KATHMANDU UNIVERSITY
End Semester Examination
March, 2022

Marks Scored:

Level: B.Tech.
Year : IV
Course : BIOT 414
Semester : II

Exam Roll No.:
Time: 30 mins.
F.M. : 20

Registration No.:
Date :

SECTION "A"
[10Q × 1 = 10 marks]

Mark "X" in the most appropriate box.

1. Commercial software not used for 2D gel Spot pattern evaluation/ annotation is
   [ ] Melanie 4 [ ] Swiss-2D PAGE
   [ ] PDQuest 6.1 [ ] PSIPRED

2. The number of rooted trees that can be made from 5 taxa is
   [ ] 150 [ ] 7 [ ] 15 [ ] 105

3. During microarray analysis, if the experimental sample is colored red, the control samples green, and the result show green fluorescent, the respective gene is
   [ ] Upregulated [ ] Downregulated
   [ ] No change in expression [ ] Non of the above

4. Which of the following method is used to make phylogenetic inference?
   [ ] Character/Time based method [ ] Distance/Time based method
   [ ] Distance/Character based method [ ] All of the above

5. Which software for transmembrane protein prediction is designed to overcome false positives caused by signal peptides.
   [ ] TMHMM [ ] HMMTOP
   [ ] Phobius [ ] None of the above

6. In which method of gene analysis we split a sequence into short (usu 14), unique tags with a restriction enzyme (N1aIII)
   [ ] Microarray [ ] RT-PCR
   [ ] Northern Blot [ ] SAGE

7. During phylogenetic analysis, _____ mutations may have occured, when mutated nucleotide reverted to original nucleotide.
   [ ] Intermediate [ ] Back [ ] Parallel [ ] Multiple

8. Which of the following parameter needs to be optimized during 2D gel electrophoresis.
   [ ] IEF pH gradient [ ] Acrylamide %
   [ ] Protein loading [ ] All of the above

9. Which RNA secondary structure refers to a structure with two ends of a single stranded region (loop) connecting a base-paired region(stem)?
   [ ] Hairpin loop [ ] Bulge loop
   [ ] Interior Loop [ ] Multibranch Loop

10. Which of the following branch deals with the physiologic and biochemical effects of drugs?
    [ ] Pharmacokinetics [ ] Pharmacodynamics
    [ ] Phase II clinical trials [ ] Phase III clinical trials

SECTION "B"

[10Q × 1 = 10 marks]

Fill in the blanks.

11. In molecular phylogenetics, DNA or protein sequences serves as _____ fossils.

12. MALDI, a technique widely used for protein analysis was developed by _____ and Michael Karas.

13. The amino acid whose side chain forms a bond with its own backbone amino group, causing it to be cyclic, making it very rigid is _____.

14. The protein product of the *lacZ* gene is _____.

15. Tryptic digestion of human hemoglobin alpha chain yields _____ tryptic peptides

16. _____ are superhelical strs involving two or more interacting alpha-helices, twisting and winding around each other.

17. His tag preferentially binds to _____ resin.

18. MTD stands for _____.

19. _____ Proteomics is concerned with the identification, classification of functions, activities and interactions of all proteins.

20. Simplest enzyme based technique for known polymorphism detection which typically involves the single base extension of an oligonucleotide by a polymerase is called _____.

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SECTION "C"
[4Q × 6 = 24 marks]

Attempt ***ANY FOUR*** questions.

1. Describe the Yeast two hybrid system. [6]

2. What is Mass Spectrometry? How can you identify an unknown protein using Mass Spectrometry? [2+4]

3. Which computer graphics tools are available for 3D protein viewing? How are transmembrane proteins secondary structure predicted? [1+5]

4. What is molecular phylogenetics? Discuss the procedure for making a phylogenetic tree. [1+5]

5. Why is Clinical trials necessary for drug development? Describe the different phases of clinical trials in brief. [1+5]

SECTION "D"

6. Write short notes on (***ANY THREE***): [3 × 2 = 6]
   a. Expressional Proteomics
   b. Immunoprecipitation
   c. Microarray
   d. Threading
   e. 2D gel electrophresis