CHEMISTRY

BOOKS - NEET PREVIOUS YEAR (YEARWISE + CHAPTERWISE)

THERMODYNAMICS

Questions

1. For a given reaction, $\Delta H = 35.5 KJ \mathrm{mol}^{-1}$ and $\Delta S = 83.6 JK^{-1} \mathrm{mol}^{-1}$. The reaction is

spontaneous at: (Assume that ΔH and δS so not vary with temperature)

A. $T < 425K$

B. $T > 425K$

C. all temperature

D. $T > 298K$

Answer: B

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2. A gas is allowed to expand in a well insulated container against a constant external pressure of

$2.5atm$ from an initial volume of $2.50L$ to a final volume of $4.50L$. The change in internal energy ΔU of the gas in joules will be:

A. 1136.25 J

B. $-500J$

C. $-505J$

D. $+505J$

Answer: C

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3. The addition of a catallystic during a chemical reaction alters which of the following quantities ?

A. Internal energy

B. Enthalpy

C. Activation energy

D. Entropy

Answer: C

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4. The correct thermodnamic conditions for the spontaneous reaction at all temperature is:

A. $\Delta H > 0 \text{ and } \Delta S < 0$

B. $\Delta H < 0 \text{ and } \Delta S > 0$

C. $\Delta H < 0 \text{ and } \Delta S < 0$

D. $\Delta H < 0 \text{ and } \Delta S = 0$

Answer: B::D

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5. Consider the following liquid-vapour equilibrium.

$$\text{Liquid} \Leftrightarrow \text{Vapour}$$

Which of the following relations is correct?

A. $\frac{\text{dInP}}{dT} = \frac{-\Delta H_v}{RT}$

B. $\frac{\text{dInP}}{dT^2} = \frac{-\Delta H_v}{T^2}$

C. $\frac{\text{dInP}}{dT} = \frac{-\Delta H_v}{RT^2}$

D. $\frac{\text{dInG}}{dT^2} = -\frac{\Delta H_v}{RT^2}$

Answer: C

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

A. $\Delta S = nR\text{In}\left(\frac{P_f}{P_i}\right)$

B. $\Delta S = nR\text{In}\left(\frac{P_i}{P_f}\right)$

C. $\Delta S = nRT\text{In}\left(\frac{P_f}{P_i}\right)$

D. $\Delta S = RT\text{In}\left(\frac{P_i}{P_f}\right)$

Answer: B

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7. Enthalpy of combustion of carbon to CO_2 is $-393.5kJmol^{-1}$. Calculate the heat released upon formation of $35.2g$ of CO_2 from carbon and dioxygen gas.

A. $-315KJ$

B. $+315KJ$

C. $-630KJ$

D. $-3.15KJ$

Answer: A

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8. Which of the following statements is correct for a reversible process in a state of equilibrium ?

A. $\Delta G = -2.30RT\log k$

B. $\Delta G = 2.30RT\log k$

C. $\Delta G^{\circ} = -2.30RT\log k$

D. $\Delta G^{\circ} = 2.30RT\log k$

Answer: A

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9. Which of the following statements of correct for the spontaneous adsoption of a gas?

A. ΔS is negative and therefore, ΔH should be highly positive.

B. ΔS is negative and therefore, ΔH should be highly negative

C. ΔS is positve and therefore, ΔH should be negative

D. ΔS is positive and therefore, ΔH should also be highly positive

Answer: B

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10. For the reaction:

$X_2O_4(l) \rightarrow 2XO_2(g)$

$\Delta U = 2.1cal, \Delta S = 20\text{cal}K^{-1}\text{at}300K$

Hence ΔG is

A. 2.7 kcal

B. -2.7 kcal

C. 9.3 kcal

D. -9.3 kcal

Answer: B

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11. For a given exothermic reaction , K_p and k'_p are the equilibrium constants at temperatures T_1 and T_2 respectively. Assuming that heat of reaction is constant in temperature range reaction is constant in temperature range between T_1 and T_2 , it is readily observed that

A. $K_p > K'_p$

B. $K_p < K'_p$

C. $K_p = K'_p$

D. $K_p = \frac{1}{k'_p}$

Answer: A

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12. A reaction having equal energies of activation for forward and reverse reactions has

A. $\Delta S = 0$

B. $\Delta G = 0$

C. $\Delta H = 0$

D. $\Delta H = \Delta G = \Delta V = 0$

Answer: C

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13. In which of the following reactions,standard reaction entropy change$(\Delta S^{\circ})$is positive and standard Gibb,s energy change(ΔG°)decreases sharply with increasing temperature?

