CHEMISTRY

RESONANCE ENGLISH

THERMODYNAMIC & THERMOCHEMISTRY

Physical Chemitry Thermodynamic Thermochemistry

1. Heat of atomisation of NH_3 and N_2H_4 are $xkcalmol^{-1}$ respectively.

Calculate average bond energy of N - N bond.

A. $\frac{4y-3x}{2}$ kcal mol^{-1}

B. $\frac{2y-3x}{3}$ kcal mol^{-1}

C. $\frac{4y-3x}{4}$ kcal mol^{-1}

D. $\frac{3y-4x}{3}$ kcal mol^{-1}

Answer: 4

Watch Video Solution

2. For the reaction at $25^{\circ}C$, $C_2O_4(l) \rightarrow 2XO_2(g)$

$\Delta H = 2.1kcal$ and $\Delta S = 20calK^{-1}$. The reaction would be :

A. spontaneous

B. non $-$ spontaneous

C. at equilibrium

D. unpredictable

Answer: 1

Watch Video Solution

3. If one mole of an ideal gas $\left(C_{p,m} = \frac{5}{2}R\right)$ is expanded isothermally at 300 K until it's volume is tripled, then change in entropy of gas is :

A. $-R \ln 3$

B. $R \ln 2$

C. R in 3

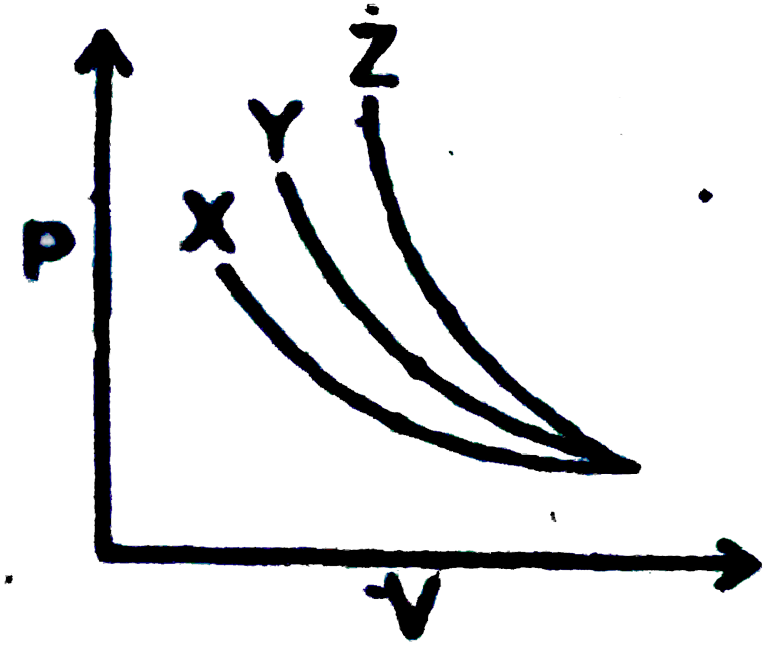
D. None of these

Answer: 3

Watch Video Solution

4. $P-V$ plts for the gases (assuming ideal behaviour and similar condition) for reversible adiabatic compression are given in the figure below :

Plots X, Y and Z should correspond to respectively :



A. CO_2, Cl_2 and Ne

B. SO_2, N_2O and He

C. He, N_2 and O_3

D. NH_3, H_2S are Ar

Answer: 2

Watch Video Solution

5. An ideal gas at initial pressur eP_1 and volume V_1 undergoes reversible expansion to the same volume V_f either isothermally or adiabatically . Consider the following statements :

1. $|P_f($ adiabatic $) < P_f($ isothermal $)|$ 2. $|W($ adiabatic $)| < |W($ isothermal $)|$

3. $|T_f($ adiabatic $) < T_f($ isothermal $)|$ 4. $|q($ adiabatic $)| < |q($ isothermal $)|$

where the symbols have their usual meaning.

How many statements of the above are correct?

A. Only one

B. Only two

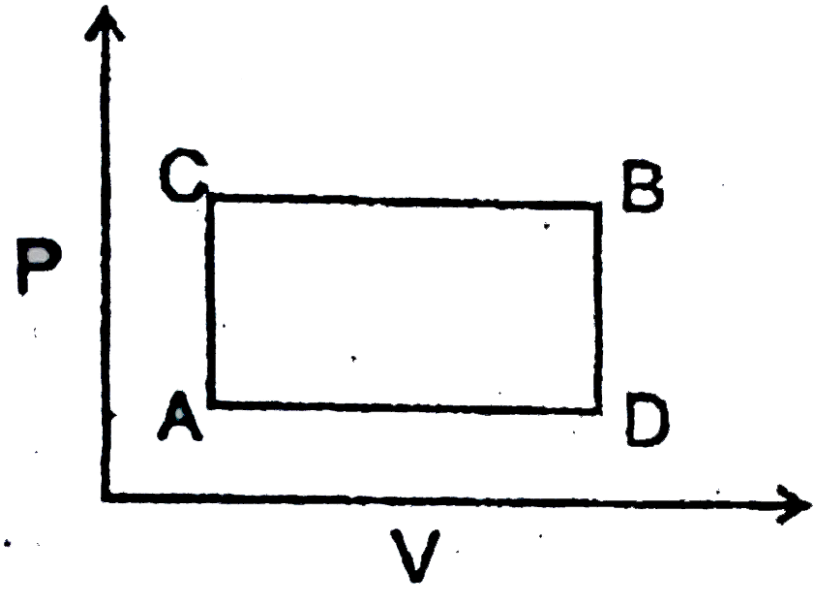
C. Only three

D. All

Answer: 4

Watch Video Solution

6. When a system is taken from state B to state A along path BDA as shown in figure below, $60J$ of heat flows out of the system and $10J$ of work is doen on path ACB , then the heat corresponding to the processes AC and BC is respectively.



