DPP
DAILY PRACTICE PROBLEMS

CLASS : XIth
DATE :

Solutions

SUBJECT : CHEMISTRY
DPP No. : 1

Topic :- THERMODYNAMICS

1 **(c)**

$\Delta H = nC_p\Delta T$

The process is isothermal therefore,

$\Delta G = 0$

$\therefore\ \Delta H = 0$

2 **(b)**

The system returns to its original state, *i.e.*, cyclic process.

3 **(b)**

$\Delta G = \Delta H - T\Delta S$; at equilibrium,

$\Delta G = 0, \quad \therefore \Delta H = T\Delta S$

or $\Delta H = 273 \times (60.01 - 38.20) = 5954.13\ \text{J mol}^{-1}$

4 **(a)**

$EN_{\text{F}} \sim \text{EN}_{\text{Cl}} = 0.2028\sqrt{\Delta}$

and $\Delta = \left[e_{\text{F–Cl}} - (e_{\text{F–F}} \times e_{\text{Cl–Cl}})^{1/2}\right]$

$\therefore EN_{\text{F}} \sim \text{EN}_{\text{Cl}} = 0.2028\left[e_{\text{F–Cl}} - (e_{\text{F–F}} \times e_{\text{Cl–Cl}})^{1/2}\right]^{1/2}$

Or $1 = 0.2028\left[e_{\text{F–Cl}} - (38 \times 58)^{1/2}\right]^{1/2}$

$\therefore\ e_{\text{F–Cl}} = 71.26\ \text{kcal mol}^{-1}$.

6 **(b)**

0.2 mole will neutralize 0.2 mole of HNO_3 heat evolved $= 51 \times 0.2 = 11.4$ kJ

7 **(b)**

Kirchhoff's equation is : $\Delta H_2 - \Delta H_1 = \Delta C_p\,(T_2 - T_1)$

8 **(d)**

Δn depends on stoichiometry of reaction.

9 **(a)**

$e_{A-A} = a$ Also, $\frac{1}{2}A_2 + \frac{1}{2}B_2 \rightarrow AB$;

$e_{A-B} = a\ \ \Delta H = -100\ \text{kJ mol}^{-1}$

$e_{B-B} = 0.5a$

$\therefore \quad \Delta H = -[e_{A-B}] + \frac{1}{2}[e_{A-A} + e_{B-B}]$

$= a + \frac{1}{2}[a + 0.5a]$

$-100 = -0.25\,a$

$\therefore \quad a = 400 \text{ kJ mol}^{-1}$

10 **(d)**

The properties of the system whose value is independent of the amount of substance present in the system are called intensive properties *e.g.,* viscosity, surface tension, temperature, pressure etc.

11 **(d)**

When a real gas is forced through a porous plug into a region of low pressure, it is found that due to expansion, the gas on the side of low pressure gets cooled

12 **(b)**

The room got heated because heat is lost to surroundings.

13 **(b)**

$$T_b = \frac{\Delta H}{\Delta S} = \frac{30 \times 10^3}{75} = 400 \text{ K}$$

14 **(d)**

Heat of combustion is always exothermic; Few combustion reactions such as F_2 to F_2O, N_2 to N_2O and NO are endothermic but these reactions do not give heat of combustion because the substance should be completely oxidized. In F_2O, F_2 is reduced and N_2O and NO are not completely oxidized state of N_2. However, three reactions are exceptions but these do not represent heat of combustion. These are,

$N_2 + O_2 \longrightarrow N_2O; \qquad \Delta H = +\text{ve}$

$N_2 + O_2 \longrightarrow NO; \qquad \Delta H = +\text{ve}$

and $F_2 + (1/2)O_2 \longrightarrow F_2O; \quad \Delta H = +\text{ve}$

15 **(b)**

For an isothermal process $\Delta T = 0$ and $\Delta E = 0$ and $q \neq 0$.

16 **(b)**

Given: (i)$H_2 + \frac{1}{2}O_2 \rightarrow H_2O$; $\Delta H = -241$ kJ

(ii)$C_6H_{10} + \frac{17}{2}O_2 \rightarrow 6CO_2 + 5H_2O$; $\Delta H = -3800$ kJ

(iii)$C_6H_{12} + 9O_2 \rightarrow 6CO_2 + 6H_2O$; $\Delta H = -3920$ kJ for the reaction

$C_6H_{10} + H_2 \rightarrow C_6H_{12}$

[It is infact Eq.(i)+Eq.(ii) − Eq.(iii)]

Thus, $\Delta H = -241 - 3800 - (-3920) = -121$ kJ

17 **(d)**

In isothermal reversible process, ideal gas has constant volume and so, $\Delta E = 0$ and

$$\Delta H = \Delta E = 0$$

18 **(a)**

$\Delta H = -2 \times e_{\text{H–Cl}} + e_{\text{H–H}} + e_{\text{Cl–Cl}}$

$\therefore \quad n182 = -2 \times a + 430 + 242$

$\therefore \quad a = 245 \text{ kJ mol}^{-1}$

19 **(d)**

$\Delta H = \Delta U + \Delta nRT$

$\Delta n = +1/2$

Thus, $\Delta H > \Delta U$

20 **(c)**

Cylinder contains 11.2 kg or 193.10 mole butane. ($\because$ molecular mass of butane $=58$)

$\because$ Energy released by 1 mole of butane $= -2658$

$\therefore$ Energy released by 193.10 mole of butane

$= -2658 \times 193.10$

$= 5.13 \times 10^5$ kJ

$\therefore \frac{5.13 \times 10^5}{20000} = 25.66$ or 26 days

ANSWER-KEY										
Q.	1	2	3	4	5	6	7	8	9	10
A.	C	B	B	A	D	B	B	D	A	D
Q.	11	12	13	14	15	16	17	18	19	20
A.	D	B	B	D	B	B	D	A	D	C