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JAYPEE UNIVERSITY OF INFORMATION TECHNOLOGY, WAKNAGHAT

TEST -3 EXAMINATION- 2021

B.Tech 7th Semester

COURSE CODE: 18B1WBT733 MAX. MARKS: 35

COURSE NAME: Industrial Enzymes Technologies

COURSE CREDITS: 03 MAX. TIME: 2 Hours

Note: *All questions are compulsory. Carrying of mobile phone during examinations will be treated as case of unfair means. Write your answer to the point with appropriate diagrams.*

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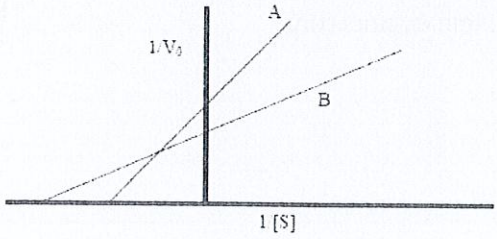
1. We load a DEAE-cellulose column adjusted to a pH of 6.5 with the following mixture of proteins: ovalbumin (pI = 4.6), urease (pI = 5.0), and myoglobin (pI = 7.0). The proteins are eluted first with a buffer of weak ionic strength at a pH of 6.5, and then the same buffer containing increasing amounts of sodium chloride is used to elute the proteins. What order are the proteins eluted? Give the reasons for your answer. [CO1, CO2] **[2]**

2. Suppose you are interested to purify an intracellular mesophilic enzyme. What the strategy will you follow for the purification? Demonstrate through a self-explanatory flow chart. [CO1, CO2] **[2]**

3. A kinetics experiment was performed with a particular enzyme and substrate A or substrate B. A Lineweaver-Burk plot was constructed from the data collected to give a graph similar to the following: [CO2]



   a) Which substrate has a higher V_{max} value? Explain. **[1]**
   b) Which substrate has a lower K_m value? Explain. **[1]**
   c) Assuming the same amount of enzyme was used in both experiments, with which substrate does the enzyme attain the highest catalytic efficiency? Explain your answer. **[2]**

4. What are the different advantages of immobilized enzymes over the suspended (free) enzymes? **[CO4]** **[2]**

P.T.O.

5. **a)** How an abzyme can help in the HIV treatment? Explain with suitable diagram. [CO3], [CO5] **[2]**

b) How an abzyme can help in the cocaine addiction treatment? Explain with suitable diagram. [CO3], [CO5] **[2]**

c) How uricase and allantoin is different in functioning during the treatment of uric acid problem? [CO3], [CO5] **[2]**

6. Differentiate between following: [CO2] **[6]**
   - **a)** Competitive reversible and Uncompetitive reversible inhibition
   - **b)** Enzymes and Inorganic catalyst
   - **c)** Ion Exchange and Hydrophobic Interaction Chromatography

7. How a directed evolution is different from the natural evolution? [CO5] **[2]**

8. List the major advantages and disadvantages of thermostable enzymes. Given an example of a thermostable enzyme with its application. [CO6] **[2+2+1]**

9. Explain the various applications of enzymes in the following industry: [CO3], [CO5] **[3]**
   - **a)** Detergent industry
   - **b)** In Medicine

10. Write short notes on: [CO5] **[3]**
    - **a)** Ribosome Display
    - **b)** Rational Design of protein engineering