

Your answers should be specific to the questions asked  
Draw neat labeled diagrams wherever necessary

**LONG ESSAY (Answer any FOUR)****4 X 25 = 100 Marks**

1.
  - a) Explain types of reactions and Michaelis – Mention constant
  - b) Explain the effect of temperature and pH on enzyme production
2.
  - a) Describe in detail the design and operation of fermenters
  - b) Write on scale up of fermentation process of any one antibiotics
3.
  - a) What are mass transfer coefficients, explain the factors affecting them
  - b) Explain the advantages and limitations of continuous fermentation systems
4.
  - a) Describe the different chromatographic techniques employed in the purification of biological products
  - b) Explain the significance of rheology in fermenter operation
5.
  - a) Explain air sterilization methods in detail
  - b) Write on thermal death of micro organisms
6. Write short notes on:
  - a) Determination of bacterial growth rate
  - b) Metabolic response assays
  - c) Control of foam in fermentation process
  - d) Effect of substrate concentration in enzyme production
  - e) Solvent extraction

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