



QP CODE: 26802006



Reg No : .....

Name : .....

**INTEGRATED M Sc DEGREE EXAMINATION APRIL 2026**

**Second Semester**

INTEGRATED M Sc BASIC SCIENCES - CHEMISTRY

**CORE - ICH2CR04 - BASIC LEVEL IN PHYSICAL CHEMISTRY**

2020 Admission Onwards

0F6986D4

Time: 3 Hours

Weightage: 30

**Part A (Short Answer Questions)**

*Answer any **eight** questions.*

*Weight 1 each.*

1. Explain and derive Charles's law from kinetic gas equation.
2. State the principle of equipartition of energy. Show that each component of kinetic motion contributes equally to the total kinetic energy.
3. Write a short note on critical constants of a gas.
4. Write the Virial equation of state of a real gas.
5. Write the Clausius equation and explain the terms.
6. Surface tension of a liquid vanishes at its critical temperature. Explain.
7. What is unit cell? Explain Bravais lattice.
8. What are different laws of crystallography?
9. What are different types of defects?
10. What is swarm theory?

(8×1=8 weightage)

**Part B (Short Essay/Problems)**

*Answer any **six** questions.*

*Weight 2 each.*

11. Derive an expression for the distribution of molecular kinetic energies from the equation for Maxwell distribution of molecular velocities.
12. Write a note on collision properties. Obtain an expression for the relation between mean free path and pressure.





13. Define coefficient of viscosity of a fluid. Show that the viscosity of a gas is independent of pressure.
14. Explain rise of water in a capillary tube.
15. What is meant by Reynolds number? What is its significance?
16. Explain the structure of ZnS.
17. What is meant by electrical conductivity? Explain the differences between n-type and p-type semiconductors.
18. Explain DSC and XRD in liquid crystals.

(6×2=12 weightage)

### **Part C (Essay Type Questions)**

*Answer any **two** questions.*

*Weight 5 each.*

19. Derive the Van der Waals equation for describing the P-V-T relationship in real gases. Illustrate how the equation satisfactorily explains the departure of real gases from ideal behaviour at different pressures and temperatures.
20. a) Compare viscosity of gases with liquids. b) Explain falling sphere method.
21. Give a detailed account of powder diffraction pattern of NaCl.
22. What are liquid crystals? Explain various types of liquid crystals with diagram and example.

(2×5=10 weightage)

