KATHMANDU UNIVERSITY
End Semester Examination
14 – January 2024

Marks Scored:

Level : B.Tech.
Year : IV

Course : BIOT 407
Semester : I

Exam Roll No. :
Registration No.:

Time: 30 mins.

F. M. : 20
Date :

SECTION "A"
[10 Q × 0.5=5 marks]

Choose and mark [X] the most appropriate alternative from each set of choices

1. .....triggers the activation of toxin of *Bacillus thuringiensis* is
   [ ] Acidic pH of stomach
   [ ] High temperature
   [ ] Alkaline pH of gut
   [ ] No adverse interaction between two population

2. Which of the following is present on a Ti plasmid, but not on any component of a binary vector system?
   [ ] Vir gene s [ ] GUS genes [ ] LB, RB [ ] Opine genes

3. Golden rice is a genetically modified crop where the incorporated genes are meant for biosynthesis of
   [ ] Vitamin E [ ] Vitamin C [ ] Vitamin B [ ] B-carotene

4. Variety-GURT is designed to control.....through a genetic process triggered by a chemical inducer.
   [ ] fertility [ ] abiotic stress [ ] flowering [ ] trait

5. Most abundant late nodulin is the protein component of
   [ ] leghemoglobin [ ] bacteroids [ ] fixL [ ] fixN

6. Conversion of molecular nitrogen into nitrogenous compound is called as
   [ ] nitrogen fixation [ ] nitrogen adsorption
   [ ] nitrogen dissociation [ ] nitrogen absorption

7. RAPD is a molecular marker based on.....amplification.
   [ ] RFLP [ ] PCR [ ] AFLP [ ] SSR

8. Opines are
   [ ] amino acids [ ] lipids [ ] nucleic acids [ ] proteins

9. Electroporation is a technique used with
   [ ] calluses [ ] pollens [ ] protoplasts [ ] organs

10. Root nodule is formed by the ..... of the root cells.
    [ ] elongation [ ] circularization [ ] curling [ ] proliferation

SECTION "B"

[5Q.× 1 = 5 Marks]

Fill in the blanks:

11. Systemic acquired resistance inhibits initiation of.....

12. Callose accumulates between the plasma membrane and cell wall at the ....of nematode.

13. 5-enolpyruvylshikimate-3-phosphate synthase is key enzyme in the production of .....

14. .....fixes molecular nitrogen in the roots of leguminous plant.

15. Cytoplasmic male sterility in plants is due to factor positioned on.....

SECTION "C"

[5Q.× 2 = 10 Marks]

Define in *one* sentence:

16. GABA

17. GMO

18. Superweeds

19. Hypersensitive Response

20. Leaf disc transformation

KATHMANDU UNIVERSITY
End Semester Examination
14 January 2024

Level : B.Tech.
Year : IV
Time : 2 hrs. 30 mins.

Course : BIOT 407
Semester: I
F.M. : 55

SECTION "D"
[3Q. × 7 = 21 marks]

Attempt *ALL* questions

1. What is biotic stress? Explain the molecular genetics of biotic stress in crops giving suitable examples.

2. Explain the role of genetic engineering in confirming resistance to herbicides.

3. Describe the mechanism and consequences of terminator technology.

OR

What are transgenic plants? Describe the insect resistant transgenic plants.

SECTION "E"

4. Write short notes on *ANY SIX*: [6 Q. × 4 = 24 marks]
   a. Molecular cloning of a nodulation gene
   b. Golden rice
   c. Signal transduction pathways for drought stress
   d. Plastid transformation
   e. ABA signaling in stomatal guard cells
   f. Virus free potato production
   g. Genetic engineering for nitrogen fixation
   h. Heat stress signaling in crops

5. Give *TWO* major differences between: [2 Q. × 2 = 4 marks]
   a. RAPD and SSR
   b. Carrier and liquid based biofertilizers

6. Explain why/how for the following: [3 Q. × 2 = 6 marks]
   a. *Rhizobium* requires nitrogenase enzyme.
   b. Leghaemoglobin is present in the root nodules of legumes.
   c. Chloroplast engineering is the attractive alternative to nuclear gene transformation