A. C (graphite) $+ \frac{1}{2} O_2(g) \rightarrow CO(g)$

B. $CO(g) \rightarrow \frac{1}{2} O_2(g) \rightarrow CO_2(g)$

C. $Mg(s) \rightarrow \frac{1}{2} O_2(g) \rightarrow MgO(s)$

D. $\frac{1}{2}C$ (graphite) $+\frac{1}{2}O_2(g) \rightarrow \frac{1}{2}CO_2(g)$

Answer: A

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14. The enthalpy of fusion of water is$1.435 kcal/mol$ .The molar entropy change for the melting of ice at $0^\circ C$is

A. 10.52 cal/mol K

B. 21.04 cal/mol K

C. 5.260 cal/mol K

D. 0.526 cal/mol K

Answer: C

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15. Standard enthalpy of vaporisationΔV_{vap}. H^{Θ} for water at $100^{\circ}C$is$40.66kJmol^{-1}$.The internal energy of Vaporization of water at$100^{\circ}C\left(\text{in kJ mol}^{-1}\right)$is

A. $+37.56$

B. -43.76

C. $+42.76$

D. $+40.66$

Answer: A

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16. If the enthaply change for the transition of liquid water to steam is 30 KJ mol^{-1} at 27° C . The entropy change for the process would be

A. $1.0 J \mathrm{mol}^{-1} K^{-1}$

B. $0.1 J \mathrm{mol}^{-1} K^{-1}$

C. $100 J \mathrm{mol}^{-1} K^{-1}$

D. $10 J \mathrm{mol}^{-1} K^{-1}$

Answer: C

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17. Which of the following is the correct option for the free expansion of an ideal gas under adiabatic condition?

A. $q \neq o, \Delta T = 0, W = 0$

B. $q = 0, \Delta T = 0, W = 0$

C. $q = 0, \Delta T < 0, W \neq 0$

D. $q = 0, \Delta T \neq 0, W = 0$

Answer: B

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18. Enthalpy change for the reaction

$2H(2)(g) \rightarrow 4H(g)$ is $-869.6kJ$

The dissociation energy of $H - - H$bond is:

A. $-869.9KJ$

B. $+434.8KJ$

C. $+217.4KJ$

D. -434.8 KJ

Answer: B

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19. The values of ΔH and ΔS for the reaction,

$C_{\text{graphite}} + CO_2(g) \rightarrow 2CO(g)$

are $170KJ$ and $170JJK^{-}$ respectively. This reaction will be spontaneous at

A. 710 K

B. 910 K

C. 1110 K

D. 510 K

Answer: C

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20. From the following bond energies: $H - - H$ bond energy: $431.37 KJmol^{-1}$

$C = C$ bond energy: $606.10 KJmol^{-1}$

$C - - C$ bond energy: $336.49 KJmol^{-1}$

$C - - H$ bond energy: $410.50 KJmol^{-1}$

Enthalpy for the reaction will be:

$$\begin{array}{c} H \\ | \\ C \\ | \\ H \end{array} = \begin{array}{c} H \\ | \\ C \\ | \\ H \end{array} + H - H \rightarrow \begin{array}{c} H \\ | \\ HC \\ | \\ H \end{array} - \begin{array}{c} H \\ | \\ C \\ | \\ H \end{array} - H$$

A. $1523.6 KJ\text{mol}^{-1}$

B. $-243.6 KJ\text{mol}^{-1}$

C. $-120.0 KJ\text{mol}^{-1}$

D. $553.0 KJ\text{mol}^{-1}$

Answer: C

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21. Bond dissociation enthalpy of H_2 , Cl_2 and HCl are $434, 242$ and $431 KJmol^{-1}$ respectively. Enthalpy of formation of HCl is

A. $93KJmol^{-1}$

B. $-245KJmol^{-1}$

C. $-93KJmol^{-1}$

D. $245KJmol^{-1}$

Answer: C

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22. For the gas phase reaction

$$PCl_5 \rightarrow PCl_3(g) + Cl_2(g)$$

which of the following conditions are correct?

A. $\Delta H = 0$ and $\Delta S < 0$

B. $\Delta H > 0$ and $\Delta S > 0$

C. $\Delta H < 0$ and $\Delta S < 0$

D. $\Delta H > 0$ and $\Delta S < 0$

Answer: B

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23. Which of the following are not state functions?

