| Daily Tutorial Sheet-10 | Level-2 |
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**116.(A)** $N_2O \Rightarrow \overset{-}{N} = \overset{+}{N} = O$

$N_2 + \frac{1}{2}O_2 \longrightarrow N_2O$

$\Rightarrow \quad (N \equiv N) + \frac{1}{2}(O = O) - [(N = N) + (O = N)] \quad \Rightarrow \quad 946 + \frac{1}{2}(498) - 418 - 607 = 170\,kJ/mol$

$\Rightarrow$ Resonance Energy = 82 – 170 = –88 kJ/mol.

**117.(B)** $CH_2 = CH_2 + 3O_2 \longrightarrow 2CO_2 + 2H_2O$

1411 kJ Heat is released with = 3 mole of $O_2$

6226 kJ Heat released with $= \frac{3}{1411} \times 6226 = 13.23$ mole of $O_2$

PV = nRT

$V = 13.23 \times 0.0821 \times 273$

V = 296.5 lt.

**118.(ABC)** By definition

**119.(A)** $C_5H_{10} + H_2 \rightarrow C_5H_{12} \quad \Delta H = +126$ kJ / mole

$C_5H_8 + 2H_2 \rightarrow C_5H_{12} \quad \Delta H_{actual} = +230$ kJ / mole

$\Delta H_{th} = 2 \times 126$ kJ / mole = 252 kJ / mole

R.E = 230 – 252 = –22kJ / mole

**120.(B)** Applying PV = nRT for gaseous mixture

$\left(\frac{740}{760}\right) \times 1 = n \times 0.082 \times 298 \quad \Rightarrow \quad n = 0.0398$

Heat generated = Heat capacity × Temperature rise = 1260 × 0.667 = 840 cal

Mole of $CH_4$ in the mixture = $\frac{840}{210.8 \times 10^3} = 3.98 \times 10^{-3}$

Mole per cent of $CH_4 = \frac{3.98 \times 10^{-3}}{0.398} \times 100 = 10$

**121.(C)** $C + H_2O(g) \longrightarrow H_2(g) + CO(g) \qquad \Delta H_f^o = ?$

$\therefore \quad \Delta H° = \Delta_f H^o_{CO} - \Delta_f H^o_{H_2O} = -110.53 - (-241.81) = 131.28$ kJ/mol ($\because \Delta_f H°$ for C and $H_2$ are zero)

Thus, $\Delta H°$ needed for 100 g carbon = $\frac{131.28 \times 100}{12}$ kJ

Now, 393.51 kJ energy is provided by 12 g C

$\frac{131.28 \times 100}{12}$ kJ energy is provided by = $\frac{12 \times 131.28 \times 100}{12 \times 393.51} = 33.36$ g

**122.(A)** Meq. of acid and base = 200

i.e. 200 Meq. of HCl react with 200 Meq. of NaOH to produce heat = $\Delta H$

$\therefore$ 1000 Meq. of HCl when react with 1000 Meq. of NaOH will give heat

$= 5 \times \Delta H$ = Heat of neutralization

Now, heat produced during neutralisation of 200 Meq. of acid and base

= heat taken up by calorimeter + solution = $M_1 \times S_1\Delta T + M_2 \times S_2\Delta T$

= $12 \times 1 \times 4.4 + 600 \times 1 \times 4.4 = 2692.8$ cal

$\therefore$ Heat of neutralization = $5 \times 2692.8$ cal = – 13.464 kcals

**123.(A)** $C_4H_{10}(g) + \frac{13}{2} O_2(g) \longrightarrow 4CO_2(g) + 5H_2O(g)$ $\Delta H = -2658$ kJ

Molecular weight of $C_4H_{10}$ = 58 g/mole

58 g of butane on combustion produces 2658 kJ heat

$\therefore$ 11.2 kg of butane on combustion produces $\frac{2658 \times 10^3 \times 11.2}{58}$ J

Family needs 20,000 kJ of energy per day

$\therefore$ Number of days = $\frac{2658 \times 10^3 \times 11.2}{58 \times 20{,}000} = 25.66$ days

**124.(B)** Total energy required in the day = $\frac{150 \times 24 \times 60 \times 60}{1000}$ kJ =12960 kJ [$\because$ Watt = $Jsec^{-1}$]

Units of glycogen required = $= \frac{12960}{476} = 27.22$ units

**125.(A)** $\rightarrow$ In, endothermic reaction, on increasing T, reaction moves in forward direction.

$\rightarrow$ There is no effect of addition of solid component on equilibrium.

$\rightarrow$ On adding $NH_4OH$, $NH_4^+$ concentration increases, due to which reaction moves to left side.