

9. What is chromophore? Give examples.
10. A solution of thickness 2 cm transmits 40% incident light. Calculate the concentration of the solution, given $\epsilon = 6,000 \text{ dm}^3 \text{ mol}^{-1} \text{ cm}^{-1}$.

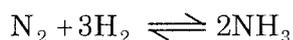
PART B — (5 × 16 = 80 marks)

11. (a) (i) What are reversible and irreversible cells? Give examples. (6)
- (ii) Describe the construction of the glass electrode. Explain. How is it used to find the pH of a solution? Give its limitations. (10)

Or

- (b) (i) Derive Nernst's equation for single electrode potential and explain the terms involved in it. Write its applications. (8)
- (ii) Discuss briefly conductometric titrations. What are the advantages of conductometric titrations over ordinary volumetric methods? (8)

12. (a) (i) The equilibrium constant of the reaction :



is $1.64 \times 10^{-4} \text{ atm}$ and $0.144 \times 10^{-4} \text{ atm}$ at 400°C and 500°C respectively. Calculate the heat of reaction in terms of calories. (7)

- (ii) What is the criteria for spontaneity? Derive Gibb's – Helmholtz equation and mention its application. (9)

Or

- (b) (i) What is meant by vant Hoff's reaction isotherm? Derive the expression for a reaction isotherm of a general reaction. (8)
- (ii) Calculate ΔH , ΔS , ΔG and ΔE when one mole of water is vapourised at 100°C and 1 atm pressure. The latent heat of vapourisation of water is 540 cal/g. (8)

13. (a) (i) Derive an expression for the kinetics of opposing reaction, first order in both directions. (8)
- (ii) In a second order reaction, the initial concentration of reactants is 0.1 mol L^{-1} . The reaction is found to be 20% complete in 40 minutes. Calculate the rate constant, half-life period and time required to complete 75% of the reaction. (8)

Or

- (b) (i) Derive an expression for the rate constant of a reaction in solution in terms of Arrhenius activation energy and entropy of activation. (8)
- (ii) Derive kinetic expression for a second order reaction and show that under certain conditions it gives first order kinetics. (8)
14. (a) Explain the following with examples : (16)
- (i) Promoters
- (ii) Catalytic poison
- (iii) Negative catalyst
- (iv) Difference between homogeneous and heterogeneous catalysis.

Or

- (b) (i) Derive Langmuir adsorption isotherm. Write the factor on which adsorption depends. (8)
- (ii) Discuss the BET theory of multilayer adsorption. (8)
15. (a) (i) What is flame photometry? Give the theory, procedure and applications of flame photometry. (8)
- (ii) How will you differentiate the inter and intra molecular hydrogen bonding with the help of IR spectroscopy? (8)

Or

- (b) (i) Explain the principle and working of spectrophotometer, giving its neat block diagram. (8)
- (ii) Discuss the principle of atomic absorption spectroscopy. Give the block diagram of atomic absorption spectroscopy. (8)