(I) $q + w$

(II)q

(III) w

(IV) $H - TS$

A. I and IV

B. II, III and IV

C. I, II and III

D. II and III

Answer: D

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24. Given the bond energies of $H - H$ and $Cl - Cl$ are $430kJmol^{-1}$ and $240kJmol^{-1}$, respectively, and

$\Delta_f H^\circ$ for HCl is $-90kJmol^{-1}$. Bond enthalpy of HCl is

A. 290 $KJ\text{mol}^{-1}$

B. $380KJ\text{mol}^{-1}$

C. $425KJ\text{mol}^{-1}$

D. $245KJ\text{mol}^{-1}$

Answer: B

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25. Consider the following reactions:

(i) $H^+(aq) + OH^-(aq) \rightarrow H_2O(l)$,

$\Delta H = \ = -X_1 Kjmol^{-1}$

(ii)

$H_2(g) + \frac{1}{2}O_2(g) \rightarrow H_2O(l), \Delta H = -X_2 Kjmol^{-1}$

(iii) $CO_2(g) + H_2(g) \rightarrow CO(g) + H_2O(l)$,

$\Delta H = -X_3 KJmol^{-1}$

(iv) $C_2H_2(g) + \frac{5}{2}O_2(g) \rightarrow 2CO_2(g) + H_2O(l)$,

$\Delta H = +X_4 KJmol^{-1}$

Enthanlpy of formation of $H_2O(l)$ is

A. $-x_2 KJ\text{mol}^{-1}$

B. $+x_3 KJ\text{mol}^{-1}$

C. $-x_4 KJ\text{mol}^{-1}$

D. $+x_1 KJ\text{mol}^{-1}$

Answer: A

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26. The enthalpy of combustion of H_2 , cyclohexene (C_6H_{10}) and cyclohexane (C_6H_{12}) are -241 , -3800 and $-3920KJ$ per mol respectively. Heat of hydrogenation of cyclohexene is

A. -121 KJ per mol

B. $+121$ KJ per mol

C. $+242$ KJ per mol

D. -242 KJ per mol

Answer: A

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27. The enthalpy and entropy change for the reaction,

$Br_2(l) + Cl_2(g) \rightarrow 2BrCl(g)$

are $30KJmol^{-1}$ and $105JK^{-1}mol^{-1}$ respectively. The temperature at which the raction will be in equilibrium is:

A. 285.7 K

B. 273 K

C. 450 K

D. 300 K

Answer: A

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28. Assume each reaction is carried out in an open container.

For which reaction will $\Delta H = \Delta U$?

A. $H_2(g) + Br_2(g) \rightarrow 2HBr(g)$

B. $C(s) + 2H_2O(g) \rightarrow 2H_2(g) + CO_2(g)$

C. $PCl_5(g) \rightarrow PCl_3 + Cl_2(g)$

D. $2CO(g) + O_2(g) \rightarrow 2CO_2(g)$

Answer: A

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29. Identify the correct statement for change of Gibbs energy for a system (ΔG_{system}) at constant temperature and pressure:

A. If $\Delta G_{\text{system}} > 0$, the process is spontaneous

B. If $\Delta G_{\text{system}} = 0$ the system has attained equilibrium

C. If $\Delta G_{\text{system}} = 0$, the system is still moving in a particlular direction

D. If $\Delta G_{\text{system}} < 0$, the process is not spontaneous

Answer: B

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30. The absolute enthalpy of neutralisation of the reaction

$MgO(s) + 2HCl(aq) \rightarrow MgCl_2(aq) + H_2O(l)$ will be

A. less than -57.33 KJ mol^{-1}

B. $-57.33KJ\mathrm{mol}^{-1}$

C. greater than $-57.33KJ\mathrm{mol}^{-1}$

D. 57.33 KJ mol^{-1}

Answer: A

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31. Which of the following pairs of a chemical reaction is certain to result in a spontaneous

reaction ?

