

QP CODE: 26801752



Reg No :

Name :

INTEGRATED M.Sc. DEGREE EXAMINATION, APRIL 2026

Eight Semester

INTEGRATED M.Sc. BASIC SCIENCES-CHEMISTRY

CORE - ICH8CR03 - ADVANCED PHYSICAL CHEMISTRY - II

2020 Admission Onwards

0EA9BA5F

Time: 3 Hours

Weightage: 30

Part A (Short Answer Questions)

*Answer any **eight** questions.*

Weight 1 each.

1. Explain the differential rate equation method for the determination of the order of a reaction.
2. Show that the half-life is inversely proportional to the initial concentration of the reactant for a second order reaction.
3. Distinguish between activated complex and transition state.
4. Outline the shock tube technique for the study of fast reactions.
5. What is primary kinetic salt effect?
6. What are surfactants? Explain their important uses.
7. Explain the principle of photoelectron spectroscopy.
8. What is the Eley-Rideal mechanism in surface-catalyzed reactions?
9. Discuss thermoluminescence.
10. Write on P-type delayed fluorescence.

(8×1=8 weightage)

Part B (Short Essay/Problems)

*Answer any **six** questions.*

Weight 2 each.

11. What are the main postulates of the collision theory of bimolecular gaseous reactions? How does collision theory explain the effect of temperature on the rate of a reaction?
12. Explain how pressure and volume affects the velocity of gas reactions.
13. Describe Lindemann's theory of unimolecular reactions.





14. What are acidity functions ? Obtain the rate expression which relates the acidity function and rate constant.
15. Derive Michelis–Menten equation for an enzyme catalyzed reaction.
16. Discuss how surface selection rules can be used to probe molecular orientation and interactions on metal surfaces.
17. Write a note about viscosity method and osmotic pressure for molecular weight determination.
18. Explain the mechanism of quenching of fluorescence.

(6×2=12 weightage)

Part C (Essay Type Questions)

*Answer any **two** questions.*

Weight 5 each.

19. Discuss briefly on the following (a) Semenov- Hinshelwood mechanism of explosive reactions
(b) Kinetics of anionic and cationic polymerization (c) Skrabal Diagrams
20. What are oscillating reactions ? Discuss on its significance and explain any three models.
21. Derive BET adsorption isotherm. How would you determine surface area of a solid using BET isotherm? Explain.
22. Write notes on (a) Surface enhanced Raman Scattering (b) Donnan membrane equilibrium

(2×5=10 weightage)

