

Laboratory Quiz – 10 marks

1. An enzyme preparation has a specific activity of 42 I.U. mg^{-1} protein and contains 12 mg of protein per ml. Calculate the initial velocity of the reaction in a standard 1 ml reaction mixture containing 20 μl of this enzyme preparation and an excess of substrate.
2. An enzyme deactivates at room temperature following the first order, substrate independent kinetics. The enzyme preparation loses one tenth of its original activity in 24 hours during storage. What is the deactivation rate constant for the enzyme?
3. Can you use any other solution to polymerize sodium alginate? Explain your answer.
4. Write the units of following parameters related to enzymes: k_2 , ΔE^* , K_i , Enzyme activity and Absorbance
5. What is the basis for selecting the substrate concentration for assay of an enzyme sample?
6. Why enzyme activity is reported as initial reaction velocity for kinetic studies?
7. An immobilized invertase in the form of calcium alginate beads is used in a plug flow reactor (packed bed of 78.5 ml, column internal diameter of 2.0 cm and voidage of 0.4) for continuous inversion of sucrose to glucose-fructose mixture. (2)
 - (a) What should be the volumetric flow rate of the feed substrate to achieve a residence time of 10 minutes.
 - (b) What is the linear flow velocity of the feed?
8. The hexokinase enzyme that uses glucose as substrate was characterized in the presence of 2 inhibitors I_1 and I_2 . The initial rates of the reaction were determined in the presence and absence of the inhibitors as shown below. Determine the details of the inhibition quantitatively. (2)