A. $q_{AC} = -20J$ & $q_{BC} = -50J$

B. $q_{AC} = -20 \& q_{BC} = 50J$

C. $q_{AC} = 20J \& q_{DB} = 50J$

D. $q_{AC} = 20J \& q_{BC} = -50J$

Answer: 4

View Text Solution

7. In a system, a piston caused an external pressure of 1.25 bar giving a change in volume of $32L$ for which, $\Delta E = -51KJ$. What was the value of heat involved :

A. $-55kJ$

B. $-11kJ$

C. $-47kJ$

D. $-91kJ$

Answer: 3

Watch Video Solution

8. If 1 mole of an ideal gas expands isothermally at $37^{\circ}C$ from 15 litres to 25 litres, the maximum work obtained is :

A. $1316.8J$

B. $6.43J$

C. $8.57J$

D. $2.92J$

Answer: A

Watch Video Solution

9. Two moles of an ideal gas undergo the following process :

(a) a reversible isobaric expansion from $(P$ atm, $VL)$ to $(P$ atm , $2VL)$.

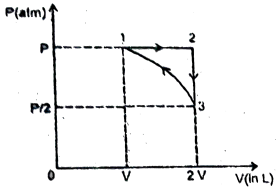
(b) a reversible isochoric change of state from $(P$ atm , $2V, L)$ to $(P/2$ atm, $2VL)$

(c) a reversible isothermal compression from $(P/2$ atm, $2VL)$ to $(P$

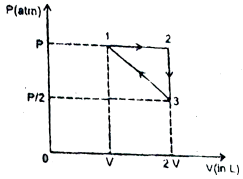
atm, VL).

Sketch with labels each of the processes on the same $P - V$ diagram.

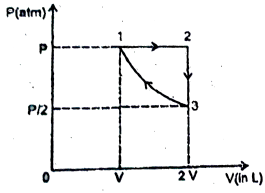
A.



B.

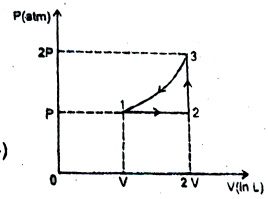


C.



(4)

D.



Answer: 3

Watch Video Solution

10. What are the signs of the entropy change $(+$ or $-)$ in the following

:

I. A liquird crystallisation in to solid

II. Temperature of solid raised from 0 to 115K

III. $2NaHCO_3(s) \rightarrow Na_2CO_3(s) + CO_2(g) + H_2O(g)$

IV. $H_2(g) \rightarrow 2H(g)$

A. $\underset{-}{I}$ $\underset{+}{II}$ $\underset{+}{III}$ $\underset{+}{IV}$

B. $\underset{-}{I}$ $\underset{-}{II}$ $\underset{+}{III}$ $\underset{+}{IV}$

C. $\underset{-}{I}$ $\underset{-}{II}$ $\underset{-}{III}$ $\underset{+}{IV}$

D. $\underset{+}{I}$ $\underset{-}{II}$ $\underset{-}{III}$ $\underset{-}{IV}$

Answer: 1

Watch Video Solution

11. If $HA + NaOH \rightarrow NaA + H_2O \qquad \Delta H = -12kcal$

and $HB + NaOH \rightarrow NaB + H_2O \qquad \Delta H = -11kcal$

then equimolar solution of which acid has higher pH:

A. HA

B. HB

C. both have same pH

D. information insufficient

Answer: B

Watch Video Solution

12. A reaction has $\Delta H = -33kJ$ and $\Delta S = -58J/K$. This reaction would be:

A. spontaneous at all temperature

B. non $-$ spontaneous at all temperatures

C. spontaneous above a certain temperature only

D. spontaneous below a certain temperature only

Answer: 4

Watch Video Solution

13. In the isothermal reversible compression of $52.0m$ mol of a perfect gas at $260K$, the volume of the gas is reduced to one $-$ third of its initial value. Calculate w of this process.

A. 0

B. $+123J$

C. $-123J$

D. $+246J$

Answer: 2

Watch Video Solution

14. A child bought a balloon which became very small in size the next day.

Which is correct statement about balloon?

A. It is isolated system

B. It is an open system

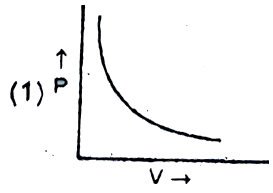
C. It is a closed system

D. It exchange only energy with the surrounding

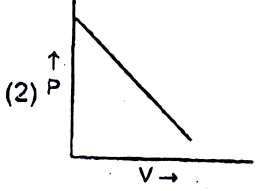
Answer: 2

Watch Video Solution

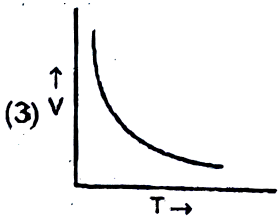
15. It the following processes, identify the irreversible process :

A. 

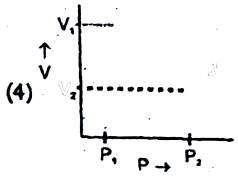
B.



C.



D.



Answer: 4

Watch Video Solution

16. If bond energy of H_2, F_2 and HF are in the ratio $2:1:3$ and $\Delta H_a(H_2) = 400kJ/mol.$ Then $\Delta H_f(HF)$ is :

A. $0kJ/mol$

B. $-600kJ/mol$

C. $-1200kJ/mol$

D. None of these

Answer: 4

Watch Video Solution

17. One mole of a non-ideal gas undergoes a change of state from (1.0 atm, 3.0 L, 200 K) to (4.0 atm, 5.0 L, 250 K) with a change in internal energy $(\Delta U) = 40$ L-atm. The change in enthalpy of the process in L-atm :

A. 43

B. 57

C. 42

D. None of these

Answer: 2

Watch Video Solution

18. Calculate the final pressure of a sample of carbon dioxide that expands reversibly and adiabatically from $57.4kPa$ and 1.0 to a final volume of $2.0L$. Take $\gamma = 1.4$

A. $1kPa$

B. $10kPa$

C. $20kPa$

D. $22kPa$

Answer: 2

Watch Video Solution

19. The heat evolved from the combustion of carbon is used to heat water. Assuming $50\ \%$ efficiency, calculate mole of water vaporized at its

boiling point $\Delta H_f = (CO_2) = -94Kcal/mol$ and $\Delta H_{vap}(H_2O) = 9.6kcal/mol)$ and $6gC$ is undergoing combustion

