DPP
DAILY PRACTICE PROBLEMS

CLASS : XIth
DATE :

Solutions

SUBJECT : CHEMISTRY
DPP No. : 6

Topic :- THERMODYNAMICS

1 **(a)**

Hess's law states that the total change in heat enthalpy during the complete course of reaction is same, whether the change is brought in one step or in several steps by one method or other method.

2 **(c)**

First we calculate the expected bond dissociation energy of benzene molecules as

$3 \times C - C + 3 \times C = C + 6 \times C - H$

$\therefore$ Calculated value $= 3(347.3) + 3(615) + 6(412.2)$

$= 4397.8$

Resonance energy = Experimental value – calculated value

$= 5335 - 4397.8$

$= 937.2$ kJ per mol

3 **(d)**

$$\Delta S = 2.303 nR \log \frac{V_2}{V_1}$$

$$= 2.303 \times 2 \times 2 \log \frac{20}{2} = 9.2$$

4 **(b)**

Work done by the system or work of expansion is negative. Work done on the system or work of compression positive.] The modern concept.

5 **(a)**

From first law of thermodynamic.

$\Delta E = q + W$ Given, $q = +300$ cal ($\because$ Heat is absorbed)

$W = -500$ cal

($\because$ Work is done on surroundings)

$\therefore \quad \Delta E = q + W = 300 + (-500)$

$= -200$ cal

6 **(b)**

An experimental fact.

7 **(b)**

$CH_4(g) + 2O_2(g) \rightarrow CO_2(g) + 2H_2O(l)$

$\Delta n_g = 1 - 3 = -2$

We know that,

$\Delta E = \Delta H + \Delta n_g RT$

$\therefore \quad \Delta H = (-885389) - (-2) \times 8.314 \times 298$

$= -885389 + 4955.1440$

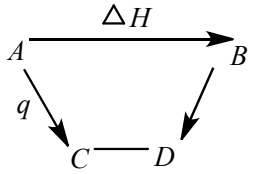
$= -880433.86 \text{ J mol}^{-1}$

8 **(a)**

Human body is an example of open system as it can exchange both mass and energy with the surroundings.

9 **(c)**

According to Hess's law, the total heat changes occurring during a chemical reaction are independent of path.



$\Delta H = q + V + 2x$

11 **(c)**

$\because q_{abs} = \Delta U + (-W)$

$\therefore \Delta U = q + W$; ΔU is state function.

12 **(c)**

For exothermic reaction, $\Delta H = (-)$ for endothermic reaction, $\Delta H = (+)$.

13 **(b)**

Find ΔH for,

$Ca + O_2 + H_2 \rightarrow Ca(OH)_2$

14 **(b)**

For maximum extent of reaction,

$4X(s) + O_2(g) \longrightarrow 2X_2O(s); \quad \Delta H = a$

Also, $X(s) + \frac{1}{4}O_2(g) \longrightarrow \frac{1}{2}X_2O(s)$; $\Delta H = -90$ kJ

$\therefore \quad a = -90 \times 4 = -360$ kJ

15 **(c)**

For spontaneous process $\Delta G = -$ ve

16 **(a)**

$$S + \frac{3}{2}O_2 \rightarrow SO_3;\ \Delta H = -2x$$

$$SO_2 + \frac{1}{2}O_2 \rightarrow CO_2 + SO_3;\ \Delta H = -y$$

$$\underline{- \quad - \qquad\qquad - \qquad +}$$

$$S + O_2 \rightarrow SO_2; \qquad\qquad \Delta H = (y - 2x)$$

17 **(a)**

Given, $2C + 3H_2 \rightarrow C_2H_6$; $\Delta H = -21.1$

$C + O_2 \rightarrow CO_2$; $\Delta H = -94.1$

$H_2 + \frac{1}{2}O_2 \rightarrow H_2O$; $\Delta H = -68.3$

Eqs .2(ii) + 3(iii) − (i)

$C_2H_6 + \frac{3}{2}O_2 \rightarrow 2CO_2 + 3H_2O$

$\Delta x = 2(-94.1) + 3(-68.3) - (-21.1)$

$= -372$ kcal

18 **(c)**

Surface tension is an intensive property because it does not depend upon the quantity of matter present in the system

19 **(a)**

$$\frac{1300}{241.8} = \frac{5.37}{1}$$

20 **(d)**

$PV = 1 \times 1$ lit − atm

$= 10^{-3}m^3 \times 0.76 \times 13.6 \times 9.8 \times 10^3 Nm^{-2}$

$= 101.3$ J

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