

SECTION 'B'

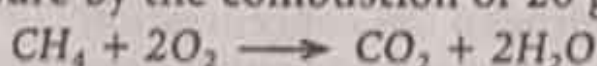
SHORT ANSWER QUESTIONS (Marks 32)

Note: Attempt any EIGHT questions from this section. All questions carry equal marks.

Q.2(i) Define the following:

- | | |
|---------------------|---------------------|
| ☆ Avogadro's Number | ☆ Heat of Formation |
| ☆ Limiting Reactant | ☆ Rate Expression |

(ii) Calculate the volume of CO_2 gas produced at 25°C and 740 torr pressure by the combustion of 20 grams of CH_4 .



(iii) An organic compound on analysis gave the following result

$$\text{C} = 12.8\%, \text{H} = 2.1\%, \text{Br} = 85.1\%$$

(iv) What is Ideal Gas? Derive the General Gas equation.

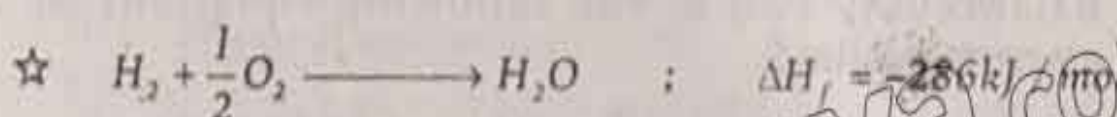
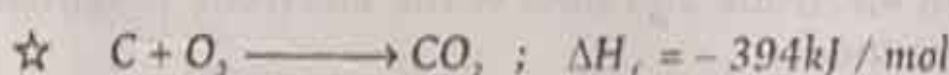
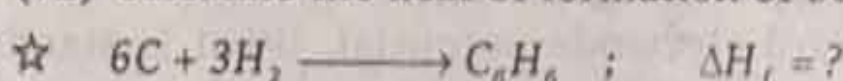
(v) Calculate the density of SO_2 in g/dm^3 at 25°C and 300 torr pressure.

(vi) State $(n + l)$ rule and write the electronic configuration of the following:

$$\star \text{Mo} (Z = 42) \quad \star \text{S}^{2-} (Z = 16)$$

$$\star \text{Sr}^{2+} (Z = 38)$$

(vii) Calculate the heat of formation of benzene at 25°C .



(viii) Define Solubility. The solubility of $\text{Mg}(\text{OH})_2$ at 25°C is 0.0046 gm/dm^3 . What is the solubility product of $\text{Mg}(\text{OH})_2$?

(ix) State and explain Le-Chatelier principle with reference to, the formation of NH_3 by Haber's process or sulphuric acid by contact process.

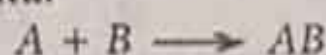
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(x) Define and explain orbital hybridization. Describe sp^2 hybridization in C_2H_4 .

(xi) Explain any four of the following:

- ☆ Evaporation is a cooling process.
- ☆ Milk gets sour more rapidly in summer than in winter.
- ☆ Glycerine is distilled at reduced pressure.
- ☆ The ionization potential of nitrogen is more than that of oxygen.
- ☆ The boiling point of H_2O is greater than HF although electronegativity of fluorine is more than oxygen.

(xii) Write the rate law. Determine the order of reaction using the following data:



Exp.	[A]	[B]	$\frac{dx}{dt}$
1	0.1M	0.1M	$2 \times 10^3 \text{ MS}^{-1}$
2	0.2M	0.1M	$8 \times 10^3 \text{ MS}^{-1}$
3	0.1M	0.2M	$4 \times 10^3 \text{ MS}^{-1}$

(xiii) Define pH. The pH of solution is 8.4. Find:

- ☆ pOH of the solution
- ☆ Hydrogen ion concentration
- ☆ Hydroxyl ion concentration

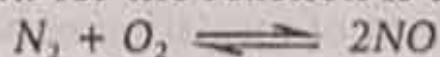
SECTION 'C'

DETAILED ANSWER QUESTIONS (Marks 20)

Note: Attempt any TWO question from this section. All questions carry equal marks.

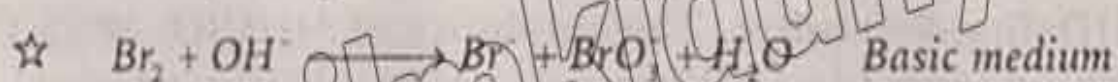
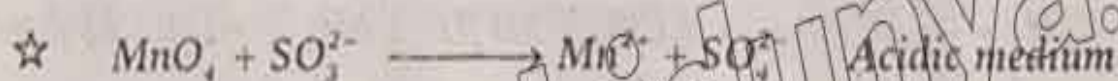
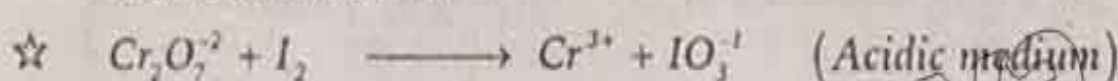
Q.3(a) With the help of the experiment of scattering α -rays, explain the atomic model and its conclusion.

(b) 1 mole of N_2 and 1 mole of O_2 were heated at 2000°C in 10 dm^3 vessel. Calculate the equilibrium concentration of Nitric Oxide K_c for the reaction is 0.1.



Q.4(a) Define standard electrode potential. What is standard hydrogen electrode and how is the electrode potential of Zn determined?

(b) Balance any two of the following equations by ion electron method:



Q.5(a) Explain the structures of BF_3 and NH_3 on the basis of electron pair repulsion model and hybrid orbital model.

(b) Differentiate any two of the following:

- ☆ Amorphous solid and Crystalline Solid
- ☆ Covalent Bond and Coordinate Covalent Bond

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$$\star \text{Polar and Non-polar Bond}$$

$$\star \text{Molarity and Molality}$$

(OR) Define Chemical bond. Explain the ionic bonding in NaCl and discuss its stability.