A. 1.21mole

B. 2.42 mole

C. 4.89 mole

D. 9.7 mole

Answer: 2

Watch Video Solution

20. The equilibrium constant for

$A(g) + B_2(g) \Leftrightarrow AB_2(g) \qquad k_p = 100$ at $522K.$

Structure of AB_2 is like H_2O . If bond energy of $A-B$ bond is $200kJ/mol$ and that of $B-B$ bond is $100kJ/mol,$ the find ΔS° of the above reaction :

A. $-0.53J/mol-K$

B. $-536J/mol-K$

C. $-550J/mol-K$

D. $-5.36J/mol-K$

Answer: 2

Watch Video Solution

21. When $1L$ of $NaOH(1M)$ is mixed with $1L$ of $HCl(1M)$ the temperature of reaction mixture rises by $10^{\circ}C$. When $1L$ of $NaOH(1M)$ is mixed with $2L(0.5M)HCl$, the temperature of reaction mixture rises approximately by :

A. $10^{\circ}C$

B. $5^{\circ}C$

C. $6.67^{\circ}C$

D. $3.33^{\circ}C$

Answer: 3

Watch Video Solution

22. $2Fe + \frac{3}{2}O_2 \rightarrow Fe_2O_3 \qquad xkJ/\text{mole}$

$2Fe + O_2 \rightarrow 2FeO \qquad ykJ/\text{mole}$

The to form one mole of Fe3O4 from Fe and O_2 is :

A. $\frac{x}{2} + y$

B. $\frac{2x + y}{2}$

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

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

Answer: 2

Watch Video Solution

23. The species which by definition has zero standard molar enthalpy of formation at $298K$ is

A. $CO_2(g)$

B. $H_2O(l)$

C. $O_2(g)$

D. P_4(red)

Answer: 3

Watch Video Solution

24. In which of the following changes at constant pressure, is work done by system on surrounding ?

A. $H_2O(g) \rightarrow H_2O(l)$

B. $H_2O(s) \rightarrow H_2O(l)$

C. $H_2O(s) \rightarrow H_2O(g)$

D. $H_2O(g) \rightarrow H_2O(s)$

Answer: 3

Watch Video Solution

25. One gram of an organic liquid X (molecular mass 78) liberates 160 J of heat on solidification. $\Delta H_{\text{fusion}}(X)$ is :

A. $19.2kJ/mol$

B. $12.48kJ/mol$

C. $124.8kJ/mol$

D. None of these

Answer: 2

Watch Video Solution

26. Bond energies are equal to dissociation energies in case of :

A. monoatomic molecules

B. polyatomic molecules

C. diatomic molecules

D. all type of molecules

Answer: 3

Watch Video Solution

27. $S(\rho mbic) + O_2(g) \rightarrow SO_2(g), \Delta H = -297.5kJ$

$S(monocl \in ic) + O_2(g) \rightarrow SO_2(g), \Delta H = -300kJ$

The above data can predict that

A. Rhomic sulphure is yellow is colour

B. monoclinic sulphur is more stalbe

C. monoclinic sulphur is more stable

D. The process $S($ rhombic $) \rightarrow S($ monoclinic $)$` is endothermic

Answer: 4

Watch Video Solution

28. A system absorbs 300 cal. Of heat, its volume doubles and temperature rises from 273 to 298 K, the work done on the surrounding is 200 cal ΔE, for the above reaction is

A. $100cal$

B. $500cal$

C. $-500cal$

D. $-100cal$

Answer: 1

Watch Video Solution

29. In which of the following changes, ΔH is always negative :

A. enthalpy of solution

B. enthalpy of hydrogenation

C. enthaly of reaction

D. enthalpy of transition

Answer: 2

Watch Video Solution

30. Calculate the enthalpy change when $50mL$ of $0.01MCa(OH)_2$ reacts with $25mL$ of $0.01MHCI$. Given that ΔH^{Θ} neutralisaiton of strong acid and string base is $140kcalmol^{-1}$

A. $14cal$

B. $35cal$

C. $10cal$

D. $7.5cal$

Answer: 2

Watch Video Solution

31. Calculate difference between ΔH and ΔU when 1 mole of grey tin (density $= 5.75g/cm^3$) changes to white tin (density $= 7.31g/cm^3$) at 10 bar . (at $298K$, $\Delta H = +2.1kJ$, at $wt = 119$ of Sn)

A. $-8.8J$

B. $-4.4J$

C. $-2.2J$

D. $4.4J$

Answer: 2

Watch Video Solution

32. Temperature of $1mol$ of a gas is increased by 1° at constant pressure. The work done is

A. R

B. $2R$

C. $R/2$

D. $-R$

Answer: 4

Watch Video Solution

33. A sample of oxgyen gas expands its volume from 3 L to 5 L against a constant pressure of 3 atm. If work done during expansion to used to heat 10 mole of water initially present at 290 K, its final temperature will be (specific heat capacity of water = 4.18 J//K-g)

A. $292.0K$

B. $298.0K$

C. $290.8K$

D. $293.7K$

Answer: C

Watch Video Solution

34. At $0^\circ C$, $\Delta H^\circ_{fus} = 6kJ/mol$, change of entropy for freezing of one mole of ice will be :

A. ∞

B. 0

C. $21.98J/mol - K$

D. $13.6J/mol - K$

Answer: C

Watch Video Solution

35. At $27^\circ C$, N_2O_4 has vapour density $= \frac{230}{6}$. If the equilibrium pressure is $0.96atm$, then find ΔG°. (given $\log 2 = 0.3$)

A. $1.1Kcal$

B. $193Kcal$

C. $79.3Kcal$

D. $8.041Kcal/mol$

Answer: 1

Watch Video Solution

36. $\Delta S = \frac{q_{rev}}{T}$, so

A. ΔS is defined only for reversible process.

B. For irreversible process, ΔS is calculated by considering the irreversible.

C. For irreversible process, $A \rightarrow B$ and same process taking place reversible, ΔS is same.

D. ΔS_{sys} is always the for irreversible process.

Answer: 3

Watch Video Solution

37. A $10g$ piece of iron $(C = 0.45J/g^{\circ}C)$ at $100^{\circ}C$ is dropped into $25g$ of water $(C = 4.2J/g^{\circ}C)$ at $27^{\circ}C$. Find temperature of the iron and water system at thermal equilibrium .

