

KATHMANDU UNIVERSITY  
End Semester Examination  
February/March, 2019

Mark Scored:

Level : B. Tech.

Year : IV

Exam Roll No. :

Time: 30 mins.

Course : BIOT 404

Semester: I

F. M. : 20

Registration No.:

Date :

SECTION "A"

[10 Q. × 1= 10 marks]

Choose and tick (✓) the most appropriate answer.

1. A bioluminescent protein from the jellyfish *Aequorea victoria* that emits blue light is  
a) GFP                      b) Luciferin                      c) Victorin                      d) Aequorin
2. All of the following statements are true, except  
a) RAPD is a quick method compared to RFLP  
b) RFLP is more reliable than RAPD  
c) Species specific primers are required for RAPD  
d) Radioactive probes are not required in RAPD
3. Which of the following organisms have the greatest problem with photorespiration?  
a) C<sub>3</sub> plants                      b) C<sub>4</sub> plants                      c) CAM plants                      d) Heterotrophs
4. To reduce six molecules of carbon dioxide to glucose via photosynthesis, how many molecules of NADPH and ATP are required?  
a) 6 NADPH and 6 ATP                      b) 12 NADPH and 12 ATP  
c) 12 NADPH and 18 ATP                      d) 18 NADPH and 12 ATP
5. The virus mediated gene transfer using genetically modified bacteriophages is called  
a) Transduction                      b) Transfection                      c) Transformation                      d) Conjugation
6. Following are the applications of Southern blotting except  
a) Identification of transferred genes                      b) Preparation of RFLP maps  
c) DNA fingerprinting                      d) DNA barcoding
7. Which group is correct for the growth inducer hormone?  
a) IAA, ABA, Cytokinins                      b) IAA, Gibberellin, ABA  
c) IAA, Gibberellin, Cytokinin                      d) ABA, Ethylene
8. Which of the following plant hormones stimulates growth in the internode region?  
a) Auxin                      b) Gibberellin                      c) Cytokinin                      d) Abscissic acid

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9. During electron transport process, protons are pumped out of the mitochondria at each of the major sites except for:  
a) Complex I      b) Complex II      c) Complex III      d) Complex IV
10. Where does  $\beta$ -oxidation NOT involve?  
a) Hydrogenation      b) Oxidation      c) Hydration      d) Attachment of CoA

SECTION "B"

[10 Q.  $\times$  1= 10 marks]

Fill in the blanks.

11. Specific biomolecules which show easily detectable differences among different strains of a species or among different species is termed as .....
12. Plants resistant to the herbicide Phosphinothricin(PPT) were produced by the introduction of .....gene from *Streptomyces hygroscopicus*.
13. The amino acids that form the chromophore of GFP are .....
14. *Taq* polymerase is a thermostable DNA polymerase named after the thermophilic bacteria ..... from which it was originally isolated.
15. In  $C_4$  plants ..... is an enzyme that fixes  $CO_2$  initially in mesophyll cells.
16. Introduction of DNA into cells by exposing to high voltage electric pulse is known as .....
17. .... is a cytokinin that was originally isolated from herring sperm DNA.
18. Gibberellins were first isolated from *Gibberella fujikuroi*, the causal agent of ..... disease of rice.
19. From one turn of citric acid cycle,..... molecule(s) of  $CO_2$  is/are produced.
20. Oxidation of palmitic acid ( $C_{16}$ ) involves ..... rounds of  $\beta$ -oxidation and yields ..... molecules of acetyl-CoA

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February/March, 2019

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

08 MAR 2019  
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Semester : I  
F. M. : 55

SECTION "C"

(Long answer questions)

[3 Q. × 7 = 21 marks]

Attempt *ANY THREE* questions.

1. What is chloroplast transformation? Describe the processes for the chloroplast genome transformation by particle delivery method.
2. What is Marker Assisted Selection? What are its requirements and applications? Explain how MAS is used to screen plants of desired genotype in a breeding program?
3. A number of high yielding and disease resistant plants have been produced by genetic engineering but it acts against natural selection. What is your opinion regarding the development of transgenic plants for crop improvement? Explain in detail.
4. Why is *Agrobacterium tumefaciens* considered as natural genetic engineer? Describe the main steps of *Agrobacterium* mediated gene transformation. Also write its advantages and limitations.

SECTION "D"

(Short answer questions)

5. Write short notes on: (*ANY SIX*) [6Q. × 4 = 24]
  - a. Structure of GFP and its uses in scientific research
  - b. Advantages of chloroplast transformation over nuclear transformation
  - c. Cytoplasmic Male Sterility
  - d. Yeast Two-Hybrid Screening
  - e. Beta oxidation of fatty acid
  - f. Plant as a bioreactor
  - g. (i) Bt cotton (ii) Round up ready soybean
6. Differentiate between: [2Q. × 2 = 4]
  - a. C<sub>4</sub> and CAM pathway
  - b. RT PCR and qPCR
7. Give reasons for the followings: [3Q. × 2 = 6]
  - a. GUS assay is not useful in most vertebrates and many molluscs.
  - b. C<sub>4</sub> plants are photosynthetically more efficient than C<sub>3</sub> plants.
  - c. The endosymbiotic hypothesis about the origin of mitochondria is more widely accepted.

