BRAINWARE UNIVERSITY

Term End Examination 2023-2024
Programme – B.Sc.(BT)-Hons-2022
Course Name – Enzymology
Course Code - BBTS402A
(Semester IV)

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) Recall that the Induced fit theory for the formation of Enzyme-Substrate complex was proposed by

a) Koshland b) Charles Leibeg
c) Buchner d) Fischer

(ii) Cite the correct option: Non-protein organic part of the enzyme is known as—

a) Co-factor b) Co-enzyme
c) Apo enzyme d) Isoenzyme

(iii) Identify the statement(s) that is/are correct—

a) Enzyme is a biocatalys b) Enzyme increases the rate of reaction
c) Enzyme decreases the activation energy of the reaction d) All of these

(iv) Cite the SI Unit for enzyme activity—

a) Bel b) mho
c) Cat d) Katal

(v) Select the correct option—

a) Apoenzyme + Cofactor = Holoenzyme b) Apoenzyme - Cofactor = Holoenzyme
c) Cofactor + Holoenzyme= Apoenzyme d) None

(vi) Hexokinase and Transmethylase are examples for which class of enzymes

a) Hydrolases b) Lyases
c) Transferase d) Isomerases

(vii) Classify the enzymes that catalyze synthetic reactions where two molecules are joined together using energy from ATP hydrolysis—

a) Hydrolases b) Lyases
c) Ligases d) Isomerases

(viii) Indicate the term for enzymes that differ in amino acid sequence but catalyze the same reaction—

a) Co-factors
b) Co-enzymes
c) Apo enzymes
d) Isoenzymes

(ix) Identify the enzyme which is found in tears, sweat, and an egg white—

a) Ribozyme
b) Lysozyme
c) Zymogen
d) Isozymes

(x) The coenzyme of this vitamin is essentially involved in all the major biochemical reactions involving electron transfer. Select the correct option?

a) Vitamin B3
b) Vitamin B5
c) Vitamin B6
d) Vitamin B12

(xi) Identify the technique that was utilized by John Kendrew and his team to determine the first protein structure in 1958

a) Electron Microscopy
b) NMR spectroscopy
c) X-ray crystallography
d) High Performance Chromatography- Mass spectroscopy

(xii) Infer the information provided by EC number about an enzyme—

a) Its genetic sequence
b) Its specific catalytic function
c) Its structural conformation
d) Its cellular location

(xiii) Recall the scientist who is credited with the discovery of amylase—

a) Payen
b) Kirchoff
c) Kuhne
d) Fleming

(xiv) Predict how abzymes facilitate chemical reactions

a) By increasing the activation energy required
b) By inhibiting the formation of transition states
c) By stabilizing the products of the reaction
d) By decreasing the activation energy required

(xv) Predict the role of DNA abzymes

a) Breaking down environmental pollutants
b) Inducing apoptosis
c) Synthesizing carbohydrates
d) Enhancing viral infections

Group-B

(Short Answer Type Questions) 3 x 5=15

2. Explain some of the utility of the Michaelis-Menten equation. (3)
3. Identify the key components of the Michaelis-Menten equation, and elaborate what they represent. Illustrate the same graphically. (3)
4. Discuss briefly the pH dependence of enzymes. (3)
5. Discuss what are enzymes. What role do they play in biological reactions? (3)
6. In the Michaelis-Menten equation for competitive inhibition, indicate what αKm represents and analyze how it changes in the presence of an inhibitor. (3)

OR

In uncompetitive inhibition, analyze what α' represents in the Michaelis-Menten equation. (3)

Group-C

(Long Answer Type Questions) 5 x 6=30

7. Describe competitive inhibition and explain why it is significant in enzyme research. (5)
8. With the help of a schematic representation, discuss about feedback inhibition of enzymes. (5)
9. Analyze the essential roles of CoA in biochemical reactions. (5)
10. Derive the Lineweaver-Burk plot (double-reciprocal plot) from the Michaelis-Menten equation. What purpose does it serve? (5)
11. Identify at least 5 wide-scale application of amylases. (5)

12. Note down the three broad mechanisms by which irreversible inhibitors work. Why is the study of irreversible inhibition significant in enzymology? (5)

OR

Provide at least five examples of enzyme inhibitors that are widely used for pharmacological purposes, highlighting the mode of action of each. (5)

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