A. $30^{\circ}C$

B. $33^{\circ}C$

C. $40^{\circ}C$

D. None of these

Answer: 1

Watch Video Solution

38. An ideal gas expands against a constant external pressure of 2.0 atmosphere from 20 litre to 40 litre and absorbs 10 kJ of heat from surrounding. What is the change in internal energy of the system? (Given : 1 atm-litre = 101.3 J)

A. $4052J$

B. $5948J$

C. $14052J$

D. $9940J$

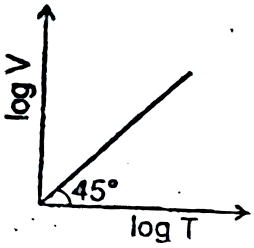
Answer: 2

Watch Video Solution

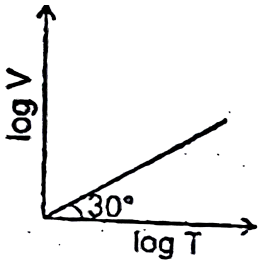
39. For a closed container containing 100 mole of an ideal gas fitted with movable, frictionless, weightless piston operating such that pressure of

gas remains constant at 8.21 atm. Which graph represents correct variation of log V vs. log T where V is in litre and T in kelvin?

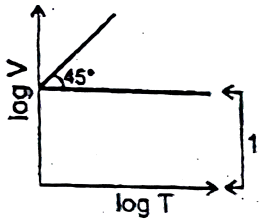
A.



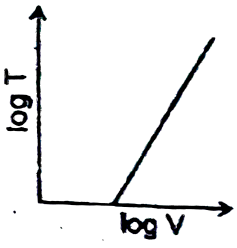
B.



C.



D.



Answer: 1

Watch Video Solution

40. 10 mole of ideal gas expand isothermally and reversibly from a pressure of 10 atm to 1atm at 300 K. What is the largest mass which can lifted through a height of 100 meter?

A. $31842kg$

B. $58.55kg$

C. $342.58kg$

D. none of these

Answer: 2

Watch Video Solution

41. What is the final temperature of 0.10 mole monoatomic ideal gas that performs 75 cal of work adiabatically if the initial temperature is $227^{\circ}C$ (use R = 2 cal/K-mol)

A. $250K$

B. $300K$

C. $350K$

D. $750K$

Answer: 1

Watch Video Solution

42. During an adiabatic process, the pressure of a gas is found to be proportional to cube of its absolute temperature. The poision's ratio of gas is:

A. $\frac{3}{2}$

B. $\frac{5}{3}$

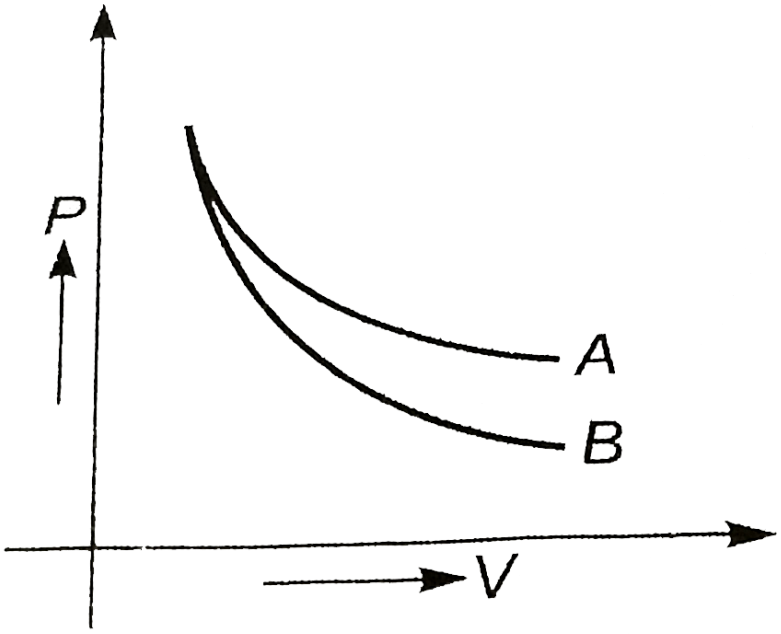
C. $\frac{7}{2}$

D. $\frac{4}{3}$

Answer: 1

Watch Video Solution

43. P-V plot for two gases (assuming ideal) during adiabatic processes are given in the Fig. Plot A and plot B should correspond respectively to:



A. He and H_2

B. H_2 and He

C. He and Ne

D. H_2 and Cl_2

Answer: 2

Watch Video Solution

44. Calculate the final temperature of a monoatomic ideal gas that is compressed reversible and adiabatically from $16L$ to $2L$ at $300K$:

A. $600K$

B. $1044.6K$

C. $1200K$

D. $2400K$

Answer: 3

Watch Video Solution

45. Calculat average molar heat capacity at constant volume of gaseous mixture contained 2 mole of each of two ideal gases $A\left(C_{v,m}=\frac{3}{2}R\right)$ and $B\left(C_{v,m}=\frac{5}{2}R\right)$:

A. R

B. $2R$

C. $3R$

D. $8R$

Answer: B

Watch Video Solution

46. Consider the reaction at 300 K

$$C_6H_6(l)+\frac{15}{2}O_2(g)\rightarrow 6CO_2(g)+3H_2O(l),\Delta H=-3271kJ$$

What is ΔU for the combustion of 1.5 mole of benzene at $27^\circ C$?

