

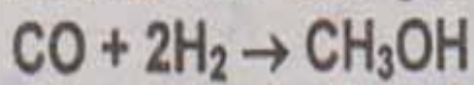
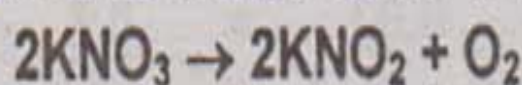
Time: 2 Hours 40 Minutes

Marks: 68

SECTION 'B' (SHORT-ANSWER QUESTIONS)**NOTE: Answer any Ten part questions. (40)**

2.(i) Define the following:

- (i) Stoichiometry (ii) Molar volume
(iii) Activation energy (iv) Enthalpy

(ii) Find the mass of the CH_3OH produced when 356 gm of CO is mixed with 65.0 gm of H_2 .(iii) 100 gram of KNO_3 heated to redness. Find volume of oxygen is liberated at 39°C and 765 torr pressure.

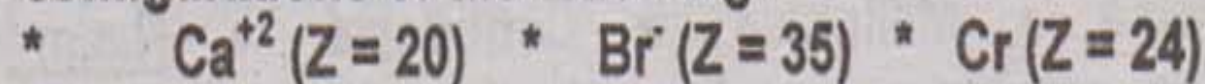
(iv) Give the scientific reasons for any four of the following:

- (*) Viscosity of ethyl alcohol is greater than that of diethyl ether.
(*) Milk sours rapidly in summer than in winter.
(*) Evaporation is a cooling process.
(*) H_2O has higher boiling point than HF .
(*) CO_2 has zero dipole moment.

(v) Calculate the density of SO_2 in g/dm^3 at 25°C and 300 torr pressure.

(vi) What is ideal gas? Derive the ideal gas equation.

(vii) State Pauli's exclusion principle and write the electronic configurations of the following:



(viii) Explain ionic character of Covalent bond.

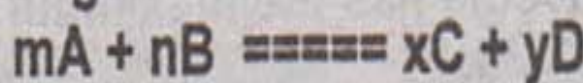
(ix) State the First Law of thermodynamics and show that:

$$q_v = \Delta E \quad q_p = \Delta H$$

(x) Calculate $\Delta H_{25^\circ\text{C}}$ of ethane from the data given below:

- * $2\text{C}_{(\text{s})} + 3\text{H}_{2(\text{g})} \rightarrow \text{C}_2\text{H}_{6(\text{g})} \quad \Delta H_{250\text{C}} = ?$
 * $\text{C}_{(\text{s})} + \text{O}_{2(\text{g})} \rightarrow \text{CO}_{2(\text{g})} \quad \Delta H_{250\text{C}} = -394 \text{ KJ/mole}$
 * $\text{H}_{2(\text{g})} + \frac{1}{2} \text{O}_{2(\text{g})} \rightarrow \text{H}_2\text{O}_{(\text{l})} \quad \Delta H_{250\text{C}} = -286 \text{ KJ/mole}$
 * $\text{C}_2\text{H}_{6(\text{g})} + 7/2 \text{O}_{2(\text{g})} \rightarrow 2\text{CO}_{2(\text{g})} + 3 \text{H}_2\text{O}_{(\text{l})} \quad \Delta H_{250\text{C}} = -1560 \text{ KJ/mole}$

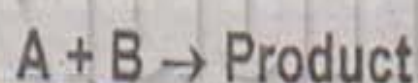
(xi) State and explain the law of mass action. Derive the expression for the general reversible reaction given below:



(xii) 4.6 gram of ethyl alcohol and 6.0 gram of acetic acid were kept at constant temperature until equilibrium was established 2.0 gram of acetic acid remained unused.

Calculate K_c for the reaction.(xiii) What is Electrolysis? Explain electrolysis in CuCl_2 solution. Also give the chemical reactions on the electrodes.

(xiv) Determine the order of reaction from the data given below:



| Experiment Number | [A] mole/ dm^3 | [B] mole/ dm^3 | Rate of reaction mole/ $\text{dm}^3 \text{ s}$ |
|-------------------|-------------------------------|-------------------------------|--|
| 1 | 0.1 | 0.1 | 3.0×10^{-3} |
| 2 | 0.2 | 0.1 | 6.0×10^{-3} |
| 3 | 0.1 | 0.3 | 9.0×10^{-3} |

(xv) Make the list of factors which affect the rate of reaction. Discuss the following factors:

- * Surface area * Temperature

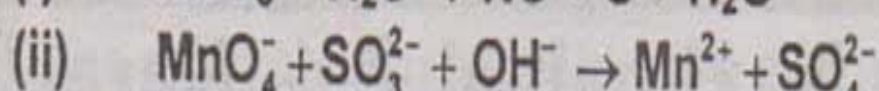
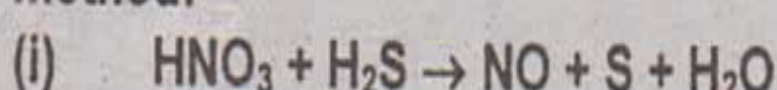
SECTION 'C' (DETAILED- ANSWER QUESTIONS)(28)**NOTE: Answer 2 questions from this section.**3.(a) With the help of the experiment of scattering of α -rays, explain the atomic model and its conclusion.(b) State the postulates of Bohr's Atomic Theory and derive an expression for the energy of an electron in the n^{th} orbit when $r = \frac{n^2 h^2}{4\pi^2 m_e Z e^2}$.

(c) Differentiate between Isomorphism and Polymorphism and explain ionic crystal.

4.(a) What is Chemical bond? Give its types. Using the example of NaCl , explain the formation and stability of ionic bond.(b) Give the postulates of electron pair repulsion model and draw the molecular shapes of BF_3 and H_2O on the basis of this model.(c) Should AgCl precipitate from a solution prepared by mixing 400 ml of 0.1 M NaCl and 600 ml of 0.03 M AgNO_3 ? (K_{sp} of $\text{AgCl} = 1.6 \times 10^{-10} \text{ mole}^2 / \text{dm}^6$)

5.(a) What is Electrode potential? Determine the electrode potential of Zinc with the help of cell diagram.

(b) Balance any one of these equation by ion electron method:

(c) 4.0 g NaOH is dissolved in 2.5 dm^3 solution. Find its molarity and pH.