K. K. Wagh Institute of Engineering Education & Research, Nashik

(An Autonomous Institute From A.Y. 2022-23)

WINTER-2025	
Exam Seat No.:	
Academic Year: 2025-2026	Semester: IV
Class: SY	Program: B.Tech
Branch Code: CHE	Pattern: 2023
Name of Course: Chemical Reactions and Synthesis II	Course Code: 2307212
Max. Marks: 60	Duration: 2.30 Hrs.

Instructions: Candidates should read carefully the instructions printed on the Question Paper and on the cover page of the Answer Book, which is provided for their use.

1. This question paper contains 02 pages.
2. Answer to each new question is to be started on a new page.
3. Assume suitable data wherever required, but justify it.
4. Draw the neat labelled diagrams, wherever necessary.
5. The last columns indicates the Course Outcome and level of Blooms Taxonomy of the Question/sub-question.

		Marks	CO
Question No. 1			
1	Discuss any three factors which affect the rate of enzyme catalysed reaction.	(6)	CO1
Question No. 2			
2	Determine the EAN of $[Co(NH_3)_6]^{3+}$ and $K_4[Fe(CN)_6]$. Do the complexes obey the EAN rule or not.	(6)	CO2
Question No. 3			
3.a)	Discuss different types of volumetric analysis with suitable examples.	(6)	CO3
	OR		
3.b)	Explain complexometric titration and how it can be used for determination of hardness of water	(6)	CO3
3.c)	Explain theory of indicators and also explain a difference of 2 PH is required for colour change.	(6)	CO3
	OR		
3.d)	What is precipitation titration? Discuss it using Fajans method.	(6)	CO3
3.e)	If 20 ml of 0.5 N NaOH is mixed with 30 ml of 0.3 N HCl, is the resulting solution acidic or basic? Calculate the normality of acidic or basic final solution.	(4)	CO3
	OR		
3.f)	What is the pH when 48.00 ml of 0.100 M NaOH solution have been added to 50.00 ml of 0.100 M HCl solution?	(4)	CO3
Question No. 4			
4.a)	Apply the assumptions of the Langmuir model to explain why the isotherm remains constant at high pressures.	(6)	CO4
	OR		

4.b)	State the Freundlich adsorption isotherm? Apply the Freundlich isotherm to determine the constants K and $1/n$	(6)	CO4
4.c)	Discuss in details the adsorption mechanism involve in the catalysis reaction.	(6)	CO4

OR

4.d)	What are zeolites? Give applications of zeolites in chemical industry.	(6)	CO4
4.e)	Discuss application of catalyst in the synthesis of industrially important chemicals.	(4)	CO4

OR

4.f)	Discuss the synthesis of aldehyde using hydroformylation reaction.	(4)	CO4

Question No. 5

5.a)	Discuss various types of conformation in ethane molecule using P.E. diagram.	(6)	CO5

OR

5.b)	Draw the structure of various conformers of propane using Newman projection formula.	(6)	CO5
5.c)	Demonstrate mechanism, thermodynamics and kinetics of nitration reaction of benzene.	(6)	CO5

OR

5.d)	Demonstrate mechanism, thermodynamics and kinetics of vinyl chloride formation reaction.	(6)	CO5
5.e)	Explain the terms enantiomers and diastereomers with examples.	(4)	CO5

OR

5.f)	Give brief description of optical isomerism.	(4)	CO5

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