A. $-3267.25kJ$

B. $-4900.88kJ$

C. $-4906.5kJ$

D. $-3274.75kJ$

Answer: 2

Watch Video Solution

47. At 5×10^5 bar pressure density of diamond and graphite are $3g/cc$ and $2g/cc$ respectively, at certain temperature 'T'. Find the value of $\Delta U - \Delta H$ for the conversion of 1 mole of graphite to 1 mole of diamond at temperature 'T' :

A. $100kJ/mol$

B. $50kJ/mol$

C. $-100kJ/mol$

D. none of these

Answer: A

Watch Video Solution

48. Predict which of the following reaction(s) has a positive entropy change?

I. $Ag^+(aq) + Cl^-(aq) \rightarrow AgCl(s)$

II. $NH_4Cl(s) \rightarrow NH_3(g) + HCl(g)$

III. $2NH_3(g) \rightarrow N_2(g) + 3H_2(g)$

A. I and II

B. III

C. II and III

D. II

Answer: 3

Watch Video Solution

49. What is the change in entropy when 2.5 mole of water is heated from $27^{\circ}C$ to $87^{\circ}C$? Assume that the heat capacity is constant. $(C_{p,m}(H_2O) = 4.2J/g - K \text{ and } \ln(1.2) = 0.18)$

A. $16.6J/K$

B. $9J/K$

C. $34.02J/K$

D. $1.89J/K$

Answer: 3

Watch Video Solution

50. Calculate standard entropy change in the reaction

$Fe_2O_3(s) + 3H_2(g) \rightarrow 2Fe(s) + 3H_2O(l)$ Given :

$S_m^{\circ}(Fe_2O_3, S) = 87.4, S_m^{\circ}(Fe, S) = 27.3,$

$S_m^{\circ}(H_2, g) = 130.7, S_m^{\circ}(H_2O, l) = 69.9JK^{-1}mol^{-1}$

A. $-212.5JK^{-1}mol^{-1}$

B. $-215.2JK^{-1}mol^{-1}$

C. $-120.9JK^{-1}mol^{-1}$

D. none of these

Answer: B

Watch Video Solution

51. For isothermal expansion in case of an ideal gas :

A. $\Delta G = \Delta S$

B. $\Delta S = \Delta H$

C. $\Delta G = -T.\Delta S$

D. none of these

Answer: 3

Watch Video Solution

52. The standard enthalpy of formation of octane (C_8H_{18}) is -250 kJ/mol. Calculate the enthalpy and -286 kJ/mol of C_8H_{18}. The enthalpy of formation of $CO_2(g)$ and $H_2O(l)$ are -394 kJ/mol and -286 kJ/mol respectively :

A. $-5200kJ/mol$

B. $-5726kJ/mol$

C. $-5476kJ/mol$

D. $-5310kJ/mol$

Answer: 3

Watch Video Solution

53. Calculate P-Cl bond enthalpy

Given :

$\Delta_f H(PCl_3, g) = 306 \text{ kJ/mol}, \quad \Delta H_{\text{atomization}}(P, s) = 314 \text{ kJ/mol},$

$\Delta_f H(Cl, g) = 121 \text{ kJ/mol}$

A. $1233.66 kJ/mol$

B. $371 kJ/mol$

C. $19 kJ/mol$

D. none of these

Answer: 1

Watch Video Solution

54. One gram equivalent of a weak acid is unable to completely neutralise one gram equivalent of a strong base.

A. -1120 cals

B. -2110 cals

C. 1210 cals

D. $+1210cals$

Answer: 3

Watch Video Solution

55. Ethyl chloride (C_2H_5Cl) , is prepared by reaction of ethylene with hydrogen chloride:

$C_2H_4(g) + HCl(g) \rightarrow C_2H_5Cl(g)$

$\Delta H = -72.3kJ/mol$

What is the value of $\Delta E($ in $kJ)$, if $98g$ of ethylene and $109.5g$ of HCl are allowed to react at $300K$

A. -64.81

B. -190.71

C. -209.41

D. -224.38

Answer: 3

Watch Video Solution

56. $NH_3(g) + 3Cl_2(g) \rightarrow NCl_3(g) + 3HCl(g), \qquad \Delta H_1$

$N_2(g) + 3H_2(g) \rightarrow 2NH_3(g), \qquad \Delta H_2$

$H_2(g) + Cl_2(g) \rightarrow 2HCl(g), \qquad \Delta H_3$

The heat of formation of NCl3(g) in the terms of $\Delta H_1, \Delta H_2$ and ΔH_3 is

:

A. $\Delta H_f = -\Delta H_1 + \frac{\Delta H_2}{2} - \frac{3}{2}\Delta H_3$

B. $\Delta H_f = \Delta H_1 + \frac{\Delta H_2}{2} - \frac{3}{2}\Delta H_3$

C. $\Delta H_f = \Delta H_1 - \frac{\Delta H_2}{2} - \frac{3}{2}\Delta H_3$

D. None

Answer: 1

Watch Video Solution

57. Calculate the entropy change when $3.6g$ of liquid water is completely converted into vapour at $100^{\circ}C$. The molar heat of vaporization is $40.85KJmol^{-1}$.

A. $6.08JK^{-1}$

B. $109.5JK^{-1}$

C. $21.89JK^{-1}$

D. $-21.89JK^{-1}$

Answer: 3

Watch Video Solution

58. The molar entropy content of 1 mole of oxygen (O_2) gas at $300K$ and $1atm$ is $250Jmole^{-1}K^{-1}$. Calculate ΔG when 1 mole of oxygen is expanded reversibility and isothermally from $300K$, 1 atm to double its volume (Take $R = 8.314Jmole^{-1}K^{-1}, \log e = 2.303$)

A. $1.728KJmole^{-1}K^{-1}$

B. 0

C. $-1.728KJmole^{-1}K^{-1}$

D. $0.75KJmole^{-1}K^{-1}$

Answer: A

Watch Video Solution

59. How many of the given statement are correct :

I: Molar entropy of a substance follows the order $(S_m)_{\text{Solid}} < (S_m)_{\text{liquid}} < (S_m)_{\text{gas}}$

II: Entroy change of system for the reaction $H_2(g) \rightarrow 2H(g)$is $+ve$.

III. Molar entropy of a non $-$ crystalline solid will be zero at absolute zero.

IV: If the path of an irreversible process is reversed, then both system and surrounding shall be restored to their original states.

V: Refractive index and molarity are intensive properties.

