

**GOVERNMENT DEGREE COLLEGE,
NANDIKOTKUR**

DEPARTMENT OF CHEMISTRY

PHYSICAL CHEMISTRY- II

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Unit I: Gaseous State

Short Questions:

State the postulates of the Kinetic Theory of Gases.

What is the Van der Waals equation of state?

Explain Andrew's isotherms of carbon dioxide.

What is the Joule-Thomson effect?

Define the critical phenomena and critical constants.

What is the Law of Corresponding States?

Long Questions:

1. Derive the gas laws from the Kinetic gas equation.

2. Explain the Van der Waals equation and its significance.

3. Discuss the concept of critical phenomena and the relationship between critical constants and Van der Waals constants.

4. Explain the Joule-Thomson effect with examples.

5. Discuss the concept of inversion temperature and its significance in the Joule-Thomson effect.

Unit II: Liquid State

Short Questions:

1. Define vapour pressure and explain how it is determined.

2. What is surface tension? How is it measured?

3. Discuss the temperature variation of viscosity of liquids.

4.What are liquid crystals? Explain their classification into smectic and nematic phases.

5.What is the difference between liquid crystals and solids?

6.Discuss the structure of water.

Long Questions:

1.Explain the physical properties of liquids like vapour pressure, surface tension, and viscosity, and how they are determined.

2.Compare the viscosity of liquids and gases and discuss the temperature variation.

3.Discuss the structure of water and its unusual properties.

4.Explain the classification of liquid crystals into Smectic and Nematic phases with examples.

5.Discuss the applications of liquid crystals in LCD devices.

Unit III: Solid State

Short Questions:

1.What are Miller indices?

2.Define lattice points and space lattice.

3.What are Bravais lattices and crystal systems?

4.What is Bragg's Law?

5.What are stoichiometric and non-stoichiometric defects in crystals?

Long Questions:

1.Explain the symmetry in crystals and the law of constancy of interfacial angles.

2.Derive Bragg's Law and explain its significance in X-ray diffraction.

3.Discuss the concept of the crystal lattice, unit cell, and different crystal systems.

4.Explain the powder diffraction method for determining crystal structure.

5.Discuss defects in crystals, highlighting stoichiometric and non-stoichiometric defects.

Unit IV: Phase Rule

Short Questions:

1. Define phase, components, and degrees of freedom.
2. State and explain Gibbs' phase rule.
3. What is a eutectic system? Give examples.
4. Define congruent and incongruent melting points with examples.

Long Questions:

1. Explain the Gibbs' Phase rule and its application to a one-component system.
2. Discuss the phase diagram of water and its significance.
3. Study and explain the phase diagram of the Pb-Ag system and its application in desilverization of lead.
4. Discuss the NaCl-water system and explain congruent and incongruent melting points.
5. Explain the concept of freezing mixtures and their applications.

Unit V: Surface Chemistry

Short Questions:

1. What are colloids? Classify colloids based on their physical state.
2. Explain Hardy-Schulze's rule of coagulation of colloids.
3. What is the Gold number?
4. Differentiate between physical and chemical adsorption.
5. State and explain Freundlich and Langmuir adsorption isotherms.

Long Questions:

1. Define colloids and explain their classification. Discuss the coagulation of colloids according to Hardy-Schulze's rule.
2. Discuss the factors affecting the stability of colloids and the protection of colloids.
3. Explain the physical and chemical adsorption processes and their applications.
4. Derive and explain Freundlich and Langmuir adsorption isotherms.

5. Discuss the concept of the Gold number and its significance in colloidal chemistry.