

DECEMBER 2015

P/ID 40126/PCHF

Time : Three hours

Maximum : 100 marks

PART A — (10 × 2 = 20 marks)

Answer ALL questions.

1. Calculate the weight-average molecular weight for a system containing equal number of particles with molecular weights 10,000 and 20,000.
2. What are copolymers? Mention the types of copolymers.
3. What is glass transition temperature?
4. What is the effect of pH on enzyme catalysed reaction?
5. Define the terms : Adsorbent and adsorbate.
6. What is parallel reaction? Give one example.
7. What is kinetic chain length?
8. What is enzyme catalysis?

9. The de Breglie's relation $\lambda = \frac{h}{mu}$ is described to be a mathematical expression of the concept of the wave-particle duality. In what sense is it true?
10. State Heisenberg's uncertainty principle.

PART B — (4 × 20 = 80 marks)

Answer ALL questions.

11. (a) (i) Write notes on calendering and moulding. (10)
- (ii) Describe the determination of molecular weight by viscosity method. (10)

Or

- (b) (i) Discuss the kinetics and mechanism of cationic polymerization. (10)
- (ii) Describe the osmotic pressure method for the determination of molecular weight of a polymer. (10)
12. (a) (i) Explain the role of semiconductor oxide catalyst in photochemical reactions. (10)
- (ii) Discuss Langmuir – Hinshelwood and Eley-Rideal mechanisms of surface reactions. (10)

Or

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- (b) (i) What is heterogeneous catalysis? Give some illustrations for heterogeneous catalysis. (5)
- (ii) How can BET equation be used to determine the surface area of catalyst? (5)
- (iii) Explain Michaelis-Menten theory of enzyme catalysis. (10)
13. (a) (i) Explain the theory of relaxation and derive the relationship for relaxation time for the reaction $A \rightleftharpoons X$. (10)
- (ii) Discuss the upper and lower explosion limits in $H_2 - O_2$ reaction. (10)

Or

- (b) (i) Discuss the kinetic of opposing reaction with an example. (10)
- (ii) Explain the study of fast reaction by flash photolysis method. (10)
14. (a) (i) Solve the Schrodinger wave equation for a particle in one dimensional box. (10)
- (ii) Write the Schrodinger wave equation for hydrogen atom in terms of polar coordinates. Separate the variables. (10)

Or

- (b) (i) Describe the postulates of quantum mechanics. (10)
- (ii) Obtain the eigen function and eigen value for the rigid rotor. (10)
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