A. 2

B. 3

C. 4

D. 5

Answer: 2

Watch Video Solution

60. One mole of an ideal monoatomic gas at $27^\circ C$ is subjected to a reversible isoentropic compression until the temperature reached to $327^\circ C$. If the initial pressure was $1.0atm$, then find the value of ln P_2 (Given : $\ln 2 = 0.7$)

A. $1.75atm$

B. $0.176atm$

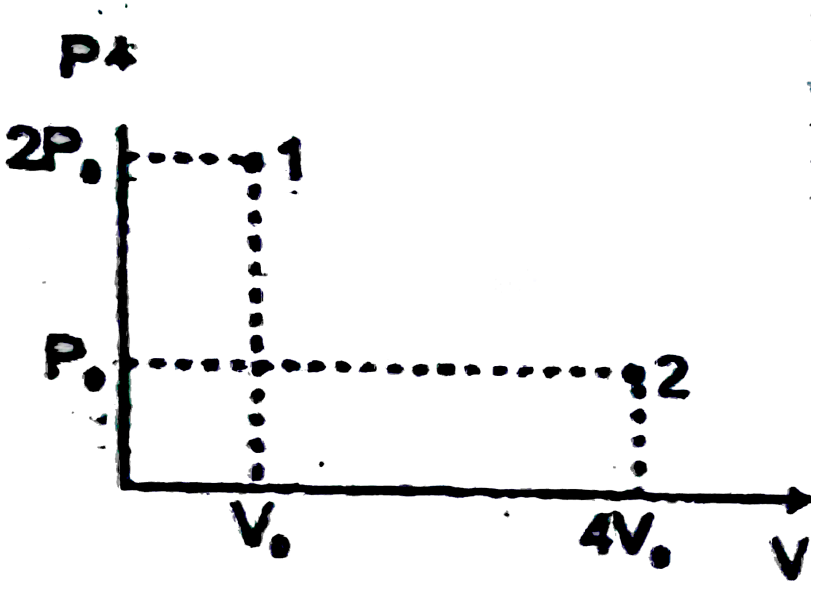
C. $1.0395atm$

D. $2.0atm$

Answer: 1

Watch Video Solution

61. A liquid which is confined inside an adiabatic piston is suddenly taken from state -1 to state -2 by a single stage irreversible process. If the piston comes to rest at point 2 as shown, then the enthalpy change for the process will be :



A. $\Delta H = \frac{2\gamma P_0 V_0}{\gamma - 1}$

B. $\Delta H = \frac{3\gamma P_0 V_0}{\gamma - 1}$

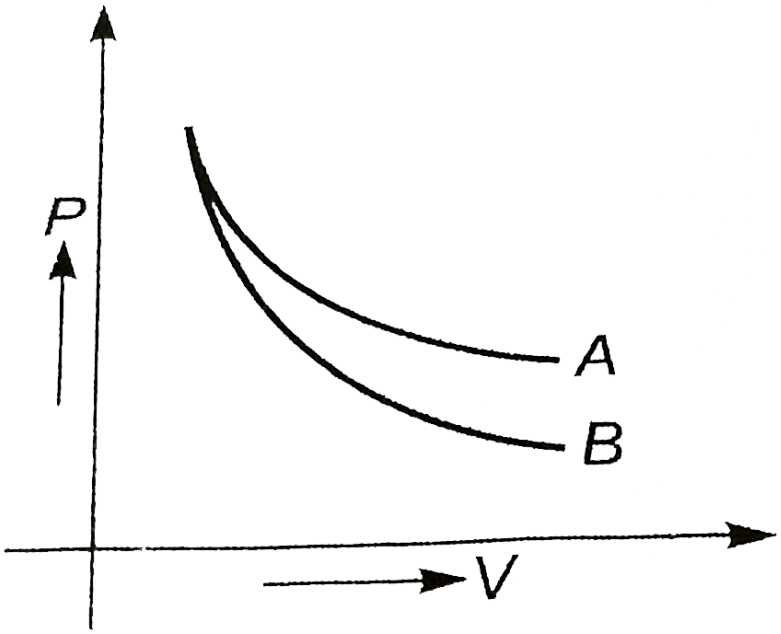
C. $\Delta H = -P_0 V_0$

D. None of these

Answer: 3

Watch Video Solution

62. P-V plot for two gases (assuming ideal) during adiabatic processes are given in the Fig. Plot A and plot B should correspond respectively to:



A. He and O_2

B. He and Ar

C. O_2 and He

D. O_2 and F_2

Answer: 3

Watch Video Solution

1. Heat of atomisation of NH_3 and N_2H_4 are $xkcalmol^{-1}$ respectively. Calculate average bond energy of N - N bond.

A. Xe

B. XeO_2

C. XeO_3

D. XeO_4

Answer: 3

Watch Video Solution

2. For the reaction at $25^\circ C$, $C_2O_4(l) \rightarrow 2XO_2(g)$ $\Delta H = 2.1kcal$ and $\Delta S = 20calK^{-1}$. The reaction would be :

A. Zn

B. Cu

C. Au

D. Pb

Answer: 1

Watch Video Solution

3. If one mole of an ideal gas $\left(C_{p,m} = \frac{5}{2}R\right)$ is expanded isothermally at 300 K until it's volume is tripled, then change in entropy of gas is :

A. N_2O

B. N_2O_5

C. NO_2

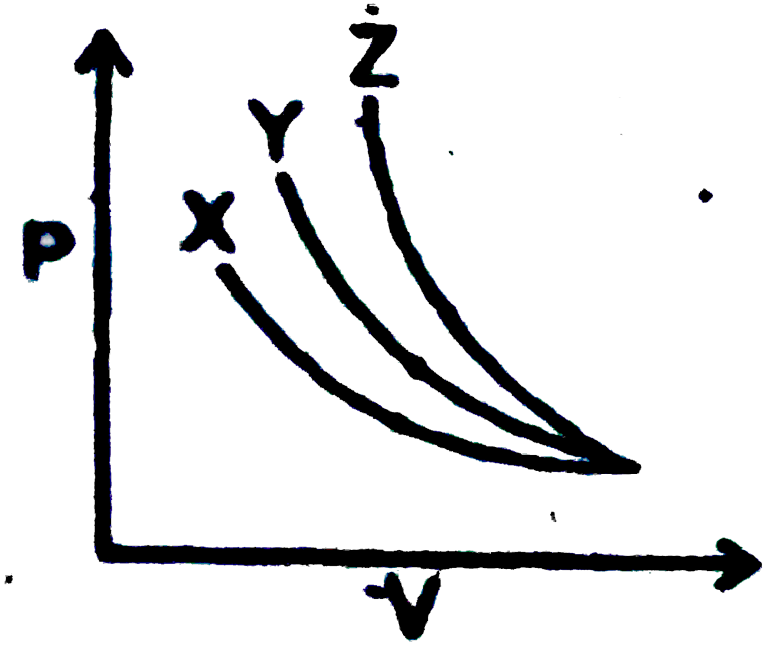
D. N_2O_3

Answer: 2

Watch Video Solution

4. $P-V$ plts for the gases (assuming ideal behaviour and similar condition) for reversible adiabatic compression are given in the figure below :

