secondary metabolites (6)
3. (A) Write the procedure for isolation and fusion of Protoplasts. (6)
- (B) List the different methods for gene transfer in plants. Explain any one method in detail. (6)

OR

- (B) Write briefly on the principle and applications of Marker Assisted Selection (6)
4. (A) Write a note on morphological, structural and chemical barriers in plants against pathogens. (6)
- (B) Define Intellectual Property Rights (IPR). Explain the significance of patents in plant Biotechnology. (6)

OR

- (B) Describe the role of Resistance (R) genes in plant defense in detail (6)

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