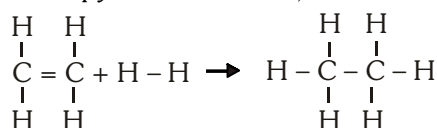


AIPMT 2009

1. From the following bond energies :-
 H – H bond energy : 431.37 kJ mol⁻¹
 C = C bond energy : 606.10 kJ mol⁻¹
 C – C bond energy : 336.49 kJ mol⁻¹
 C – H bond energy : 410.50 kJ mol⁻¹
 Enthalpy for the reaction,



will be :-

- (1) 553.0 kJ mol⁻¹ (2) 1523.6 kJ mol⁻¹
 (3) -243.6 kJ mol⁻¹ (4) -120.0 kJ mol⁻¹
2. The values of ΔH and ΔS for the reaction,
 $\text{C}_{(\text{graphite})} + \text{CO}_{2(\text{g})} \rightarrow 2\text{CO}_{(\text{g})}$ are 170 kJ and 170 JK⁻¹, respectively. This reaction will be spontaneous at :-
 (1) 510 K (2) 710 K
 (3) 910 K (4) 1110 K

AIPMT 2010

3. For vaporization of water at 1 atmospheric pressure, the values of ΔH and ΔS are 40.63 kJ mol⁻¹ and 108.8 JK⁻¹mol⁻¹, respectively. The temperature when Gibbs energy change (ΔG) for this transformation will be zero, is :-
 (1) 393.4 K (2) 373.4 K
 (3) 293.4 K (4) 273.4 K
4. Three moles of an ideal gas expanded spontaneously into vacuum. The work done will be :-
 (1) 3 Joule (2) 9 Joule
 (3) Zero (4) Infinite

5. The following two reactions are known :
 $\text{Fe}_2\text{O}_3(\text{s}) + 3\text{CO}(\text{g}) \rightarrow 2\text{Fe}(\text{s}) + 3\text{CO}_2(\text{g})$;
 $\Delta H = -26.8 \text{ kJ}$
 $\text{FeO}(\text{s}) + \text{CO}(\text{g}) \rightarrow \text{Fe}(\text{s}) + \text{CO}_2(\text{g})$;
 $\Delta H = -16.5 \text{ kJ}$
 Correct target equation is
 $\text{Fe}_2\text{O}_3(\text{s}) + \text{CO}(\text{g}) \rightarrow 2\text{FeO}(\text{s}) + \text{CO}_2(\text{g})$, $\Delta H = ?$
 (1) -43.3 kJ (2) -10.3 kJ
 (3) + 6.2 kJ (4) + 10.3 kJ

6. Standard entropies of X_2 , Y_2 and XY_3 are 60, 40 and 50 JK⁻¹ mol⁻¹ respectively. For the reaction
 $\frac{1}{2}\text{X}_2 + \frac{3}{2}\text{Y}_2 \rightleftharpoons \text{XY}_3$, $\Delta H = -30 \text{ kJ}$ to be at equilibrium, the temperature should be :-
 (1) 500 K (2) 750 K
 (3) 1000 K (4) 1250 K

AIPMT Pre. 2011

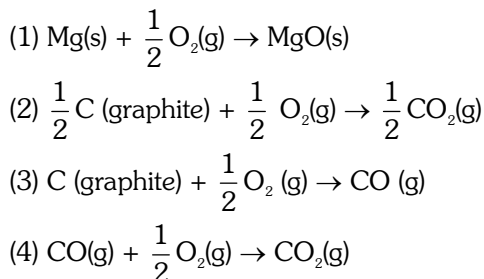
7. If the enthalpy change for the transition of liquid water to steam is 30 kJ mol⁻¹ at 27°C, the entropy changes for the process would be:
 (1) 10 J mol⁻¹ K⁻¹ (2) 1.0 J mol⁻¹ K⁻¹
 (3) 0.1 J mol⁻¹ K⁻¹ (4) 100 J mol⁻¹ K⁻¹
8. Enthalpy change for the reaction,
 $4\text{H}_{(\text{g})} \rightarrow 2\text{H}_{2(\text{g})}$ is -869.6 kJ
 The dissociation energy of H-H bond is :
 (1) -434.8 kJ (2) 869.6 kJ
 (3) +434.8 kJ (4) +217.4 kJ
9. Which of the following correct option for free expansion of an ideal gas under adiabatic condition ?
 (1) $q = 0$, $\Delta T \neq 0$, $w = 0$
 (2) $q \neq 0$, $\Delta T = 0$, $w = 0$
 (3) $q = 0$, $\Delta T = 0$, $w = 0$
 (4) $q = 0$, $\Delta T < 0$, $w \neq 0$