Plots X, Y and Z should correspond to respectively :



A. $CaC_2 + CaCN_2$

B. $CaC_2 + Ca_3P_2$

C. $Ca_2P_2 + CaCN_2$

D. $CaC_2 + CaCO_3$

Answer: B

Watch Video Solution

5. An ideal gas at initial pressur eP_1 and volume V_1 undergoes reversible expansion to the same volume V_f either isothermally or adiabatically . Consider the following statements :

1. $|P_f($ adiabatic $) < P_f($ isothermal $)|$ 2. $|W($ adiabatic $)| < |W($ isothermal $)|$

3. $|T_f($ adiabatic $) < T_f($ isothermal $)|$ 4. $|q($ adiabatic $)| < |q($ isothermal $)|$

where the symbols have their usual meaning.

How many statements of the above are correct?

A. $cis - 1, 2$diol

B. Trans$-1, 2$diol

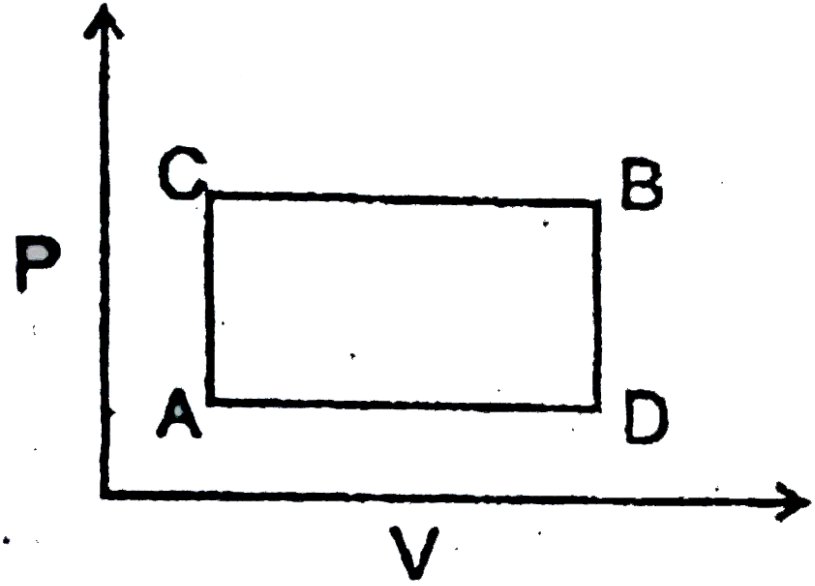
C. Borax

D. Na_2HPO_4

Answer: 1

Watch Video Solution

6. When a system is taken from state B to state A along path BDA as shown in figure below, $60J$ of heat flows out of the system and $10J$ of work is doen on path ACB , then the heat corresponding to the processes AC and BC is respectively.



A. $XeSiO_4 + H^=$

B. $XeF_2 + SiF_2$

C. $XeOF_4 + SiF_4$

D. $XeO_3 + SiF_2$

Answer: 3

View Text Solution

7. In a system, a piston caused an external pressure of 1.25 bar giving a change in volume of $32L$ for which, $\Delta E = -51KJ$. What was the value of heat involved :

A. $ZnSO_4$

B. $Fe_2(SO_4)_3$

C. $FeSO_4$

D. $CaSO_4$

Answer: 4

Watch Video Solution

8. If 1 mole of an ideal gas expands isothermally at $37^{\circ} C$ from 15 litres to 25 litres, the maximum work obtained is :

A. CO

B. CO_2

C. C_3O_2

D. Both CO and CO_2

Answer: 1

Watch Video Solution

9. Two moles of an ideal gas undergo the following process :

(a) a reversible isobaric expansion from $(P$ atm, $VL)$ to $(P$ atm , $2VL)$.

(b) a reversible isochoric change of state from $(P$ atm , $2V, L)$ to $(P/2$ atm, $2VL)$

(c) a reversible isothermal compression from $(P/2$ atm, $2VL)$ to $(P$ atm, $VL)$.

Sketch with labels each of the processes on the same $P-V$ diagram.

A. $\begin{vmatrix} \text{(p)} & & \text{(q)} & \text{(r)} & \text{(s)} \\ \text{Catalyst and high pressure} & & \text{Cool} & NO_2 & H_2O \text{ and } O_2 \end{vmatrix}$

B. $\begin{vmatrix} \text{(p)} & \text{(q)} & \text{(r)} & \text{(s)} \\ \text{Catalyst} & \text{Cool} & N_2O & HNO_3 \text{ and } O_2 \end{vmatrix}$

C. $\begin{vmatrix} \text{(p)} & \text{(q)} & \text{(r)} & \text{(s)} \\ \text{Catalyst and high pressure} & \text{High pressure} & NO_2 & H_2O \text{ and } O_2 \end{vmatrix}$

D. $\begin{vmatrix} \text{(p)} & \text{(q)} & \text{(r)} & \text{(s)} \\ \text{High pressure} & \text{catalyst} & N_2O_3 & HNO_3 \end{vmatrix}$

Answer: 1

Watch Video Solution

10. What are the signs of the entropy change $(+$ or $-)$ in the following :

I. A liquird crystallisation in to solid

II. Temperature of solid raised from 0 to 115K

III. $2NaHCO_3(s) \rightarrow Na_2CO_3(s) + CO_2(g) + H_2O(g)$

IV. $H_2(g) \rightarrow 2H(g)$

A. $He > Ar > Kr > Ne > Xe -$ (abundance in air).

B. $He < Ne < Ar < Kr < Xe -$ (boiling point).

C. $XeF_2 > XeF_4 > XeF_6 -$ (melting point)

D. $XeF_6 < XeF_4 < XeF_2 - (Xe -$ F bond length).

Answer: 1

Watch Video Solution

11. If $HA + NaOH \rightarrow NaA + H_2O \qquad \Delta H = -12kcal$

and $HB + NaOH \rightarrow NaB + H_2O \qquad \Delta H = -11kcal$

then equimolar solution of which acid has higher pH:

A. O_3 is used as disinfectant

B. NO_2 is oxidised to N_2O_5 by O_3

C. O_3^- is paramagnetic in nature

D. Dry iodine reacts with ozone and form I_2O_5

Answer: 4

Watch Video Solution

12. A reaction has $\Delta H = -33kJ$ and $\Delta S = -58J/K$. This reaction would be:

A. At ordinary temperature, the ratio of disproportionation of hyphohalites of chlorine, bromine and iodine follows the order $IO^- > BrO^- > ClO^-$

B. Fluorine can not be prepared in aqueous medium by electrolysis, since it decomposes water with liberation of ozonised oxygen.

