

KATHMANDU UNIVERSITY  
End Semester Examination  
January/February 2024

Marks Scored:

Level : B.E.  
Year : II

15 FEB 2024

Course : CHEG 213  
Semester : II

Exam Roll No. :

Time: 30 mins.

F. M. : 10

Registration No.:

Date :

SECTION "A"

[20Q. × 0.5 = 10 marks]

**Choose and encircle the most appropriate answer.**

- The term prokaryotes refer to which of the following?  
 very small organism  
 unicellular organism that have no nucleus  
 multicellular organism  
 cells that resembles animal cell more than plant cells
- Which of the following amino acid below is the uncharged derivative of an acidic amino acid?  
 cysteine       tyrosine       glutamine       serine
- Which of the following is the most common and stable conformation for a polypeptide chain?  
 alpha helix       beta pleated sheets  
 anti parallel beta pleated sheet       tertiary structure
- Which of the following is "NOT" correct?  
 enzymes are thermostable       enzymes are biocatalyst  
 enzymes are proteins       all protein are enzymes
- Which of the following enzymes break starch into sugar?  
 hydrolases       amylases       lipases       nucleases
- In competitive inhibition, inhibitors resemble close structural similarity with the  
 co-enzyme       co-factor       prosthetic group       substrate
- An enzyme used in both glycolysis and gluconeogenesis is  
 hexokinase       glucose -6-phsphatase  
 3-phosphoglycerate kinase       pyruvate kinase
- Which one of the following statements is correct, with reference to enzymes?  
 holoenzyme = apoenzyme + coenzyme       coenzyme = apoenzyme + holoenzyme  
 holoenzyme = coenzyme + co-factor       apoenzyme = holoenzyme + co-enzyme
- \_\_\_\_\_ is the process of removing the \_\_\_\_\_ from pre-mRNA and joining the remaining \_\_\_\_\_ together to form an mRNA molecule  
 splicing, introns, exons       transcription, introns, exons  
 splicing, exons, introns       transcription, exons, introns

10. Southern blotting is a technique used to detect and analyze  
[ ] RNA molecules [ ] DNA molecules  
[ ] protein molecules [ ] lipid molecules

**Fill in the blanks by most appropriate *VALUE* or *WORD***

11. Sulphur containing amino acids are \_\_\_\_\_
12. Archaea and Bacteria are most similar in terms of their \_\_\_\_\_
13. A nucleotide is composed of \_\_\_\_\_
14. Nucleotides in RNA are joined by \_\_\_\_\_
15. Maltose is composed of \_\_\_\_\_ and \_\_\_\_\_
16. The point at which the line intersects the Y-axis of double reciprocal plot is numerically equal to \_\_\_\_\_
17. Krebs cycle begins with \_\_\_\_\_
18. Oxidative phosphorylation, oxidation and phosphorylation takes place simultaneously and form \_\_\_\_\_
19. If the sequence of bases in DNA is TACCGACCA, then the sequence of codons on the transcript will be \_\_\_\_\_
20. \_\_\_\_\_ a nucleic acid sequence with a reading frame that contain no stop codon, it can therefore potentially be translated into a polypeptide

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

Course : CHEG 213  
Semester : II  
F. M. : 40

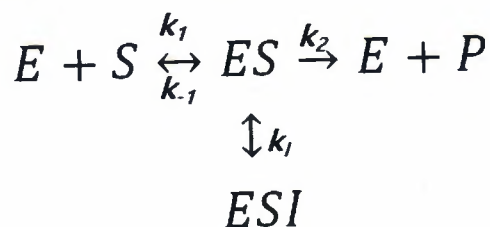
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SECTION "B"  
[8Q × 5 = 40 marks]

Attempt ANY EIGHT questions. (Q.N. 1 is compulsory)

1. The pentose phosphate pathway is regarded as an alternative route of the oxidation of glucose [5]  
a. Write down the reactions of pentose phosphate pathway.  
b. Explain the significance of pentose phosphate pathway.

2. The following reaction represents the enzyme catalyzed reaction in the presence of uncompetitive inhibitors [5]



- a. Derive the rate equation for the enzyme.  
b. Draw the standard Michaelis-Menten curve in the absence and presence of increasing amount of inhibitors.
3. a. Briefly explain the different growth medium used for the bacterial growth. [3]  
b. Write short notes on the streaking methods used for the microbe's isolation. [2]
4. a. Differentiate between monolayer and bilayer formation by lipid. [3.5]  
b. Draw structure of the Boat and Fisher Projection of glucose. [1.5]
5. a. Draw the structure of amylose and amylopectin. Shed light on the major structural difference. [2]  
b. Briefly explain the Watson – Crick model for the structure of DNA. [3]
6. a. Why are immobilized enzymes more stable? Differentiate between entrapment and surface immobilization. [0.5+2.5]  
b. What is turnover number of the enzyme? Shed light on the induced fit model and lock and key model of enzyme action. [0.5+1.5]
7. a. Differentiate between anabolic and catabolic reaction. Explain the various enzymes, coenzymes and electron carrier involved in biological oxidation. [0.5+2]  
b. Write the enzyme catalyzed reaction by citrate synthase and aconitase in TCA cycle. Name the enzyme that catalyzes this reaction and draw the structure of reactant and the

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8.
  - a. What is gene expression? Briefly explain the process of transcription and translation. [0.5+2]
  - b. Briefly explain the major steps involved in gene cloning. [2.5]
9. Write short notes on: [2.5×2=5]
  - a. DNA replication and mutation
  - b. Genetic code