UUCMS. No.

B.M.S COLLEGE FOR WOMEN AUTONOMOUS BENGALURU – 560004 SEMESTER END EXAMINATION – SEPTEMBER- 2023

B.Sc in Chemistry – 2nd Semester

ANALYTICAL, PHYSICAL AND ORGANIC CHEMISTRY – PAPER II (NEP Scheme 2021-22 onwards F+R)

Course Code: CHE2DSC02 Duration: 2 ¹/₂ Hours QP Code:2014 Max. marks: 60

Instructions: 1. The Question Paper has three Parts. Answer all the Parts.2. Write the chemical equations and diagrams wherever necessary.

PART – A

Answer any FIVE of the following questions. Each question carries TWO marks. (5X2=10)

- 1. What is a metal ion indicator? Give an example.
- 2. Define the limit of detection (LOD) in Analytical chemistry.
- 3. Mention the electrophiles involved in sulphonation and nitration of benzene.
- 4. What is meant by *ipso* substitution? Give an example.
- 5. Define molar refraction.
- 6. Calculate the most probable velocity of oxygen molecules at 300 K. (Given $R = 8.314 \text{ JK}^{-1} \text{mol}^{-1}$).
- 7. State the law of constancy of interfacial angle.

PART – **B**

Answer any FOUR of the following questions. Each question carries FIVE marks.	(5X4=20)
8. Describe the determination of temporary hardness of water.	(5)
9. (a) Explain the factors influencing precipitation.	
(b) Mention any two organic reagents used in gravimetry.	(3+2)
10. (a) Explain S_NAr mechanism with a suitable example.	
(b) Mention the role of chlorine atom in chlorobenzene towards electrophilic substit	ution
reactions.	(4+1)
11. (a) Define (i) Collision frequency; (ii) mean free path of gas molecules	
(b) What is meant by compressibility factor?	(4+1)
12. (a) Describe the elucidation of structure of benzene using Parachor values.	
(b) State the law of corresponding states.	(3+2)

13.	(a) 0.676 g of an organic compound of molar mass 152 g.mol ⁻¹ when dissolved in 4 acetone raised the boiling point of acetone from 329.3 K to 329.5 K. Calculate th ebullioscopic constant of acetone.	0 g of e
	(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 tit	ration.
	(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 tempo critical pressure of a gas.	erature and
	(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 are more beneficial?	extractions
	(c) What is benzyne? Give the mechanism of generation of benzyne.	(4+3+3)
18	(a) Banzoic acid distributes itself between water and toluane as follows:	

18.	(a)	Benzoic	acid	distributes	itself	between	water	and	toluene	as	follows	3:
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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)