DPP
DAILY PRACTICE PROBLEMS

CLASS : XIth
DATE :

Solutions

SUBJECT : CHEMISTRY
DPP No. : 8

Topic :- THERMODYNAMICS

1 **(b)**

$H^+ + OH^- \longrightarrow H_2O$; $\Delta H = -13.7$ kcal

Also, $\Delta H = H_f^\circ H_2O - [H_{H^+}^\circ + H_{OH^-}^\circ]$

Or $-13.7 = -68.0 - [0 + H_{OH^-}^\circ]$ $[\because H_{H^+}^\circ = 0]$

$\therefore H_{OH^-}^\circ = -54.3$ kcal

2 **(a)**

This is the derived formula for W_{rev} is isothermal change.

3 **(b)**

Internal energy depends upon the temperature of gas and not on P and V.

4 **(a)**

T_A and T_B are same for a liquid.

5 **(d)**

$\Delta H = -2 \times [2 \times e_{O-H}] + 2 \times e_{H-H} + e_{O-O}$

$= -4 \times 220 + 2 \times 105 + 120 = -550$ kJ

6 **(c)**

Heat measurements are made in calorimeter usually made of copper.

7 **(d)**

The process involves conversion of 1 mole of C(s) to C(g), *i.e.*, sublimation.

8 **(d)**

$C + 2H_2 \rightarrow CH_4$; $\Delta H = -17.9$ kcal.....(i)

$C + O_2 \rightarrow CO_2$; $\Delta H = -94.1$ kcal.....(ii)

$H_2 + \frac{1}{2}O_2 \rightarrow H_2O$; $\Delta H = -68.3$ kcal.....(iii)

Eqs. [(ii) + 2 × (iii)] – (i),

$CH_4 + 2O_2 \rightarrow 2H_2O$

10 **(a)**

The branch deals with interconversion of heat and chemical energy.

11 **(d)**

$2H_2 \rightarrow 4H$; $\Delta H = -869.6$ kJ

$\therefore e_{\mathrm{H—H}} = \frac{969.6}{2} = +434.8$ kJ

13 **(c)**

The properties, which do not depend on the amount of substance, are called intensive property. *e.g.*, surface tension, viscosity etc.

14 **(a)**

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

$\Delta n = -3$

15 **(a)**

$W_{\mathrm{rev}} = -\int PdV \; or \; -\int P\Delta V$; note that opposing pressure is not constant throughout .

16 **(b)**

Joule-Thomson coefficient

$$\mu = \frac{dT}{dP} = \frac{27-30}{5-2} = -1$$

For all negative values of μ,the gas warms on expansion

17 **(b)**

$W = -p\Delta V$

Given, $p + 100\mathrm{kPa} = 10^5$ Pa,

$V_1 = 1\mathrm{dm}^3 = 10^{-3}\mathrm{m}^3, V_2 = 1\mathrm{m}^3$

$W = 10^5 \times (1 - 10^{-3})$ J

$\therefore \quad W = 99900$ J

18 **(d)**

The efficiency of engine is given as,

$\eta = \frac{T_2 - T_1}{T_2}$;η is more when $T_2 - T_1$ is maximum.

20 **(d)**

A spontaneous change is accompanied by lowering of free energy

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