AIPMT Msins 2011

10. Consider the following processes :-
 $\Delta H(\text{kJ mol}^{-1})$
- | | |
|--|------|
| $\frac{1}{2} \text{A} \rightarrow \text{B}$ | +150 |
| $3\text{B} \rightarrow 2\text{C} + \text{D}$ | -125 |
| $\text{E} + \text{A} \rightarrow 2\text{D}$ | +350 |
- For $\text{B} + \text{D} \rightarrow \text{E} + 2\text{C}$, ΔH will be :
 (1) 325 kJ mol⁻¹ (2) 525 kJ mol⁻¹
 (3) -175 kJ mol⁻¹ (4) -325 kJ mol⁻¹

AIPMT Pre. 2012

11. In which of the following reactions, standard reaction entropy change (ΔS°) is positive and standard Gibbs energy change (ΔG°) decreases sharply with increasing temperature?



12. Standard enthalpy of vapourisation $\Delta_{\text{vap}}H^\circ$ for water at 100°C is $40.66 \text{ kJ mol}^{-1}$. The internal energy of vaporisation of water at 100°C (in kJ mol^{-1}) is
 (1) +43.76 (2) +40.66 (3) +37.56 (4) -43.76

13. The enthalpy of fusion of water is $1.435 \text{ kcal mol}^{-1}$. The molar entropy change for the melting of ice at 0°C is:
 (1) $5.260 \text{ Cal mol}^{-1} \text{ K}^{-1}$ (2) $0.526 \text{ Cal mol}^{-1} \text{ K}^{-1}$
 (3) $10.52 \text{ Cal mol}^{-1} \text{ K}^{-1}$ (4) $21.04 \text{ Cal mol}^{-1} \text{ K}^{-1}$

AIPMT 2014

14. For the reaction : $\text{X}_2\text{O}_4(\ell) \longrightarrow 2\text{XO}_2(\text{g})$
 $\Delta U = 2.1 \text{ kcal}$, $\Delta S = 20 \text{ cal K}^{-1}$ at 300 K
 Hence ΔG is :-
 (1) 2.7 kcal (2) -2.7 kcal
 (3) 9.3 kcal (4) -9.3 kcal

AIPMT 2015

15. Which of the following statements is **correct** for a reversible process in a state of equilibrium ?
 (1) $\Delta G = 2.30 RT \log K$
 (2) $\Delta G^\circ = -2.30 RT \log K$
 (3) $\Delta G^\circ = 2.30 RT \log K$
 (4) $\Delta G = -2.30 RT \log K$

Re-AIPMT 2015

16. The heat of combustion of carbon to CO_2 is $-393.5 \text{ kJ mol}^{-1}$. The heat exchange in the formation of 35.2 g of CO_2 from carbon and oxygen gas is:
 (1) -630 kJ (2) -3.15 kJ
 (3) -315 kJ (4) $+315 \text{ kJ}$

NEET-I 2016

17. The correct thermodynamic conditions for the spontaneous reaction at all temperatures is
 (1) $\Delta H > 0$ and $\Delta S > 0$ (2) $\Delta H > 0$ and $\Delta S < 0$
 (3) $\Delta H < 0$ and $\Delta S > 0$ (4) $\Delta H < 0$ and $\Delta S < 0$

NEET-II 2016

18. For a sample of perfect gas when its pressure is changed isothermally from p_i to p_f , the entropy change is given by

(1) $\Delta S = nRT \ln \left(\frac{p_f}{p_i} \right)$ (2) $\Delta S = RT \ln \left(\frac{p_i}{p_f} \right)$
 (3) $\Delta S = nR \ln \left(\frac{p_f}{p_i} \right)$ (4) $\Delta S = nR \ln \left(\frac{p_i}{p_f} \right)$

NEET(UG) 2017

19. For a given reaction, $\Delta H = 35.5 \text{ kJ mol}^{-1}$ and $\Delta S = 83.6 \text{ JK}^{-1}\text{mol}^{-1}$. The reaction is spontaneous at : (Assume that ΔH and ΔS do not vary with temperature)
 (1) $T > 425 \text{ K}$ (2) All temperatures
 (3) $T > 298 \text{ K}$ (4) $T < 425 \text{ K}$

20. A gas is allowed to expand in a well insulated container against a constant external pressure of 2.5 atm from an initial volume of 2.50 L to a final volume of 4.50 L . The change in internal energy ΔU of the gas in joules will be:-
 (1) -500 J (2) -505 J
 (3) $+505 \text{ J}$ (4) 1136.25 J

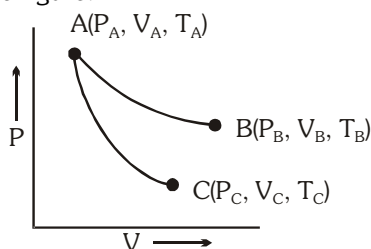
NEET (UG) 2018

21. The bond dissociation energies of X_2 , Y_2 and XY are in the ratio of $1 : 0.5 : 1$. ΔH for the formation of XY is -200 kJ mol^{-1} . The bond dissociation energy of X_2 will be
 (1) 200 kJ mol^{-1} (2) 100 kJ mol^{-1}
 (3) 800 kJ mol^{-1} (4) 400 kJ mol^{-1}

