

Chemistry (Theory) Paper-III

Time Allowed : 3 hrs

Max. Marks : 40

Pass Marks : 33%

Attempt FIVE Questions in all, Section-A is Compulsory. Select Two questions from Section-B and Two from Section-C.

SECTION-A

1- Briefly answer any Eight of the following:

1x8

- i) Differentiate between ebullioscopy and cryscopy.
- ii) What is collision frequency?
- iii) What is internal energy?
- iv) Elaborate Arrhenius equation.
- v) What is difference between ppm and ppb?
- vi) Differentiate between spontaneous and non-spontaneous process.
- vii) Differentiate between homogenous and heterogeneous equilibria.
- viii) Explain the term surface tension.
- ix) Differentiate between molality and molarity.
- x) Explain the term collision diameter.

SECTION-B

2-a) Derive Van der Waal's equation of state.

4

b) Experimental determination of critical temperature.

2

c) You are provided with CO₂. Calculate the critical volume for this gas.

$$(a = 3.61 \text{ atm dm}^6 \text{ mol}^{-1}; \quad b = 4.27 \times 10^{-2} \text{ dm}^3 \text{ mol}^{-1})$$

2

3-a) Define osmotic pressure and how can you measure it by Morse and Frazer's method?

4

b) Explain concept of azeotropic mixtures.

2

c) Discuss briefly lowering of vapour pressure.

2

4- a) Derive kinetic expression for first order reaction with example.

4

b) What do you know about arhenius plots?

3

c) Calculate half life for first order reaction whose rate is 10^{-3} s^{-1} .

1

5-a) Define refractive index method. How can you measure it by Pulfrich method?

3

b) Explain term parachor.

2

c) What is molar refraction? Write its application.

3

SECTION-C

6-a) Derive relation between K_p and K_c .

3

b) Describe law of mass action.

2

c) What is le-Chatlier's principle? And discuss its effect over the change in concentration.

3

7-a) Write note on carnot cycle.

2

b) What is second law of thermodynamics?

2

c) What is entropy? And explain for irreversible process.

4

8-a) Draw x-ray crystallographic structure of NaCl.

4

b) What do you know about bravis lattice?

2

c) Explain plane of symmetry and inversion axis with example.

2

9-a) Explain wave theory of light.

3

b) Write postulates of photoelectric effect.

3

c) Describe Schrodinger wave equation.

2