A. Exothermic and decreasing disoder

B. Endothermic and increasing disorder

C. Exothermic and increasing disorder

D. Endothermic and decreasing disorder

Answer: C

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32. A reaction occurs spontanecously if : $-$

A. $T\Delta S < \Delta H$ and both ΔH and ΔS are +ve

B. $T\Delta S > \Delta H$ and both ΔH and ΔS are +ve

C. $T\Delta S = \Delta H$ and both ΔH and ΔS are +ve

D. $T\Delta S > \Delta H$ and ΔH is +ve and ΔS is -ve

Answer: B

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33. The work done during the expanision of a gas from a volume of $4dm^3$ to $6dm^3$ against a constant external pressure of 3 atm is (1 L atm = 101.32 J)

A. $-6J$

B. $-608J$

C. $+304J$

D. $-304J$

Answer: B

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34. Considering entropy (S) as a thermodynamics parameter, the criterion for the spontaneity of any process is

A. $\Delta S_{\text{system}} + \Delta S_{\text{surrounding}} > 0$

B. $\Delta S_{\text{system}} - \Delta S_{\text{surrounding}} > 0$

C. $\Delta S_{\text{system}} > 0$

D. $\Delta S_{\text{surrounding}} > 0$

Answer: A

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35. Standard enthalpy and standard entropy change for the oxidation of NH_3 at $298K$ are $-382.64KJmol^{-1}$ and $145.6Jmol^{-1}$ respectively. Standard free energy change for the same reaction at $298K$ is

A. $-221.1KJ\text{mol}^{-1}$

B. $-339.3KJ\text{mol}^{-1}$

C. $-439.3KJ\text{mol}^{-1}$

D. $-523.2KJ\text{mol}^{-1}$

Answer: B

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36. The bond energies of $H--H$, $Br--Br$ and $H--Br$ are $433,,192$ and $364KJmol^{-1}$ respectively. The ΔH° for the reaction $H_2(g)+Br_2(g)\rightarrow 2HBr(g)$ is

A. $-261KJ$

B. $+103KJ$

C. $+261KJ$

D. $-103KJ$

Answer: D

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37. For the reaction

$$C_3H_8(g) + 5O_2 \rightarrow 3CO_3(g) + 4H_2O(l)$$

at constant temperature, $\Delta H - \Delta U$ is

A. $+3RT$

B. $-RT$

C. $+RT$

D. $-3RT$

Answer: D

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38. For which one of the following equation is $\Delta H^{\circ}_{reaction}$ equal to ΔH°_{f} for the product ?

A. $Xe(g) + 2Fe(g) \rightarrow XeF_4(g)$

B. $2CO(g) + O_2(g) \rightarrow 2CO_2(g)$

C. $N_2(g) + O_3(g) \rightarrow N_2O_3(g)$

D. $CH_4(g) + 2Cl_2(g) \rightarrow CH_2Cl_2(l) + 2HCl(g)$

Answer: A

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39. What is the entropy change (in $JK^{-1}mol^{-1}$) when one mole of ice is converted into water at $0^\circ C$?

(The enthalpy change for the conversion of ice to liquid water is $6.0KJmol^{-1}$ at $0^\circ C$)

A. $2.198 JK^{-1}\text{mol}^{-1}$

B. $21.98 JK^{-1}\text{mol}^{-1}$

C. $20.13 JK^{-1}\text{mol}^{-1}$

D. $2.013 JK^{-1}\text{mol}^{-1}$

Answer: B

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40. The molar heat capacity of water at constant pressure, C, is $75 JK^{-1}mol^{-1}$. When 1.0 kJ of heat is supplied to 100 g water which is free to expand, the increase in temperature of water is :

A. 4.8 K

B. 6.6 K

C. 1.2 K

D. 2.4 K

Answer: D

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41. The densities of graphite and diamond at $298K$ are 2.25 and $3.31gcm^{-3}$, respectively. If the standard free energy difference (ΔG^0) is equal to

$1895 Jmol^{-1}$, the pressure at which graphite will be transformed into diamond at $298K$ is

A. 9.92×10^6pa

B. 9.02×10^5 pa

C. 9.92×10^8 pa

D. 9.92×10^7 pa

Answer: C

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42. Heat of combustion ΔH° for $C(s), H_2(g)$ and $CH_4(g)$ are $94, -68$ and $-213 Kcal/mol$. Then

ΔH° for $C(s) + 2H_2(g) \rightarrow \Delta CH_4(g)$ is

A. -17 kcal/mol

B. -111 kcal/mol

C. -170 kcal/mol

D. -85 kcal/mol

Answer: A

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43. 2 mol of an ideal gas at $27^{\circ}C$ temperature is expanded reversibly from $2L$ to $20L$. Find entropy change $(R = 2calmol^{-1}K^{-1})$

A. 92.1

B. 0

C. 4

D. 9.2

Answer: D

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44. In a closed insulated container, a liquid is stirred with a paddle to increase the temperature. Which of the following is true?

