



MIX TEST-3 (JEE)

Some Basic Concepts of Chemistry + Thermodynamics-1 + Thermochemistry

"Don't judge yourself for falling short. Applaud yourself for trying."

- The percentage (by weight) of sodium hydroxide in a 1.25 molal NaOH solution is :**
(1) 4.76% (2) 1.25% (3) 5% (4) 40%
- 4 g of hydrocarbon (C_xH_y) on complete combustion gave 12 g of CO_2 . What is the empirical formula of the hydrocarbon? (C = 12, H = 1)**
(1) CH_3 (2) C_4H_9 (3) CH (4) C_3H
- 20 mL of acetic acid reacts with 20 mL of ethyl alcohol to form ethyl acetate. The density of acid and alcohol are 1 g/mL and 0.7 g/mL respectively. The limiting reagent in this reaction is :**
(1) Acetic acid (3) Acetic acid and ethyl alcohol both
(2) Ethyl alcohol (4) Ester
- What is the value (in litres) of CO_2 liberated at STP when 2.12 g of sodium carbonate (mol. wt. 106) is treated with excess dilute HCl?**
(1) 2.28 L (2) 0.448 L (3) 44.8 L (4) 22.4 L
- The number of molecules present in 3.5 g of CO at $0^\circ C$ and 760 mm pressure is :**
(1) 6.02×10^{23} (2) $1.25 \times 6.02 \times 10^{23}$ (3) $0.125 \times 6.02 \times 10^{23}$ (4) $1.25N_A$
- Consider the following:**
 $Mg(s) + 2HCl(aq) \rightarrow MgCl_2(aq) + H_2(g); \Delta H = -467 \text{ kJ mol}^{-1}$
 $MgO(s) + 2HCl(aq) \rightarrow MgCl_2(aq) + H_2O(l); \Delta H = -151 \text{ kJ mol}^{-1}$
 $H_2(g) + \frac{1}{2}O_2(g) \rightarrow H_2O(l); \Delta H_f^\circ = -286 \text{ kJ mol}^{-1}$
What is ΔH_f° for $MgO(s)$?
(1) -904 kJ mol^{-1} (3) -334 kJ mol^{-1}
(2) -602 kJ mol^{-1} (4) -30 kJ mol^{-1}
- An ideal gas at initial pressure P_i and volume V_i undergoes reversible expansion to the same volume V_f either isothermally or adiabatically. Consider the following statements:**

1. $P_f(\text{adiabatic}) < P_f(\text{isothermal})$
2. $|W(\text{isothermal})| > |W(\text{adiabatic})|$
3. $T_f(\text{adiabatic}) < T_f(\text{isothermal})$
4. $|q(\text{isothermal})| > |q(\text{adiabatic})|$

- (1) Only one
- (2) Only two
- (3) Only three
- (4) All

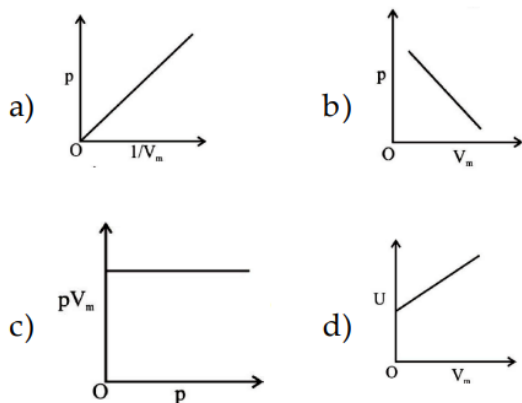
8. For the formation of $\text{NH}_3(\text{g})$ from its constituent elements at constant temperature and pressure, which of the following options is correct?

- (1) $\Delta H = 0$ (2) $\Delta U = \Delta H$ (3) $\Delta U > \Delta H$ (4) $\Delta U < \Delta H$

9. Molar heat capacity (C_p) of water at constant pressure is $75 \text{ J K}^{-1} \text{ mol}^{-1}$. The increase in temperature (in K) of 100 g of water when 1 kJ of heat is supplied to it is :

- (1) 2.4 (2) 0.24 (3) 1.3 (4) 0.13

10. The combination of plots which does not represent isothermal expansion of an ideal gas is :



- (1) B and D (2) A and D (3) B and C (4) A and C

Section – B: Integer Type Questions (+4, -1)

(Answers from 0 to 99 are possible)

11. On complete combustion 0.30 g of an organic compound gave 0.20 g of CO_2 and 0.10 g of H_2O . The percentage of carbon in the given organic compound is _____ (Nearest integer).
12. When a 60 W electric heater is immersed in a gas for 100 s in a constant volume container with adiabatic walls, the temperature of the gas rises by 5°C . The heat capacity of the given gas is $100x \text{ J K}^{-1}$. Find x (Nearest integer).
13. An organic compound having carbon, hydrogen and sulphur contains 4% of sulphur. The minimum molecular weight of the compound is $100a$. Find a .