

QP Code: D143798		Total Pages: 2	Name:
			Register No.
FOURTH SEMESTER (CUFYUGP) DEGREE EXAMINATION, APRIL 2026			
POLYMER CHEMISTRY			
PCH4CJ205: PHYSICAL CHEMISTRY - I			
2024 Admission onwards			
Maximum Time :2 Hours			Maximum Marks :70
Section A			
All Questions can be answered. Each Question carries 3 marks (Ceiling : 24 Marks)			
1	Define i) isothermal process ii) adiabatic process and iii) isobaric process.		
2	If a gas of volume 40m^3 is contained in a rigid container and 70J of heat is provided to it. Calculate the change in internal energy. Assume that the gas exerts 1atm pressure on the walls.		
3	Explain state functions, exact differential and inexact differentials with examples.		
4	What are the limitations of the 1 st law? State the 2 nd law of thermodynamics		
5	Calculate the change in entropy when 54.6 KJ of heat is transferred to a system at 273 k isothermally and reversibly.		
6	What is meant by order of a reaction? Determine the units of the rate constant k for a zero order reaction.		
7	What are colligative properties?		
8	Write any three difference between alloys and composites.		
9	What are solid solutions?		
10	Write down the Arrhenius equation? What is its significance?		
Section B			
All Questions can be answered. Each Question carries 6 marks (Ceiling : 36 Marks)			
11	State and explain Hess's law of constant heat summation. Discuss the applications of this law.		
12	The enthalpy of the chemical reaction $\text{N}_2 + 3\text{H}_2 \longrightarrow 2\text{NH}_3$, is found to be -91.69 at 27°C. Calculate ΔH at 60°C. Cp for N_2 , H_2 and NH_3 are 28.5, 28.32 and 37.07 joules respectively.		
13	Discuss the Carnot cycle for establishing the maximum convertibility of work.		
14	What is meant by half-life time of a reaction? The half-life of a chemical reaction is $\text{A} \longrightarrow \text{B} + \text{C}$, which follows 1 st order kinetics is 10 minutes. How much time will it take for the reactant A to reach 2% of its initial value?		
15	What are the factors influencing solubility of gases in liquids?		
16	State and derive Rault's law for vapour pressure lowering.		
17	Describe briefly the collision theory of bimolecular reaction rates.		
18	What is Helmholtz free energy? Why is it termed as work function?		

Section C**Answer any ONE .Each Question carries 10 marks (1x10=10 Marks)**

19	a) What is meant by chemical potential? Derive Gibbs-Duhem equation. (6 Marks)
	b) Derive thermodynamically the relation between C_p and C_v for one mole of an ideal gas. (4 Marks)
20	a) Discuss Joule-Thomson effect. Derive the expression for Joule-Thomson coefficient. (5 Marks)
	b) Discuss the Lindemanns theory of unimolecular reaction. (5 Marks)