A. $\Delta E = W \neq , q = 0$

B. $\Delta E = W = 0, q \neq 0$

C. $\Delta E = 0, W = q \neq 0$

D. $W = 0, \Delta E = q \neq 0$

Answer: A

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45. The unit of entropy is

A. $JK^{-1}\text{mol}^{-1}$

B. $J\text{mol}^{-1}$

C. $J^{-1}K^{-1}\text{mol}^{-1}$

D. $JK\text{mol}^{-1}$

Answer: A

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46. Enthalpy of $CH_4 + \frac{1}{2}O_2 \rightarrow CH_3OH$ is negative. If enthalpy of combustion of CH_4 and CH_3OH are x and y respectively, then which relation is correct?

A. $x > y$

B. $x < y$

C. $x = y$

D. $x \geq y$

Answer: B

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47. When 1 mole gas is heated at constant volume, temperature is raised from 298 to 308 K. Heat supplied to the gas in 500 J. Then, which statement is correct ?

A. $q = W = 500J, \Delta E = 0$

B. $q = \Delta E = 500JmW = 0$

C. $q = -W = 500J, \Delta E = 0$

D. $\Delta E = 0, q = W = -500J$

Answer: B

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48. Change in enthalpy for reaction

$2H_2O_2(l) \rightarrow 2H_2O(l) + O_2(g)$

if heat of formation of $H_2O_2(l)$ and $H_2O(l)$ are -188 and $-286KJ/mol$ respectively is

A. -196 KJ/mol

B. $+196$ KJ/mol

C. $+948$ KJ/mol

D. -948 KJ/mol

Answer: A

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49. $PbO_2 \rightarrow PbO, \Delta G_{298} < 0$

$SnO_2 \rightarrow SnO, \Delta G_{298} > 0$

Most proble oxidation states of Pb and Sn will be

A. $Pb^{4+} m Sn^{4+}$

B. Pb^{4+}, Sn^{2+}

C. Pb^{2+}, Sn^{2+}

D. Pb^{2+}, Sn^{4+}

Answer: D

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50. On the basic of the following $\Delta_r G^{\Theta}$ values at $1073K$:

$S_1(s) + 2O_2(g) \rightarrow 2SO_2(g) \Delta_r G^{\Theta} = -544 kJmol^{-1}$

$2Zn(s) + O_2(g) \rightarrow 2ZnO(s) \Delta_r G^{\Theta} = -480 kJmol^{-1}$

$2Zn(s) + S_2(s) \rightarrow 2ZnS(s) \Delta_r G^{\Theta} = -293 KJmol^{-1}$

Show that roasting of zinc sulphide to zinc oxide is a spontaneous process.

A. $-357KJ$

B. $-731KJ$

C. $-773KJ$

D. $-229KJ$

Answer: B

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51. At $27^{\circ}C$ latent heat of I^{-} fusion of a compound is $2.7 \times 10^{3} Jmol^{-1}$. Calculate the entropy change during fusion.

A. $9.77JK^{-1}\text{mol}^{-1}$

B. $10.73JK^{-1}\text{mol}^{-1}$

C. $2930JK^{-1}\text{mol}^{-1}$

D. $108.5JK^{-1}\text{mol}^{-1}$

Answer: A

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52. If ΔE is the heat of reaction for $C_2H_5OH_{(1)} + 3O_{2(g)} \rightarrow 2CO_{2(g)} + 3H_2O_{(1)}$ at constant volume, the ΔH (Heat of reaction at constant pressure) at constant temperature is

A. $\Delta H = \Delta E + RT$

B. $\Delta H = \Delta E - RT$

C. $\Delta H = \Delta E - 2RT$

D. $\Delta H = \Delta E + 2RT$

Answer: B

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53. Given : $S_{(s)} + \frac{3}{2}O_{2(g)} \rightarrow SO_{3(g)} + 2XKcal$

$SO_{2(s)} + \frac{1}{2}O_{2(g)} \rightarrow SO_{3(g)} + YKcal$

The heat of formation of SO_2 is : $-$

A. $(x + y)$

B. $(x - y)$

C. $(2x + y)$

D. $(2x - y)$

Answer: D

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54. In an endothermic reaction, the value of ΔH is

A. zero

B. positive

C. negative

D. constant

Answer: B

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55. One mole of an ideal gas at $300K$ is expanded isothermally from an inital volume of 1 litre to 10 litres. The ΔE for this process is $(R = 2calmol^{-1}K^{-1})$

