2017

Full Marks : 50

Time : 3 hours

The questions are of equal value

Answer **five** questions, selecting not more than **two** from any Group

Group—A

1. What is critical phenomenon? Derive expression for the critical constant of a gas using van der Waals' equation of state. How do you find out the van der Waals' constant from the critical values of pressure, temperature and volume?

2. What is meant by unit cell of crystal? Sketch the unit cell of simple body centred and face centred cubic space lattice and calculate the number of atoms per unit cell in these system.

3. *(a)* What is electrophoresis? How does this phenomenon provide information about the sign of charge on particles?

(Turn Over)

(b) Explain the Schultz-Hardy rule of coagulation.

4. Wrote short notes on *any two* of the following :

(a) Refractive index

(b) Tyndall effect and Brownian Movement

(c) Lattice energy.

Group—B

5. Explain Nernst distribution law. How is it modified when a solute undergoes—

(a) association in a solvent;

(b) dissociation in the solvent?

6. *(a)* The melting point curve of ice in the water system has a negative slope. Explain it with the help of the phase diagram of water system.

(b) Draw a well-labelled phase diagram of KI-water system and discuss its salient features.

7. *(a)* Define solubility and solubility product.

(Continued)

(b) How do you determine the degree of ionisation of an electrolyte by conductance method?

8. Determine the entropy change for an ideal gas when temperature and volume are varied.

Group—C

9. Deduce the rate expression for second-order reaction when both the concentration terms are same. What is half-life period of second-order reaction?

10. (a) What is meant by the term catalyst? Give general characteristics of catalytic reactions.

(b) Derive an expression for the rate of an acid catalysed reaction.

11. Derive Nernst equation showing effect of electrolyte concentration on the potential of an oxidation reduction electrode.

12. Write short notes on *any two* of the following :

(a) Factors affecting the conductance of an electrolyte

(b) Variation of equivalent conductance with dilution

(c) Conductometric titration.

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