

B. SC. BIOCHEMISTRY

Second Semester

Enzymology

(BBC - 09)

Duration: 3Hrs.

Full Marks: 70

(PART-B: Descriptive)

Duration: 2 hrs. 40 mins.

Marks: 50

A. Answer the following question (any five)

2×5=10

1. Katal.
2. Coenzyme.
3. Specific activity.
4. Holoenzyme.
5. K_m value of an enzyme.
6. Allosteric inhibition.
7. Pingpong mechanism.

B. Answer the following question (any five)

3×5= 15

1. Competitive inhibition.
2. Double reciprocal plot of $1/V_o$ and $1/[S]$.
3. Mechanism of action of chymotrypsin.
4. Factors affecting enzyme activity.
5. Role of pH in maintaining the integrity of active site of an enzyme.
6. Different classes of enzymes.
7. Acid base catalysis.

PTO...

C. Answer the following question (any five)

5×5= 25

1. Derive the Michaelis Menten equation for uni-substrate reactions.
2. Write about the role of cofactors and coenzymes in activity of an enzyme.
3. Write about the reversible inhibition of an enzyme and its effect on Lineweaver Burk's plot.
4. Write about the kinetics of zero order and first order enzyme catalyzed reactions.
5. Write about the clinical and industrial applications of enzymes.
6. Explain the proximity and orientation effects of enzyme catalysis.
7. What are the different types of chromatography used in the purification of enzymes and proteins? Explain in details of any two techniques.

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(The figures in the margin indicate full marks for the questions)

Duration: 20 minutes**Marks – 20****PART A- Objective Type****A. Underline the correct option (underlining more than one option will not carry any marks) 1×20=20**

1. Succinate Dehydrogenase uses FADH₂ as (Coenzyme/ Holoenzyme/ Core-enzyme/ inhibitor).
2. Enzymes enhance the reaction rates by (lowering activation energy/ increasing activation energy/ bringing chemical alteration in reactants/ altering chemical structure of products).
3. Mathematically, the K_m value is equivalent to (2×V_{max} / Substrate concentration at which the velocity of the enzyme catalyzed reaction is equal to half of V_{max} / Substrate concentration at which the temperature is maximum / Substrate concentration at which the temperature is minimum).
4. The hydrolysis of peptide bond catalyzed by chymotrypsin occurs in two stages and (Hydrogenation and dehydrogenation/ amination and deamination/ Acylation and deacylation/ Alkylation and dealkylation)
5. The transition state analogues are the compounds that fit in of an enzyme like its substrate (Surface/ Active state/ Core/ All of the above).
6. The anti-HIV drugs called protease inhibitor tightly bind to active site of protease are an example of (Catalytic antibodies/ Enzyme activators/ Transition state analogues/ Protease homologue).
7. The curve expressing relationship between substrate concentration [S] and V_o has the shape of for most enzymes (Linear/ Rectangular hyperbola/ Irregular / None of the above).
8. The Lineweaver-Burk plot is (Double reciprocal plot between $\frac{1}{V_o}$ and $\frac{1}{[S]}$ / Single reciprocal plot between V_o and 1/[S] / Plot between [E] and [S] / Plot between [E] and [P])

9. Which of the following is termed as turnover number ($K_m / K_{cat} / [E_t] / K_d$).
10. The low K_m value of an enzyme to a substrate indicates its for the substrate (high affinity / low affinity / No affinity / None of the above).
11. is equivalent to the number of substrate molecules converted to product in a given unit of time on a single enzyme molecule when enzyme is saturated with substrate. ($K_m / K_d / K_{cat} / [S]$).
12. When several steps occur in a reaction, the overall rate is determined by the step with highest activation energy. This step is called..... (Rate inhibiting step / Rate limiting step / enzyme activating step / enzyme reactivating step).
13. When enzyme is mixed with large excess of substrate, there is an initial period during which the concentration of enzyme-substrate complex builds up is called..... (Pre-steady state/ Steady state/ Post-steady state/ Unsteady state).
14. The uncompetitive inhibitors bind the..... (Enzyme directly/ Enzyme-Substrate Complex/ Enzyme product complex/ substrate).
15. During competitive inhibition the remains unchanged (Slope of the Lineweaver-Burk plot/ V_{Max} / Enzyme Substrate Concentration / Enzyme product complex).
16. The Enzyme chymotrypsin hydrolyzes the peptide bonds adjacent to..... (Glycine residues / aromatic amino acid residues / Alanine residues/ Glutamate residues).
17. The enzymes transferases belongs to class..... (I / II / III / IV).
18. are enzymes catalysing the joining together of two molecules coupled with the hydrolysis of a diphosphate bond in ATP or a similar triphosphate (Hydrolases / Lyases / Ligases / Oxidoreductases).
19. One is defined as the amount of the enzyme that catalyzes the conversion of 1 micro mole of substrate per minute (Enzyme Unit / katal / International Unit / All of the above).
20. The enzyme acts on lactose yielding one molecule of D-glucose and one molecule of D-galactose (lactate dehydrogenase / lactate ligase / lactase / Glucose-galactose dehydrogenase).
