22CHU308N

PSG COLLEGE OF ARTS & SCIENCE
(AUTONOMOUS)

BSc DEGREE EXAMINATION DECEMBER 2025
(Third Semester)

Branch - **CHEMISTRY**

GENERAL CHEMISTRY -III

Time: Three Hours | Maximum: 75 Marks

SECTION-A (10 Marks)

Answer **ALL** questions

ALL questions carry **EQUAL** marks (10 × 1 = 10)

Module No.	Question No.	Question	K Level	CO
1	1	Which reagent is commonly used to prepare diborane? (a) $LiAlH_4$ (b) NaCl (c) H_2SO_4 (d) NH_3	K1	CO1
	2	Why silicones show more heat resistant than organic polymers? (a) have strong Si–O bonds in their backbone (b) possess metal atoms (c) have more hydrogen atoms (d) contain double bonds	K2	CO1
2	3	Recall vanillin is mainly used as a) Flavoring agent b) Pesticide c) Solvent d) Detergent	K1	CO2
	4	Interpret the acid given below have cinnamon odour. (a) Acrylic acid (b) Benzoic acid (c) Cinnamic acid (d) Salicylic acid	K2	CO2
3	5	What is the molecular formula of chloroform? (a) $CHCl_3$ (b) CCl_4 (c) $C_2H_4Cl_2$ (d) CH_3Cl	K1	CO3
	6	Which one of the following point relate the property of phenol? (a) It is a liquid (b) It is basic (c) It is neutral (d) It is acidic	K2	CO3
4	7	The second Law of Thermodynamics deals about (a) Energy conservation (b) Direction of heat flow (c) Volume changes (d) Pressure changes	K1	CO4
	8	The entropy of an ideal gas increase when (a) Volume decreases (b) Pressure increases (c) Temperature increases (d) All the above	K2	CO4
5	9	Which of the following is exception to the Third Law of Thermodynamics? (a) Perfect crystals (b) Gases (c) Substances with residual entropy (d) Liquids at room temperature	K1	CO5
	10	The value of ΔG at equilibrium is (a) Positive (b) Negative (c) Zero (d) Infinite	K2	CO5

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SECTION - B (35 Marks)

Answer **ALL** questions

ALL questions carry **EQUAL** Marks (5 × 7 = 35)

sModule No.	Question No.	Question	K Level	CO
1	11.a.	How is diborance prepared from boron halides? Discuss in detail the bonding in diborance.	K4	CO1
		(OR)		
	11.b.	What are interhalogen compounds? Describe the preparation structure and uses of IF_5 and IF_7.		
2	12.a.	How are the following prepared? (i) acetophenone (ii) benzophenone	K3	CO2
		(OR)		
	12.b.	Explain the preparation and uses of matonic acid and succinic acid.		
3	13.a.	How are alkylhalides classified? Explain each type with suitable examples.	K2	CO3
		(OR)		
	13.b.	Summarize the preparation, properties of resorcinol		
4	14.a.	Discuss (i) Limitations of First law (ii) Need for the second law (iii) Various statements of second law.	K3	CO4
		(OR)		
	14.b.	A system's number of microstates increases from 100 to 10,000. (i) Explain how this change affects the system's entropy in terms of disorder and probability. (ii) Calculate the change in entropy (ΔS) using the formula S=RlnW, where W=the number of microstates.		
5	15.a.	Derive Gibbs-Duhem equation and describe how this equation is applied to change in chemical potential if components.	K4	CO5
		(OR)		
	15.b.	Explain how Le Chatlier principle is used to predict the effect of temperature, pressure and concentration on chemical equilibrium of a system.		

SECTION -C (30 Marks)

Answer **ANY THREE** questions

ALL questions carry **EQUAL** Marks (3 × 10 = 30)

Module No.	Question No.	Question	K Level	CO
1	16	Write a note on the preparation, properties, uses and structure of borazole and dithionic acids.	K4	CO1
2	17	Discuss the preparation, properties of benzoic and salicylic acids, distinguish their properties, and categorize their uses.	K4	CO2
3	18	Examine the preparation, properties of ethyl chloride and chloroform, and explain how their structures facilitate applications.	K4	CO3
4	19	Contrast the efficiency of the Carnot cycle with other heat engines and examine Carnot's theorem in establishing the limits of thermal efficiency.	K4	CO4
5	20	Analyze the relationship between T and P as shown by the Clapeyron-Clausius equation and explain what happens during boiling?	K4	CO5

Z-Z-Z END