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Class – B.Sc-II Sem.

Subject – Chemistry

Paper – Physical

Time Allowed : 3 Hours

Maximum Marks : 35

Note:– Use of simple calculator and log table is allowed.

### SECTION-A

Attempt all questions. Each question carries 1 mark.

1. What is zeta potential?
2. Explain the difference between liquid and liquid crystal.
3. Define collision number and collision diameter.
4. What is the significance of Vander Waal's constant 'a' and 'b'?
5. What is compressibility factor?
6. What is flocculation value?
7. Define Gold number.
8. What is the difference between Molarity and molality?  
(1 × 8 = 8)

### SECTION-B

#### PART-I

Attempt any six questions. Each question carries 4.5 marks. (Attempt any two questions from each part)

9. (a) What is the continuity of state? Explain isotherms of  $\text{CO}_2$ .

(b) Calculate the temperature at which 160g of  $\text{SO}_2$  would occupy a volume of 10L at 15 atm pressure ( $a = 6.7 \text{ atm L}^2 \text{ mol}^{-2}$ ,  $b = 0.0565 \text{ L mol}^{-1}$ ) (2½, 2)

10. (a) Derive the relation;  $(\pi + \frac{c}{v^2}) (3\phi - 1) = 8\theta$ ; where  $\pi$ ,  $\phi$  &  $\theta$  are reduced pressure, reduced volume and reduced temperature respectively.

(b) What is adiabatic demagnetization method of liquifaction of gas? (3, 1½)

11. (a) What are liquid crystals? How Nematic, Smectic and Cholestric liquid crystals differ?

(b) Write a note on structure of liquids with special reference to hole theory. (2½, 2)

### PART-II

12. (a) How will you calculate critical parameters using Vander Waal's equation?

(b) What is most probable velocity?

(c) Calculate the average and root mean square speed for oxygen molecule at 25°C. (2½, 1, 1)

13. (a) Why 1 M solution is more concentrated than 1 m solution?

(b) Calculate the molarity and normality of a solution containing 9.8g of  $\text{H}_2\text{SO}_4$  in 250 ml of solution.

(1½, 3)

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14. (a) What is Hardy Schulze law?  
(b) What is Tyndall effect?  
(c) Write a note on Electrodialysis. (1½, 1½, 1½)

**Part-III**

15. (a) Describe the working of a liquid crystal cell.  
(b) Write a short note on 'Thermography'.  
(c) Briefly describe the application of liquid crystals in medical field. (1½, 1½, 1½)

16. Explain the following:—

- (a) Peptization  
(b) Electrophoresis  
(c) Emulsifiers (1½, 1½, 1½)

17. (a) The reduced volume and reduced temperature of a gas are 10.2 and 0.7. What will be its pressure if critical pressure is 42 atm?

- (b) Calculate mole fraction of each component in 70% Ethanol. (2, 2½)

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