Marks scored:

KATHMANDU UNIVERSITY
End Semester Examination
March/April, 2017

Level : B. Tech.
Year : III

Course : BIOT 303
Semester : I

Exam. Roll No. :

Time: 30 mins.

F. M. : 20

Registration No.:

Date : MAR 2 9 2017

SECTION "A"
[10 Q × 0.5 = 5 marks]

Choose and tick [√] the most appropriate answer.

1. Naturally occurring auxins are
[ ] IAA [ ] IBA [ ] 2,4-D [ ] NAA

2. Polyphenol oxidase undergoes.....reaction which results in blackening of culture medium.
[ ] reduction [ ] oxidation [ ] hydrogenation [ ] carbonation

3. .....is the phase where the cell number and size remainconstant.
[ ] Lag phase [ ] Log phase [ ] Linearphase [ ] Deceleration phase

4. A culture is continuously supplied with nutrients by the inflow of fresh medium but the culture volume is normally constant is called as.....culture.
[ ] continuous [ ] batch
[ ] semi continuous [ ] closed continuous

5. Polyethylene glycol induced protoplast fusion is enhanced by.....medium.
[ ] low pH and polyethylene glycol treatment
[ ] high pH and polyethylene glycol treatment
[ ] high pH washing
[ ] high pH high Ca^{+2} washing

6. Direct androgenesis is very common in plants belonging to family.....
[ ] Solanaceae [ ] Poaceae [ ] Malvaceae [ ] Fabaceae

7. In nature, *Agrobacterium tumefaciens* mediated infection of plant cells leads to
[ ] crown gall disease in plants
[ ] hairy root disease in plants
[ ] transfer of *Ti*-plasmid into the plant chromosome
[ ] transfer of *Ri*-plasmid into the plant cell

8. Somaclonal variations are the ones.....
[ ] caused by mutagens [ ] produced during tissue culture
[ ] caused by gamma rays [ ] induced during embryogeny

9. The enzymes required to obtain wall-free protoplasts are
[ ] Cellulase and Proteinase [ ] Cellulase and Pectinase
[ ] Cellulase and amylase [ ] Amylase and Pectinase

10. When plated only in nutrient medium, how much time is required for the protoplast to develop new cell wall?
[ ] 2-5 days [ ] 5-10 days [ ] 10-17 days [ ] 17-20 days

SECTION "B"

[5 Q × 1 = 5 marks]

Fill in the blanks:

1. .....adsorbs toxic substances and stabilizes pH.
2. The conversion of a small part of molecule in the structure of composition to industrially important chemicals by means of biological systems is termed as .....
3. Haploid production through anther culture has been referred to as.....
4. .....method has been employed for successful transformation of protoplast with Ti plasmid.
5. .....has been introduced for variation observed among plants regenerated from cultured gametic cells.

SECTION "C"

[10 Q. × 1=10 marks]

Define in *one* sentence:

6. Elicitors:
7. Molecular farming:
8. β-glucocerebrosidase:
9. Apical meristem culture:
10. *In vitro* pollination:
11. 5-enolpyruvylshikimate-3-phosphate synthase:
12. Super Weeds:
13. 3rd Stage of micropropagation:
14. Co-integrate vector:
15. Cryotherapy:

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SECTION "D"

(Long answer questions)
[3Q. × 7 = 21 marks]

1. Describe the different techniques used for establishment of protoplast fusion leading to produce somatic hybrids. Discuss the application of this technology in crop improvement giving suitable examples.

2. Describe the role of *Agrobacterium tumefaciens* in transforming a plant cell.

3. What is *in vitro* clonal propagation? Explain deficiencies, limitations and applications of micropropagation.

SECTION "E"

(Short answer questions)

4. Write short notes on: [6Q.×4 = 24 marks]

   a) Callus culture
   b) *In vitro* pollination
   c) *Ti* Plasmid
   d) Golden rice
   e) Micro chamber cell cloning
   f) Synthetic seeds

5. Give *TWO* major differences between: [2 Q. × 2 = 4 marks]
   a) Micro and macro nutrients
   b) Direct and indirect androgenesis

6. Explain why/how for the following: [3 Q. × 2 = 6 marks]
   a) Auxin requires for callus induction.
   b) Frequent shifting of inoculated explant within the vessel somewhat reduces oxidative browning.
   c) Abscissic acid treatment induces germination of somatic embryos.