Arjuna NEET (2024)

Thermodynamics

DPP-07

1. Since the enthalpy of the elements in their standard states is taken to be zero. The heat of formation (ΔH_f) of compounds:
(1) Is always negative
(2) Is always positive
(3) Is zero
(4) May be positive or negative

2. Which of the following equations represents standard heat of formation of CH_4?
(1) $C_{(diamond)} + 2H_2(g) \rightarrow CH_4(g)$
(2) $C_{(graphite)} + 2H_2(g) \rightarrow CH_4(g)$
(3) $C_{(diamond)} + 4H_2(g) \rightarrow CH_4(g)$
(4) $C_{(graphite)} + 4H_2(g) \rightarrow CH_4(g)$

3. Given enthalpy of formation of $CO_2(g)$ and $CaO(s)$ are –94.0 KJ and –152 KJ respectively and the enthalpy of the reaction:
$CaCO_3(s) \rightarrow CaO(s) + CO_2(g)$ is 42 KJ.
The enthalpy of formation of $CaCO_3(s)$ is
(1) –42 KJ (2) –202 KJ
(3) + 202 KJ (4) –288 KJ

4. The enthalpies of combustion of carbon and carbon monoxide are –393.5 KJ and –283 KJ, respectively the enthalpy of formation ofcarbon monoxide is:
(1) –676.5 KJ (2) –110.5 KJ
(3) 110.5 KJ (4) 676.5 KJ

5. The heat of combustion of $CH_{4(g)}$, $C_{(s)}$ and $H_{2(g)}$ at 25°C are –212.4 Kcal, –94.0 Kcal and –68.4 Kcal respectively, the heat of formation of CH_4 will be-
(1) + 54.4 Kcal (2) – 18.4 Kcal
(3) – 375.2 Kcal (4) + 212.8 Kcal

6. Standard enthalpy of formation is zero for.
(1) $C_{diamond}$ (2) $Br_{(g)}$
(3) $C_{graphite}$ (4) $O_{3(g)}$

7. Heat of formation of CO_2 is –94.0 Kcal. What would be the quantity of heat liberated, when 3 g of graphite is burnt in excess of oxygen:-
(1) 23.5 Kcals (2) 2.35 Kcals
(3) 94.0 Kcals (4) 31.3 Kcals

8. If $S + O_2 \rightarrow SO_2$; $\Delta H = -298.2$ kJ mol^{-1}

$SO_2 + \frac{1}{2} O_2 \rightarrow SO_3$; $\Delta H = -98.7$ kJ mol^{-1}

$SO_3 + H_2O \rightarrow H_2SO_4$; $\Delta H = -130.2$ kJ mol^{-1}

$H_2 + \frac{1}{2} O_2 \rightarrow H_2O$; $\Delta H = -287.3$ kJ mol^{-1}

Then the enthalpy of formation of H_2SO_4 at 298 K will be–
(1) –814.4 kJ mol^{-1}
(2) –650.3 kJ mol^{-1}
(3) –320.5 kJ mol^{-1}
(4) –433.5 kJ mol^{-1}

9. The heat of reaction for $A + \frac{1}{2} O_2 \rightarrow AO$ is –50 kcal/mol and $AO + \frac{1}{2} O_2 \rightarrow AO_2$ is 100 kcal/mol. The heat of reaction (in kcal/mol) for $A + O_2 \rightarrow AO_2$ will be:
(1) –50 (2) +50
(3) 100 (3) 150

10. Which of the reaction defines molar $\Delta H_f°$?
(1) $CaO(s) + CO_2(g) \rightarrow CaCO_3(s)$
(2) $\frac{1}{2} Br_2(g) + \frac{1}{2} H_2(g) \rightarrow HBr(g)$
(3) $N_2(g) + 2H_2(g) + \frac{3}{2} O_2(g) \rightarrow NH_4NO_3(s)$
(4) $I_2(g) + H_2(g) \rightarrow 2HI(g)$

11. The enthalpy of formation of ammonia is -46.0 kJ mol^{-1}. The enthalpy change for following reaction is $2NH_3 \rightarrow N_2 + 3H_2$

(1) 42.0 kJ mol^{-1}
(2) 64.0 kJ mol^{-1}
(3) 86.0 kJ mol^{-1}
(4) 92.0 kJ mol^{-1}

12. The molar heat of combustion of C_6H_6 is -3250 kJ mol^{-1}. When 0.39 g of C_6H_6 is burnt in excess of oxygen in an open vessel, the amount of heat evolved is:

(1) 8.32 kJ (2) 12.36 kJ
(3) 16.25 kJ (4) 20.74 kJ

13. Heat of combustion ΔH^o for C(s), $H_2(g)$ and $CH_4(g)$ are -94, -68 and -213 kcal/ mol. Then, ΔH^o for

$C(s) + 2H_2(g) \rightarrow CH_4(g)$ is

(1) -17 kcal/mol
(2) -111 kcal/mol
(3) -170 kcal/mol
(4) -85 kcal/mol

14. The enthalpy and entropy change for the reaction, $Br_2(l) + Cl_2(g) \rightarrow 2BrCl(g)$ are 30 kJ mol^{-1} and 105 JK^{-1} mol^{-1} respectively. The temperature at which the reaction will be in equilibrium is:

(1) 285.7 K
(2) 273 K
(3) 450 K
(4) 300 K

15. Assume each reaction is carried in open container. For which reaction $\Delta H > \Delta E$?

(1) $H_2(g) + I_2(g) \rightarrow 2HI(g)$
(2) $N_2(g) + 3H_2(g) \rightarrow 2NH_3(g)$
(3) $PCl_5(g) \rightarrow PCl_3(g) + Cl_2(g)$
(4) $SO_2(g) + 1/2O_2(g) \rightarrow SO_3(g)$

16. The following reactions are given :

$CH_4(g) + 2O_2(g) \rightarrow CO_2(g)\ 2H_2O(g)$; $\Delta H = -x$…(i)

$C(s) + O_2(g) \rightarrow CO_2(g)$; $\Delta H = -y$ ….(ii)

$H_2(g) + 1/2O_2(g) \rightarrow H_2O(g)$; $\Delta H = -z$ ……(iii)

Calculate the heat of formation of CH_4 ?

(1) $x + y + z$ (2) $y + 2z - x$
(3) $x - y - 2z$ (4) none of the above

17. $\Delta U°$ of combustion of methane is $-X$ kJ mol^{-1}. The value of $\Delta H°$ is:

(1) $-X - 596R$ (2) $-X + 596$ R
(3) X + 596 R (4) X – 596 R

18. Consider the following process:

$A \rightarrow 2B$; $\Delta H = +150$ kJ

$3B \rightarrow 2C + D$; $\Delta H = -125$ kJ

$G + A \rightarrow 2D$; $\Delta H = +350$ kJ

For $B + D \rightarrow G + 2C$; ΔH will be

(1) +525 kJ (2) +325 kJ
(3) –175 kJ (4) –325 kJ

19. The standard enthalpies of formation of CO, NO_2 and CO_2 are -110.5 kJ mol^{-1}, -33.2 kJ mol^{-1} and -393.5 kJ mol^{-1} respectively. The standard enthalpy of the reaction is:

$4CO(g) + 2NO_2(g) \rightarrow 4CO_2(g) + N_2(g)$ is

(1) – 1065.6 kJ (2) – 200 kJ
(3) – 700 kJ (4) 850 kJ

20. Given $C_{(s)} + O_{2(g)} \rightarrow CO_{2(g)}$; $\Delta H = -94.2$ kcal

$H_{2(g)} + 1/2O_{2(g)} \rightarrow H_2O_{(g)}$; $\Delta H = -68.3$ kcal

$CH_{4(g)} + 2O_{2(g)} \rightarrow CO_{2(g)} + 2H_2O_{(g)}$; $\Delta H = -210.8$ kcal

What will be heat of formation of CH_4 in (kcal)?

(1) + 45.9 (2) – 20.0
(3) + 47.8 (4) – 47.3

21. From the given information, what is the standard enthalpy of formation for $Al_2O_3(s)$?

$2Al_2O_3(s) \rightarrow 4Al(s) + 3O_2(g)$; $\Delta H°_{rxn} = 3352$ kJ

(1) – 6704 kJ/mol (2) – 3352 kJ/mol
(3) – 1676 kJ/mol (4) 1676 kJ/mol

22. Consider the following reactions

$C(s) + O_2(g) \rightarrow CO_2(g) + X\ kJ$

$CO(g) + 1/2O_2(g) \rightarrow CO_2(g) + Y\ kJ$

The heat of formation of CO (g) is

(1) $-(X + Y)$ kJ/mol

(2) $(X - Y)$ kJ/mol

(3) $(Y - X)$ kJ/mol

(4) $(Y + X)$ kJ/mol

23. The enthalpy change for the following reaction is 368 kJ. Calculate the average O–F bond energy

$OF_2(g) \rightarrow O(g) + 2F(g)$

(1) 184 kJ/mol (2) 368 kJ/mol

(3) 536 kJ/mol (4) 736 kJ/mol

24. $N_2(g) + 2O_2(g) \longrightarrow 2NO_2(g) + xkJ$

$2NO(g) + O_2(g) \longrightarrow 2NO_2(g) + ykJ$

The enthalpy of formation of NO is

(1) $x - 2y$ (2) $x - y$

(3) $\frac{1}{2}(y - x)$ (4) $\frac{1}{2}(x - y)$

Note: Kindly find the Video Solution of DPPs Questions in the DPPs Section.

Answer Key

1.	**(4)**	**13.**	**(1)**
2.	**(2)**	**14.**	**(1)**
3.	**(4)**	**15.**	**(3)**
4.	**(2)**	**16.**	**(3)**
5.	**(2)**	**17.**	**(1)**
6.	**(3)**	**18.**	**(4)**
7.	**(1)**	**19.**	**(1)**
8.	**(1)**	**20.**	**(2)**
9.	**(2)**	**21.**	**(3)**
10.	**(3)**	**22.**	**(3)**
11.	**(4)**	**23.**	**(1)**
12.	**(3)**	**24.**	**(3)**

PW Web/App - https://smart.link/7wwosivoicgd4

Library- https://smart.link/sdfez8ejd80if