

13. (a) 0.676 g of an organic compound of molar mass 152 g.mol^{-1} when dissolved in 40 g of acetone raised the boiling point of acetone from 329.3 K to 329.5 K. Calculate the ebullioscopic constant of acetone.
 (b) What is meant by osmotic pressure of a solution? (3 + 2)

PART – C

Answer any THREE of the following questions. Each question carries TEN marks. (3X10=30)

14. (a) Define co-precipitation.
 (b) Draw the precipitation titration curve and indicate the equivalence point in the titration.
 (c) Explain the Mohr's method of precipitation titrimetry.
 (d) What is meant by figures of merit? Mention any two types for figures of merit. (2+2+3+3)
15. (a) With energy profile diagram explain the mechanism of S_N1 reaction.
 (b) Explain the orienting influence of $-OH$ group in phenol towards electrophilic substitution reactions. (5+5)
16. (a) Describe Cagniard de la Tour method to determine the critical temperature and critical pressure of a gas.
 (b) Describe the determination of Viscosity of a liquid using Ostwald's viscometer.
 (c) What is Joule Thomson effect? (4+4+2)
17. (a) Describe the Beckmann method of determination of molar mass of a solute.
 (b) What are (i) simple extraction and (ii) multiple extractions? Why multiple extractions are more beneficial?
 (c) What is benzyne? Give the mechanism of generation of benzyne. (4+3+3)
18. (a) Benzoic acid distributes itself between water and toluene as follows:

Concentration of benzoic acid in water c_1 (g/L)	0.75	0.98	1.48
Concentration of benzoic acid in toluene c_2 (g/L)	12.1	20.6	48.5

Show that benzoic acid exists as a dimer in toluene.

- (b) Derive Bragg's equation, $n\lambda = 2d \sin \theta$.
 (c) Find the Miller indices for a crystal plane, which cut the crystallographic axes at $(2a, 3b, 2c)$. (4+4+2)
