

**Code: 9A23602****R09**

B.Tech III Year II Semester (R09) Supplementary Examinations December/January 2015/2016

**BIOCHEMICAL REACTION ENGINEERING – II**

(Biotechnology)

Time: 3 hours

Max Marks: 70

Answer any FIVE questions

All questions carry equal marks

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- 1 Summarize the principles involved in mass balances of a reaction system with suitable examples.
- 2 Distinguish between chemostat and turbidostat with diagrammatic representation and explain their significance.
- 3 Write brief notes on:
  - (a) Mechanism of enzyme action.
  - (b) Kinetic of single substrate reactions.
- 4 Discuss in detail about multi-substrate reaction mechanisms and kinetics.
- 5 Give various advantages and disadvantages of different immobilization technique.
- 6 In a laboratory packed bed fermentation process for the production of ethanol from glucose using *S.cerevisiae* in an immobilized form, the following data were obtained. As a first approximation, the reaction was assumed to follow first-order kinetics with the rate constants of  $0.2 \text{ h}^{-1}$ . The average diameter of the particle is 2.5 mm. The diffusivity coefficient of the substrate is  $5.2 \times 10^{-16} \text{ m}^2 \text{ s}^{-1}$ . Estimate the effectiveness factor, observable Thiele modulus and ascertain whether the reaction systems are suffering from any mass transfer limitations.
- 7 Discuss in detail about design and analysis of enzyme reactors and explain their significance.
- 8 Give brief notes on:
  - (a) Air lifts bioreactor with neat diagram and its analysis.
  - (b) Applications of air lift bioreactor.

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