



K. K. Wagh Institute of Engineering Education & Research, Nashik
(An Autonomous Institute From A.Y. 2022-23)

SUMMER-2024	
Exam Seat No.:	
Academic Year: 2023-2024	Semester: IV
Branch Code: SY-B.Tech Chemical Engineering	Pattern: 2022
Name of Course: Chemistry II	Course Code: CHE222011
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.

Question No. 1 Attempt following Question

- 1 Discuss the traditional and green path way of synthesis of polycarbonate. (6) CO1

Question No. 2 Attempt following Question

- 2 Explain the variable oxidation state shown by first transition series elements. (6) CO2

Question No. 3 Attempt following Question

- 3.a) Explain the titration between HCl and NaOH with the help of titration curve and appropriate indicators. (6) CO3

OR

- 3.b) Explain theory of indicators and also explain a difference of 2 P^H is required for colour change (6) CO3

- 3.c) Explain different types of volumetric analysis with suitable examples. (6) CO3

OR

- 3.d) What is precipitation titration? How chloride ions are estimated using Mohrs method. (6) CO3

- 3.e) The Concentration of NaOH is 0.5 M if 15 ml is needed to titrate 20 ml of acid, calculate the concentration of the acid? (4) CO3

OR

- 3.f) 15 ml of 0.10N, HCl is added from burette is added into 13 ml 0.11N NaHCO_3 solution in the flask. Calculate pH of the titration mixture. (4) CO3

Question No. 4 Attempt following Question

4.a) What is adsorption isotherm? Deduce the Langmuir adsorption isotherm equation. (6) CO4

OR

4.b) What is adsorption isotherm? Describe Freundlich adsorption isotherm. (6) CO4

4.c) Discuss any three factors which affect the rate of extent of adsorption. (6) CO4

OR

4.d) What are zeolites? Give applications of zeolites in chemical industry. (6) CO4

4.e) 100 ml of 0.3M acetic acid is shaken with 0.8 g wood charcoal. The final concentration of acetic acid in the solution after adsorption is 0.125M. Calculate mass of acetic acid adsorbed per gram of charcoal. (4) CO4

OR

4.f) The volume of nitrogen gas at 1 atm and 273K required to cover 1g of the silica gel is 0.129 dm³. Calculate the surface area of the gel if each nitrogen molecule occupies an area of 16.2 X 10²⁰ m² (4) CO4

Question No. 5 Attempt following Question

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

OR

5.b) Draw the structure of various conformers of n-butane using Newman projection formula (6) CO5

5.c) Give mechanism, thermodynamics and kinetics of nitration reaction of benzene. (6) CO5

OR

5.d) Give mechanism, thermodynamics and kinetics of vinyl chloride formation reaction. (6) CO5

5.e) Explain the terms enantiomers taking the help of 2-chlorobutane (4) CO5

OR

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

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