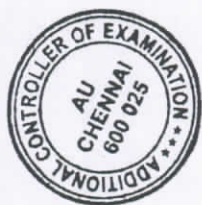


Roll No.

--	--	--	--	--	--	--	--	--	--



ANNA UNIVERSITY (UNIVERSITY DEPARTMENTS)
B.E. (Full Time) - END SEMESTER EXAMINATIONS, APRIL/MAY 2024

MATERIAL SCIENCE AND ENGINEERING
 Semester II Course
(for Sem IV & VI Bridge Course Students)
ML 5202 Reaction Kinetics and Dynamics
 (Regulation 2019)

Time: 3 hrs

Max. Marks: 100

- CO1 To discuss and explain the basics of solid state chemistry
 CO2 To understand and apply the basic principles of chemical reaction kinetics & dynamics
 CO3 To explain the theoretical models of molecular collisions, dynamics & microscopic kinetics
 CO4 To theoretically derive the rate law equations and solve simple numerical problems
 CO5 To describe the experimental methods of preparation of materials in various forms

BL – Bloom's Taxonomy Levels

(L1-Remembering, L2-Understanding, L3-Appling, L4-Analysing, L5-Evaluating, L6-Creating)

PART - A (10 x 2 = 20 Marks)

(Answer all Questions)

Q.No	Questions	Marks	CO	BL
1	State the difference between amorphous and crystalline solids.	2	<u>1</u>	<u>1</u>
2	What do you understand by symmetry of elements?	2	<u>1</u>	<u>2</u>
3	Define threshold energy.	2	<u>2</u>	<u>1</u>
4	State the use of Arrhenius equation.	2	<u>2</u>	<u>2</u>
5	What is the principle of TLC?	2	<u>3</u>	<u>1</u>
6	How BET theory is useful?	2	<u>3</u>	<u>2</u>
7	What is Kirkendall effect?	2	<u>4</u>	<u>1</u>
8	Bring the difference between epitactic and topotactic reactions.	2	<u>4</u>	<u>2</u>
9	What are the uses of intercalated compounds?	2	<u>5</u>	<u>1</u>
10	Brief about the use of plasma fusion technique.	2	<u>5</u>	<u>2</u>

PART- B (5 x 13 = 65 Marks)

Q.No	Questions	Marks	CO	BL
11 (a)	(i) What is a chemical bond? What are its types? Explain with examples. (10) (ii) Write a note on intrinsic and extrinsic semiconductors. (3)	13	<u>1</u>	<u>4</u>
OR				
11 (b)	(i) Draw and label the Born Haber cycle for formation of MX, where M is a metal and X is a halide. (10) (ii) Write a note on Frenkel and Schottky defects. (3)	13	<u>1</u>	<u>4</u>

12 (a)	(i) How do you determine order of a reaction? Explain any two methods in detail. (10)	13	<u>2</u>	<u>4</u>
	(ii) Write a note on half-life period. (3)			
OR				
12 (b)	(i) Illustrate the mechanism of a chain reaction with an example. (10)	13	<u>2</u>	<u>4</u>
	(ii) Write a note on pseudo first order reaction. (3)			
13(a)	(i) Derive the Langmuir adsorption isotherm. (10)	13	<u>3</u>	<u>4</u>
	(ii) Distinguish between physisorption and chemisorption. (3)			
OR				
13(b)	(i) Discuss the various types of isotherms with examples. (10)	13	<u>3</u>	<u>4</u>
	(ii) Distinguish between Langmuir, Hinshelwood and Freundlich mechanisms (3)			
14 (a)	(i) Distinguish between (2 x 5 = 10)	13	<u>4</u>	<u>3</u>
	• Nucleation and Growth			
	• Direct exchange mechanism and ring mechanism			
	(ii) Brief on Kirkendall effect. (3)			
OR				
14 (b)	(i) Distinguish between: (2 x 5 = 10)	13	<u>4</u>	<u>3</u>
	• Epitactic and Topotactic reactions			
	• Precipitation and Co-precipitation			
	(ii) Brief on Wagner mechanism. (3)			
15 (a)	(i) Discuss the difference in the working, construction and the procedure followed for: (2 x 5 = 10)	13	<u>5</u>	<u>3</u>
	• Cathodic deposition and Anodic oxidation			
	• Bridgman and Stockbarger methods			
	(ii) Briefly explain how SC Si chips are made. (3)			
OR				
15 (b)	(i) Discuss the difference in the working principle, construction and the procedure followed for: (2 x 5 = 10)	13	<u>5</u>	<u>3</u>
	• CVD and PVD			
	• Hydrothermal and microwave synthesis			
	(ii) Briefly explain how optical fibers are produced. (3)			

PART- C (1 x 15 = 15 Marks)3

(Q.No.16 is compulsory)

Questions

Q.No		Marks	CO	BL
16	Neatly draw and account for all the elements of symmetry in a cubic crystal.	15	<u>1</u>	<u>6</u>