A. 163.7 cal

B. zero

C. 1381.1 cal

D. 9 L atm

Answer: B

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56. Identify the correct statement regarding entropy

A. At absolute zero temperature , entropy of a perfectly crystalline substance is taken to be zero

B. At absolute zero temperature, the entropy of a perfectly crystalline substance is positive

C. At absolute zero temperature , the entropy of all crystalline substance is to be zero.

D. At $0^{\circ}C$, the entropy of a perfectly crystalline substance is taken to be zero.

Answer: A

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57. Given that $C + O_2 \rightarrow CO_2, \Delta H^{\circ} = -xKJ$ and $2CO + O_2 \rightarrow 2CO_2, \Delta H^{\circ} = -yKJ$ The

enthalpy of formation of carbon monoxide will be

A. $y - 2x$

B. $2x - y$

C. $\frac{y - 2x}{2}$

D. $\frac{2x - y}{2}$

Answer: C

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58. Given the following entropy values (in $JK^{-1}\text{mol}^{-1}$) at 298 K and 1 atm: $H_2(g): 130.6, Cl_2(g): 223.0, HCl(g): 186.7.$ The

entropy change (in $JK^{-1}\text{mol}^{-1}$) for the reaction

$H_2(g) + Cl_2(g) \rightarrow 2HCl(g)$, is

A. $+540.3$

B. $+727.0$

C. -166.9

D. $+19.8$

Answer: D

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59. According to the third law of thermodynamics which one of the following quantities for a perfectly

crystalline solid is zero at absolute zero?

A. Free energy

B. Entropy

C. Enthalpy

D. Internal energy

Answer: B

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60. The correct relationship between free energy change in a reaction and the corresponding equilibrium constant K_c is:

A. $\Delta G^{\circ} = -RT$ In K

B. $\Delta G = RT$In K

C. $\Delta G^{\circ} = RT$ In K

D. $\Delta G^{\circ} = -RT$ In K

Answer: A

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61. If enthalpies of formation of $C_2H_4(g)$1,CO_(2) and $H_2O(l)$ at$25(\circ)C$ and1atm pressure be $52, -394$ and$-286kJmol^{-1}$respectively ,the enthalpy of combustion of $C_2H_4(g)$will be

A. $-141.2KJ/mol$

B. -1412 KJ/mol

C. $+14.2$ KJ/mol

D. $+1412$ KJ/mol

Answer: B

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62. The standard state Gibbs's energy change for the isomerisation reaction $cis-2-pentence \Leftrightarrow trans-2-pentence$ is $-3.67kJmol^{-1}$ at $400K$. If more

$trans - 2 - pentence$ is added to the reaction vessel, then:

A. more cis-2-pentene is formed

B. equilibrium remains unaffected

C. additional trans-2-pentene is formed

D. equilibrium is shifted in forward direction

Answer: A

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63. The combustion reaction occuring in an automobile is

$2C_8H_{18} + 25O_2(g) \rightarrow 16CO_2(g) + 18H_2O(g)$ This reaction is accompanied with:

A. $+, -, +$

B. $-, +, -$

C. $-, +, +$

D. $+, +, -$

Answer: B

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64. A chemical reaction will be spontaneous if it is accompanied by a decrease in

A. entropy of the system

B. enthalpy of the system

C. internal eneryg of the system

D. free energy of the system

Answer: D

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65. During isothermal expansion of an ideal gas, its:

A. internal energy increases

B. enthalpy decreases

C. enthalpy remains unaffected

D. enthalpy reduces to zero

Answer: C

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66. For the reaction

$$N_2(g) + 3H_2(g) \Leftrightarrow 2NH_3(g), \Delta H = ?$$

A. $\Delta E + 2RT$

B. $\Delta E - 2RT$

C. $\Delta H = RT$

D. $\Delta E - RT$

Answer: B

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67. Equal volumes of molar hydrochloric acid and sulphuric acid are neutralized by dil. $NaOH$ solution and x Kcal and y Kcal of heat are liberated respectively. Which of the following is true?

A. $x = y$

B. $x = \frac{1}{2}y$

C. $x = 2y$

D. None of the above

Answer: B

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68. If ΔH is the enthalpy change and ΔU the change in internal energy accompanying a gaseous reaction, then

A. ΔH is always greater than ΔE

B. $\Delta H < \Delta E$ only if the number of moles of products is greater than the number of moles

of the reactants

C. ΔH is always less than ΔE

D. $\Delta G < \Delta E$ only if the number of moles of products is less than the number of moles of the reactants

Answer: D

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