- 22.** Under isothermal condition, a gas at 300 K expands from 0.1L to 0.25L against a constant external pressure of 2 bar. The work done is :-
[Given that 1L bar = 100 J]
- (1) -30 J (2) 5kJ (3) 25 J (4) 30 J

- 23.** An ideal gas expands isothermally from 10^{-3} m^3 to 10^{-2} m^3 at 300 K against a constant pressure of 10^5 Nm^{-2} . The work, in the process is :-
- (1) +270 kJ (2) -900 J
(3) +900 kJ (4) -900 kJ

- 24.** Reversible expansion of an ideal gas under isothermal and adiabatic conditions are as shown in the figure.



AB \rightarrow Isothermal expansion

AC → Adiabatic expansion

Which of the following options is **not** correct ?

- (1) $\Delta S_{\text{isothermal}} > \Delta S_{\text{adiabatic}}$ (2) $T_A = T_B$
 (3) $W_{\text{isothermal}} > W_{\text{adiabatic}}$ (4) $T_c > T_A$

- 25.** The correct option for free expansion of an ideal gas under adiabatic condition is :
- (1) $q > 0$, $\Delta T > 0$ and $w > 0$
 - (2) $q = 0$, $\Delta T = 0$ and $w = 0$
 - (3) $q = 0$, $\Delta T < 0$ and $w > 0$
 - (4) $q < 0$, $\Delta T = 0$ and $w = 0$

- 26.** Hydrolysis of sucrose is given by the following reaction.
 Sucrose + H₂O \rightleftharpoons Glucose + Fructose

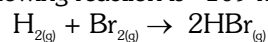
If the equilibrium constant (K_c) is 2×10^{13} at 300K, the value of $\Delta_r G^\ominus$ at the same temperature will be:

- (1) $-8.314 \text{ J mol}^{-1} \text{ K}^{-1} \times 300 \text{ K} \times \ln(4 \times 10^{13})$
- (2) $-8.314 \text{ J mol}^{-1} \text{ K}^{-1} \times 300 \text{ K} \times \ln(2 \times 10^{13})$
- (3) $8.314 \text{ J mol}^{-1} \text{ K}^{-1} \times 300 \text{ K} \times \ln(2 \times 10^{13})$
- (4) $8.314 \text{ J mol}^{-1} \text{ K}^{-1} \times 300 \text{ K} \times \ln(3 \times 10^{13})$

- 27.** For the reaction $2\text{Cl(g)} \rightarrow \text{Cl}_2\text{(g)}$, the **correct** option is:
- (1) $\Delta_r H < 0$ and $\Delta_r S < 0$
 - (2) $\Delta_r H > 0$ and $\Delta_r S > 0$
 - (3) $\Delta_r H > 0$ and $\Delta_r S < 0$
 - (4) $\Delta_r H < 0$ and $\Delta_r S > 0$

- 28.** If for a certain reaction $\Delta_r H$ is 30 kJ mol^{-1} at 450 K , the value of $\Delta_r S$ (in $\text{JK}^{-1} \text{mol}^{-1}$) for which the same reaction will be spontaneous at the same temperature is
 (1) 70 (2) -33 (3) 33 (4) -70

- 29.** At standard conditions, if the change in the enthalpy for the following reaction is -109 kJ mol^{-1}



Given that bond energy of H_2 and Br_2 is 435 kJ mol^{-1} and 192 kJ mol^{-1} , respectively, what is the bond energy (in kJ mol^{-1}) of HBr ?

- (1) 368 (2) 736 (3) 518 (4) 259

- 30.** Which one among the following is the correct option for right relationship between C_p and C_v for one mole of ideal gas ?

- $$\begin{array}{ll} (1) C_P + C_V = R & (2) C_P - C_V = R \\ (3) C_P = R C_V & (4) C_V = R C_P \end{array}$$

- 31.** For irreversible expansion of an ideal gas under isothermal condition, the correct option is :

- $$\begin{array}{ll} (1) \Delta U = 0, \Delta S_{\text{total}} = 0 & (2) \Delta U \neq 0, \Delta S_{\text{total}} \neq 0 \\ (3) \Delta U = 0, \Delta S_{\text{total}} \neq 0 & (4) \Delta U \neq 0, \Delta S_{\text{total}} = 0 \end{array}$$

Que.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Ans.	4	4	2	3	3	2	4	3	3	3	3	3	1	2	2
Que.	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30
Ans.	3	3	4	1	2	3	4	2	4	2	2	1	1	1	2
Que.	31														
Ans.	3														