

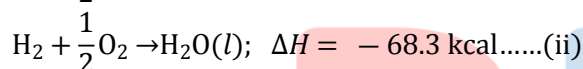
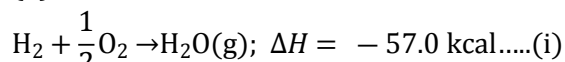
Topic :- THERMODYNAMICS

1 (d)

$$\Delta n = 0$$

$$\therefore \Delta H = \Delta U$$

2 (a)



By eq. (i) and (ii),



3 (b)

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

$$\begin{aligned} \therefore \Delta U &= 176 - 1 \times 8.314 \times 1240 \times 10^{-3} \\ &= 165.6 \text{ kJ} \end{aligned}$$

4 (a)

$$TV^{\gamma-1} = \text{constant}$$

$$\frac{T}{T_{\text{final}}} = \left(\frac{V_2}{V_1}\right)^{\gamma-1}$$

$$\frac{T}{T_{\text{final}}} = \left(\frac{2}{1}\right)^{(5/3-1)} = 2^{(2/3)}$$

$$\frac{T}{T_{\text{final}}} = \frac{T}{2^{(2/3)}}$$

6 (b)

$$\Delta n = -2$$

$$\begin{aligned} \therefore \Delta H &= \Delta U + \Delta nRT \\ &= -1415 + (-2) \times 0.0083 \times 300 \\ &= -1420 \text{ kJ} \end{aligned}$$

7 (c)

Experimental determination of heats of reaction by bomb calorimeter represents its value at constant volume, i.e., ΔU .

8 (b)

Graphite possesses sp^2 -hybridisation and has flat layer structure whereas diamond possesses sp^3 -hybridisation and has rigid tetrahedral nature.

9 (c)

$$n_{\text{efficiency}} = \frac{T_2 - T_1}{T_2}$$

$$\text{or } 0.25 = \frac{T - 400}{T}$$

$$\therefore T = 533.3 \text{ K}$$

10 (a)

Lower is energy level of a system, more is its stability.

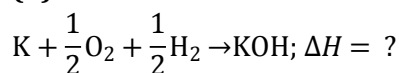
11 (b)

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

$$\text{Since, } \Delta n = -2$$

$$\text{Thus, } \Delta H < \Delta U$$

12 (b)



Find ΔH by Eq. [(i) + (ii)] - (iii).

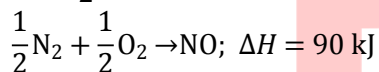
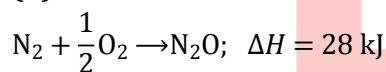
14 (c)

The fact for a quantity referred as state function.

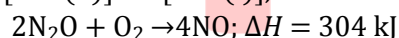
15 (c)

Bond formation is always exothermic.

16 (d)



By eq. [4 × (ii)] - [2 × (i)],



17 (b)

Calorific value = Heat of combustion per g of fuel, i.e., for C_2H_4 , it is $\frac{-1411}{28}$, the lowest value.

18 (b)

$$\Delta G^\circ = \Delta H^\circ - T\Delta S^\circ$$

$$= -54.07 - 298 \times 10 \times 10^{-3}$$

$$= -57.05 \text{ kJ}$$

$$\text{Also, } \Delta G^\circ = 2.303 RT \log_{10} K$$

$$\log_{10} K = \frac{-57.05 \times 10^3}{2.303 \times 8.314 \times 298}$$

19 (b)

Hess's law is based upon law of conservation of energy i.e., first law of thermodynamics.

20 (d)

$$\Delta S_f = \frac{\Delta H_f}{T} = \frac{6 \times 10^3}{273} = 21.98 \text{ J}$$

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

PE