

Section-B
(Short Answer)

Note: Answer any EIGHT of the following questions. Each question carries 05 marks.

- Q.2: Define the following with examples.
(i) Significant figures (ii) Stoichiometry
- Q.3: A compound of C, H and O contains 40% carbon and 6.6% hydrogen, the molecular mass of compound is 180. Find out the molecular formula.
- Q.4: State the following gas laws and explain in terms of kinetic theory of gases.
(a) Boyle's law (b) Dalton's law of partial pressure
- Q.5: A 12.5 dm³ vessel contains 4.0 g of CH₄, 1.8 g of N₂ and 10.0 g Xe? What is the pressure in the vessel at 0 °C?
- Q.6: Explain the following:
(i) Evaporation is a cooling process (ii) A falling drop of liquid is spherical
(iii) Honey is more viscous than water.
- Q.7: What do you understand by atomic spectra? Explain the types of atomic spectra you know.
- Q.8: Define Ionic Bond. Explain by giving examples of the formation of ionic bond between sodium and chlorine atoms.
- Q.9: State and explain First law of Thermodynamics and derive the expression $q_p = \Delta H$.
- Q.10: Define Oxidation Number. Find oxidation number of:
(i) S in H₂SO₄ (ii) Cr in K₂Cr₂O₇ (iii) C in C₆H₁₂O₆
- Q.11: What is rate law? Derive rate expression for the following reaction:
2A + 3B → Product.

Section-C
(Descriptive Answer)

Note: Answer any TWO of the following. Each question carries 14(7+7) marks.

- Q.12 (a) State and explain Law of Mass Action and derive equilibrium constant (K_c) expression for the following reaction.
$$N_{2(g)} + 3H_{2(g)} \rightleftharpoons 2NH_{3(g)}$$
- (b) A quantity of PCl₅ was heated in a 12 dm³ vessel at 250 °C.
$$PCl_{5(g)} \rightleftharpoons PCl_{3(g)} + Cl_{2(g)}$$

At equilibrium, the vessel contains 0.21 mole of PCl₅, 0.32 mole PCl₃ and 0.32 mole Cl₂. Calculate the value of K_c.
- Q.13(a) Explain with the help of discharge tube experiment that hydrogen atom contains proton.
- (b) Calculate heat of formation of Ethane at 25 °C from the following data:
(i) $2C_{(s)} + 3H_{2(g)} \rightleftharpoons C_2H_{6(g)}$ $\Delta H_f = ?$
(ii) $C_{(s)} + O_{2(g)} \rightleftharpoons CO_{2(g)}$ $\Delta H = -394.0 \text{ KJ/mole}$
(iii) $H_{2(g)} + \frac{1}{2}O_{2(g)} \rightleftharpoons H_2O_{(l)}$ $\Delta H = -286.0$
(iv) $C_2H_{6(g)} + \frac{7}{2}O_{2(g)} \rightleftharpoons 2CO_{2(g)} + 3H_2O_{(l)}$ $\Delta H = -1560.632 \text{ KJ/mole}$