QP CODE: D2BCH2402	(Pages: 2)	Reg. No : .....
		Name : .....

SECOND SEMESTER FYUGP EXAMINATION, APRIL 2025

MINOR COURSE

CHE2MN107 : BASIC ANALYTICAL AND PHYSICAL CHEMISTRY

(Credits: 4)

Time: 2 Hours **Maximum Marks: 70**

Section A

Answer the following questions. Each carries 3 marks (Ceiling: 24 marks)

1.	Give any three applications of common ion effect.	BL2	CO2
2.	Give the Henderson's equation for an acidic buffer.	BL1	CO2
3.	How does a chiral centre affect the number of possible stereoisomers?	BL1	CO4
4.	Describe conformational isomerism with regard to ethane.	BL3	CO4
5.	Calculate the percentage of hydrolysis of aniline hydrochloride in a 0.1 M solution of it in water at 298 K. (K_b of aniline = 5.93×10^{-10}; Kw = 1×10^{-14})	BL2	CO2
6.	Mention the significance of the term entropy.	BL2	CO1
7.	Calculate the pH of 0.01 M KOH solution.	BL1	CO2
8.	Explain how normality is used in acid-base titrations.	BL2	CO3
9.	Draw the chair and boat conformation of cyclohexane.	BL3	CO4
10.	What is the numerical value of Avogadro's number?	BL1	CO3

Section B

Answer the following questions. Each carries 6 marks (Ceiling: 36 Marks)

11.	Distinguish between isothermal, adiabatic, isobaric and isochoric processes.	BL2	CO1

(PTO)

12.	What is the entropy change for the conversion of one mole of ice to water at 273 K and 1 atm? ($\Delta_{fus}H$ = 6008 $kJmol^{-1}$)	BL3	CO1
13.	How are sulfide ion concentrations manipulated to differentiate between Group II and Group IV cations by varying conditions?	BL3	CO3
14.	Compare the directing effects of -OCH_3 (methoxy) and -SO_3H (sulfonic acid). Why is -OCH_3 ortho/para-directing while -SO_3H is meta-directing?	BL3	CO5
15.	How does standardizing experimental procedures contribute to reducing systematic errors?	BL3	CO3
16.	Discuss the limitations of the First Law of Thermodynamics which necessitates the Second law.	BL1	CO1
17.	What is meant by a spontaneous process? Explain the criteria for spontaneity and equilibrium in terms of Gibb's free energy change.	BL2	CO1
18.	What are the advantages of using potassium dichromate over potassium permanganate ($KMnO_4$) in redox titrations? Address factors like stability, primary standard status, and indicator requirements.	BL2	CO3
	Section C		
	Answer any one question. Each carries 10 marks (1 x 10 = 10 Marks)		
19.	(a) Give the relation between Gibb's free energy (G) and entropy (S). (b) Discuss the effect of temperature on spontaneity of a reaction.	BL2	CO1
20.	How can the melting point of cis-trans isomers be used to identify them? Discuss the relationship between molecular symmetry, polarity, and how this affects the melting points of cis and trans isomers.	BL3	CO4
	CO : Course Outcome		
	BL : Bloom's Taxonomy Levels (1 – Remember, 2 – Understand, 3 – Apply, 4 – Analyse, 5 – Evaluate, 6 – Create)		