



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

InSem Examination-I Winter 2024	
Exam Seat No.:	
Academic Year: 2024-2025	Semester: III
Class: SY.B.Tech.	Program: B.Tech
Branch Code: CHE	Pattern: 2023
Name of Course: Chemical Reactions and Synthesis I	Course Code: 2307203
Max. Marks: 30	Duration: 1.15 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 01 page.
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. Question 1 and 3 are compulsory

Marks CO

Question No. 1

- 1 a) Explain formation of Nitrogen molecule using Molecular orbital theory. (4) CO1
- 1 b) Carboxylic acids are stronger acids than phenol explain (3) CO1

Question No. 2

- 2 a) Explain the formation of H_2 molecule with the help of V.B.T. (4) CO1
- 2 b) Explain the formation of BMO and ABMO using LCAO approximation (4) CO1

OR

- 2 c) What is resonance? Discuss the effect of resonance on strength of acids. (4) CO1
- 2 d) What is Inductive effect? Give its effects on pKa values of acids. (4) CO1

Question No. 3

- 3 a) Discuss the factors affecting rate and extent of reaction. (4) CO2
- 3 b) Show that half life time is inversely proportional to rate constant. (3) CO2

Question No. 4

- 4 a) Define second order reaction and derive the rate constant equation for second order reaction involving same initial concentrations of reactants. (4) CO2
- 4 b) How does the Arrhenius equation relate activation energy to the rate constant of a chemical reaction derive it. (4) CO2

OR

- 4 c) How does Transition state theory explain the effect of temperature on the reaction rate of a chemical reaction. (4) CO2
- 4 d) The time for half change in a first order decomposition of a substance A is 60 seconds. Calculate the rate constant. How much of A will be left after 180 seconds? (4) CO2