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Question Paper Code: UD101

B.E./B.Tech. DEGREE EXAMINATION, NOV 2023

Professional Elective

Biotechnology

21BTV101 - ENZYME TECHNOLOGY

(Regulations 2021)

Duration: Three hours

Maximum: 100 Marks

Answer All Questions

PART A - (10x 2 = 20 Marks)

1. How activation energy is differed from threshold energy? CO1-U
2. If like molecules collide what is the factor that kick start the reaction? Justify your answer. CO1-U
3. How does Dissociation constant related with enzyme affinity? CO1-U
4. Calculate the value of V_{max} of keratinase which has K_m value of 4.6×10^{-5} M, studied at an initial substrate concentration of 0.25 M and initial velocity of $33.3 \mu\text{M}/\text{min}$. After 45 seconds, it is found that $25 \mu\text{M}$ of product has been produced. CO2-App
5. Differentiate Affinity and Ion exchange chromatography CO1- U
6. In gel electrophoresis whether the compounds with low molecular size moves faster than the higher size compounds. Justify the statement. CO2-App
7. Define adsorption CO1-U
8. List some application of Immobilized enzyme CO1-U
9. Draw the block diagram of a biosensor CO1-U
10. Illustrate an electrochemical cell and mention its parts. CO1-U

PART – B (5 x 16= 80Marks)

11. (a) Explain in detail how enzymes were classified based on their biochemical reaction with examples for each. CO1-U (16)

Or

- (b) How enzymes and substrate complex were formed. Explain the related theories in detail. CO1-U (16)
12. (a) The data represent an enzymatic hydrolysis which is studied by a group of students
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|---|-----|-----|------|------|
| [S] / 10 ⁻⁴ M | 4.1 | 8.2 | 17.3 | 35.6 |
| V _o / 10 ⁻⁶ M min ⁻¹ | 2.4 | 4.2 | 8.6 | 13.1 |
- Help them to derive an equation relating substrate concentration and initial velocity construct a Eadie - Hofstee plot and calculate the V_{max} and K_m values.
- Or
- (b) Explain in detail about the various ways a multi substrate reaction could take place and derive its equation. CO2-App (16)
13. (a) An enzyme was produced by prokaryotic cell intracellularly. The cells were lysed and the molecules filtered. Now suggest a chromatography technique to separate the enzyme from rest filtrate and justify it by explaining it in detail. CO2-App (16)
- Or
- (b) In detail explain how enzymes were studied by Zymography. List its advantages and applications. CO2-App (16)
14. (a) Explain in detail about immobilized enzyme and various methods for enzyme immobilization. CO1-U (16)
- Or
- (b) Classify the carrier molecules used for enzyme immobilization and explain in detail the various ways carriers were used for immobilization process.. CO1-U (16)
15. (a) How environment could be monitored or analyzed using biosensor explain it in detail with an example. CO1-U (16)
- Or
- (b) How biosensors are used in healthcare industries explain it in detail with an example. CO1-U (16)