



BRAINWARE UNIVERSITY

Term End Examination 2023-2024

Programme – B.Sc.(BT)-Hons-2021

Course Name – Enzymology

Course Code - BBT5301B

(Semester III)

Full Marks : 60

Time : 2:30 Hours

[The figure in the margin indicates full marks. Candidates are required to give their answers in their own words as far as practicable.]

Group-A

(Multiple Choice Type Question)

1 x 15=15

1. Choose the correct alternative from the following :

- (i) The rate determining step of Michaelis-Menten kinetics is
 - a) The complex dissociation step to produce products
 - b) The complex formation step
 - c) The product formation step
 - d) None of these
- (ii) The allosteric inhibitor of an enzyme
 - a) Causes the enzyme to work faster
 - b) Binds to the active site
 - c) Participates in feedback regulation
 - d) Denatures the enzyme
- (iii) Which of the following options is false about allosteric feedback inhibition?
 - a) Bacterial enzyme system is the first known example
 - b) Conversion of L-leucine to L-isoleucine
 - c) Threonine dehydratase is inhibited by isoleucine
 - d) If the isoleucine concentration decreases, the rate of threonine dehydration increases?
- (iv) Which of the following enzymes catalyzes a reaction that introduces reduced nitrogen into cellular metabolism?
 - a) Bacterial glutamine synthase
 - b) Bacterial dinitrogenase reductase
 - c) Bacterial dinitrogenase oxidase
 - d) Phosphatase
- (v) Which of the following purified enzyme is used in pharmaceutical industry?
 - a) Subtilisin
 - b) Novozym-435
 - c) Bromelain
 - d) Asparaginase
- (vi) Which type of fermentation is used for large scale manufacturing of enzymes?
 - a) Solid-state fermentation
 - b) Submerged fermentation
 - c) Solid-Gas state fermentation
 - d) Gas-state fermentation
- (vii) Induced fit theory for the formation of Enzyme-Substrate complex was proposed by
 - a) Koshland
 - b) Charles Leibeg
 - c) Buchner
 - d) Fischer

- (viii) In a conjugated enzyme, a non-protein group is required for the enzyme's activity known as
- Co-factor
 - Prosthetic group
 - Metal ions
 - None of these
- (ix) K_m of an enzyme is
- Substrate concentration when reaction rate $\frac{1}{2}$ th of the V_{max}
 - Substrate concentration when reaction rate $\frac{1}{4}$ th of the V_{max}
 - Substrate concentration when reaction rate archived the V_{max}
 - None of these
- (x) What is the nature of an enzyme?
- Vitamin
 - Lipid
 - Protein
 - Carbohydrate
- (xi) What is an apoenzyme?
- It is a protein portion of an enzyme
 - It is a non-protein group
 - It is a complete, biologically active conjugated enzyme
 - It is a prosthetic group
- (xii) Which of the following options is not a catalytic strategy for an enzyme to perform specific reaction?
- Covalent catalysis
 - Metal ion catalysis
 - Michaelis constant
 - Acid-base catalysis
- (xiii) Which of the following options is not an example of irreversible enzyme inhibitor?
- Cyanide
 - Sarin
 - Diisopropyl phosphoflouridate (DIPF)
 - Statin drugs
- (xiv) The transition state of a catalyzed reaction is
- lower in energy than that of an uncatalyzed reaction
 - lower in energy than the reaction substrate
 - bound very weakly to the catalyst
 - highly-populated intermediate on the reaction pathway
- (xv) An uncompetitive inhibitor of an enzyme catalyzed reaction
- is without effect at saturating substrate concentration
 - can actually increase reaction velocity in rare cases
 - binds to the Michaelis complex and decreases V_{max}
 - All of these

Group-B

(Short Answer Type Questions)

3 x 5=15

- What is so useful about studying the effect of pH on the rates of enzymatic reactions? (3)
- Explain how does the heat affect enzyme activity? (3)
- What are enzymes? Give one example of protein and one non protein enzyme. (3)
- Why are the most enzymes so large relative to their substrate? (3)
- Ionic liquids (ILs) are used to degrade lignocellulose. ILs resemble the mixed inhibitors where it is thought to occur when the inhibitor (IL) binds at a separate site other than the active site to either the enzyme-substrate complex or free enzyme. In this particular reaction what will be the fates of K_m and V_{max} ? (3)

OR

What determines the localization of a protein?

(3)

Group-C

(Long Answer Type Questions)

5 x 6=30

7. Show how does the increasing [S] cause damage in an Enzyme with proper mechanism and example. (5)
8. What is the Michaelis-Menten equation, and what does it describe? (5)
9. Draw the general reaction equation for an uncompetitive inhibition of Enzyme with the proper mentioning of each component of the reaction. (5)
10. Evaluate the clinical significance of enzymes with proper examples. (5)
11. State your opinion briefly on Ribozyme: a non-protein enzyme. (5)
12. Calculate the K_i value for the Competitive inhibition and draw the L.B plot against it. (5)

OR

What will be your strategy to detect SARS CoV2 Ag using ELISA. (5)
