

KATHMANDU UNIVERSITY
End Semester Examination
21 January 2024

Marks Scored:

Level : B.Pharm.

Year : IV

Course : PHAR 422

Semester : I

Exam Roll No. :

Time: 30 mins.

F. M. : 20

Registration No.:

Date :

SECTION "A"

[20Q. × 1 = 20 marks]

Choose and encircle the most appropriate option from each set of choices.

- All of the following is an examples of new biotechnology except:
 - recombinant DNA technology
 - polymerase chain reaction
 - production of antibiotics using naturally occurring organisms
 - gene therapy
- Which of the following reaction is catalyzed by Lyases?
 - Formation of bond
 - Removal of group leaving behind double bond
 - Intramolecular rearrangement of bonds
 - Transfer of group from one molecule to another
- The transition state of enzyme catalyzed reaction is
 - a highly populated intermediate on reaction pathway
 - higher in energy than that of an uncatalyzed reaction
 - lower in energy than that of uncatalyzed reaction
 - lower in energy than that of reaction substrate
- Which of the following is an inorganic material used as support for enzyme immobilization?
 - pectin
 - gelatin
 - alginate
 - ceramics
- Enzyme immobilization by forming disulphide bond between enzyme and carrier can be reversed by using
 - reducing agents
 - oxidizing agents
 - metal ions
 - bifunctional reagents
- Which of the following is not a criterion for the choice of an organism for fermentation?
 - The organism must be genetically stable.
 - The organism must be able to produce a high yield of product.
 - The optimum temperature for the growth of an organism must be above 50°C.
 - The organism must be able to grow in an easily available growth medium.
- What is the basic function of the fermenter?
 - To provide the optimum growth condition to microorganism and obtain the desired product
 - To sterilize the fermentation medium
 - To recover the desired product
 - To purify the desired product

8. When DNA replication starts,
 - a. the phosphodiester bonds between the adjacent nucleotide break
 - b. the hydrogen bonds between the nucleotides of two strands break
 - c. the bonds between the nitrogen base and deoxyribose sugar break
 - d. the leading strand produces Okazaki fragments

9. The DNA chain acting as a template for RNA synthesis has the base sequence of AGCTTCGA. What will be the sequence of bases in mRNA?
 - a. TCGAAGCT
 - b. UGCUAGCT
 - c. TCGAUCGU
 - d. UCGAAGCU

10. Which of the following is the formulation approach to protein stabilization?
 - a. Chemical modification of polypeptide chain
 - b. Addition of excipients such as polyols, amino acid, carbohydrate etc.
 - c. Site directed mutagenesis
 - d. Immobilization of protein molecules

11. enzyme removes the phosphate group from 5' end of a DNA molecule leaving a free 5' hydroxyl group.
 - a. DNA polymerase
 - b. Restriction endonucleases
 - c. Alkaline phosphatases
 - d. Primase

12. cDNA library is
 - a. a collection of DNA fragments that constitutes the entire genome of an organism cloned into a suitable vectors
 - b. a collection of cloned DNA sequences that are complementary to the mRNA
 - c. DNA library representing all the genes- expressed, non-expressed, introns and exon
 - d. chemically synthesized polynucleotide of the base sequence that is deduced from amino acid sequence

13. The mechanism of intake of DNA fragments from the surrounding medium by a bacterial host cell is called
 - a. transformation
 - b. transduction
 - c. conjugation
 - d. transfection

14. Which of the following cell is made deficient of hypoxanthine guanine phosphoribosyl transferase enzyme during the monoclonal antibodies production?
 - a. B cells
 - b. Myeloma cell
 - c. Hybridoma cell
 - d. T cells

15. Which of the following statement about vaccination is **FALSE**?
 - a. The vaccine components are taken up by phagocytic cells in peripheral tissue.
 - b. APC cells that have taken up antigens become activated and start migrating towards lymph nodes.
 - c. In lymph node, processed antigens are presented by APC to lymphocytes along with appropriate co-stimulatory signals.
 - d. The antigen specific T cells clonally expand and form memory T cells and T plasma cells that produce antibodies.

16. The vaccine is good to utilize within its shelf life when the vaccine vial monitor shows that
 - a. the colour of central square is lighter than that of surrounding circle
 - b. the colour of central square is equal to that of surrounding circle
 - c. the colour of central square is darker than that of surrounding circle
 - d. none

17. What does trademark protect?
a. an invention
b. a work of art
c. logos, names and brands
d. a secret formula
18. In Nepal, patent can be renewed
a. once
b. twice
c. thrice
d. lifelong of inventor
19. Which of the following organism is to be worked in biosafety level 4?
a. *Bacillus subtilis*
b. *Salmonella typhi*
c. Adeno-associated virus
d. Ebola virus
20. In NFPA label, yellow color signifies.....
a. fire hazard of chemical
b. health hazard of chemical
c. reactivity potential of chemical
d. any specific hazard of chemical

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Semester : I
F. M. : 55

SECTION "B"
[5Q. × 3 = 15 marks]

Attempt *ANY FIVE* questions.

1. Write about the models describing the specificity of enzyme catalytic activity.
2. List down the advantages and disadvantages of enzyme immobilization.
3. How is real time PCR and reverse transcriptase PCR different from conventional PCR?
4. Write about the types of mammalian cell culture system.
5. What is protein post translational modification (PTM)? Mention the significances of PTM.
6. How can you identify the specific gene in DNA library by DNA probe?
7. Mention any three enzymes involve in DNA replication with their respective function.

SECTION "C"
[5Q. × 5 = 25 marks]

Attempt *ANY FIVE* questions.

8. What is biotechnology? Discuss the contribution of biotechnology in modern medicine.
9. Differentiate between the competitive and non-competitive method of enzyme inhibition.
10. Write about the covalent binding and microencapsulation method of enzyme immobilization.
11. Describe about the mechanism involved in protein degradation.
12. What is hybridoma? How these cells are selected during murine monoclonal antibodies production?
13. Give brief account on trademark and patent.
14. Describe the biotechnological precautions to be taken to ensure safety in biotechnology laboratory.

SECTION "D"
[2 Q. × 7.5 = 15 marks]

Attempt *ANY TWO* questions.

15. Explain in detail about the modern vaccine.
16. What are steps involved in fermentation process? How the extraction and purification of desired product is performed in fermentation?
17. What is blotting technique? Describe in detail about the steps involved in Southern blotting.