C. HI is a stronger acid than HBr because of the low dissociation energy of HI.

D. In aqueous solution chlorine is a strong oxidizing agent than fluorine.

Answer: 4

Watch Video Solution

13. In the isothermal reversible compression of $52.0m$ mol of a perfect gas at $260K$, the volume of the gas is reduced to one $-$ third of its initial value. Calculate w of this process.

A. two moles of sulphuric acid

B. two moles of peroxomono $-$ sulphuric acid

C. one mole of sulphuric acid , one mole of peroxomono $-$ sulphuric acid

D. one mole of sulphuric acid, one mole of peroxomono – sulphuric acid and one mole of hydrogen peroxides.

Answer: 3

Watch Video Solution

14. A child bought a balloon which became very small in size the next day. Which is correct statement about balloon?

A. F_2 has higher dissociation energy than Cl_2

B. F has higher electron affinity than Cl

C. HF is stronger acid than HCl

D. Boiling point increases down the group in halogens.

Answer: 4

Watch Video Solution

15. It the following processes, identify the irreversible process :

A. It has a very high dielectric constant so that ionic compounds cannot be dissolved in it

B. It dows not act as an oxidising agent

C. It acts as a reducing agent.

D. It dissociates easily and acts as an oxidising agent in chemical reactions.

Answer: 4

Watch Video Solution

16. If bond energy of H_2, F_2 and HF are in the ratio $2:1:3$ and $\Delta H_a(H_2) = 400kJ/mol.$ Then $\Delta H_f(HF)$ is :

A. $NaNO_3$

B. $AgNO_3$

C. NH_4NO_3

D. NH_4NO_2

Answer: 2

Watch Video Solution

17. One mole of a non-ideal gas undergoes a change of state from (1.0 atm, 3.0 L, 200 K) to (4.0 atm, 5.0 L, 250 K) with a change in internal energy $(\Delta U) = 40$ L-atm. The change in enthalpy of the process in L-atm :

A. $FTFT$

B. $TFTF$

C. $FFTT$

D. $FFTF$

Answer: A

Watch Video Solution

18. Calculate the final pressure of a sample of carbon dioxide that expands reversibly and adiabatically from $57.4kPa$ and 1.0 to a final volume of $2.0L$. Take $\gamma = 1.4$

A. HCl, Mg

B. HCl, C

C. C, Al

D. HCl, Al

Answer: D

Watch Video Solution

19. The heat evolved from the combustion of carbon is used to heat water. Assuming $50\ \%$ efficiency, calculate mole of water vaporized at its

boiling point $\Delta H_f = (CO_2) = -94Kcal/mol$ and $\Delta H_{vap}(H_2O) = 9.6kcal/mol)$ and $6gC$ is undergoing combustion

A. $FTTF$

B. $FTTT$

C. $TFTT$

D. $TTFF$

Answer: 1

Watch Video Solution

20. The equilibrium constant for

$A(g) + B_2(g) \Leftrightarrow AB_2(g) \qquad k_p = 100$ at $522K.$

Structure of AB_2 is like H_2O . If bond energy of $A-B$ bond is $200kJ/mol$ and that of $B-B$ bond is $100kJ/mol,$ the find ΔS° of the above reaction :

A. It has the lowest boiling point.

B. It has the highest first ionization energy.

C. It can diffuese through rubber an dplastic material.

D. It can form clathrate compound.

Answer: D

Watch Video Solution

21. When $1L$ of $NaOH(1M)$ is mixed with $1L$ of $HCl(1M)$ the temperature of reaction mixture rises by $10^{\circ}C$. When $1L$ of $NaOH(1M)$ is mixed with $2L(0.5M)HCl$, the temperature of reaction mixture rises approximately by :

A. square planar , trigonal bipyramidal

B. $T-$ shaped , octahedral

C. square pyramidal, octahedral

D. square planar, octahedral

Answer: 2

Watch Video Solution

22. $2Fe + \frac{3}{2}O_2 \rightarrow Fe_2O_3 \qquad xkJ/\text{mole}$

$2Fe + O_2 \rightarrow 2FeO \qquad ykJ/\text{mole}$

The to form one mole of Fe3O4 from Fe and O_2 is :

A. $\begin{matrix} a & b & c & d \\ (1) & i & ii & iii & iv \end{matrix}$

B. $\begin{matrix} a & b & c & d \\ (2) & ii & iii & iv & i \end{matrix}$

C. $\begin{matrix} a & b & c & d \\ (3) & iv & iii & i & ii \end{matrix}$

D. $\begin{matrix} a & b & c & d \\ (4) & iii & iv & ii & iii \end{matrix}$

Answer: 2

Watch Video Solution

23. The species which by definition has zero standard molar enthalpy of formation at $298K$ is

A. $\begin{matrix} & a & b & c & d \\ (1) & iv & iii & i & ii \end{matrix}$

B. $\begin{matrix} & a & b & c & d \\ (2) & ii & iii & iv & i \end{matrix}$

C. $\begin{matrix} & a & b & c & d \\ (3) & i & ii & iii & iv \end{matrix}$

D. $\begin{matrix} & a & b & c & d \\ (4) & iv & iii & ii & i \end{matrix}$

Answer: 4

Watch Video Solution

24. In which of the following changes at constant pressure, is work done by system on surrounding ?

A. (I), (II), and (III) are correct

B. (I), (II), and (IV) are correct

C. (I), (III), and (IV) are correct

D. All of these

Answer: 3

Watch Video Solution

25. One gram of an organic liquid X (molecular mass 78) liberates 160 J of heat on solidification. $\Delta H_{\text{fusion}}(X)$ is :

A. $Al_2(C_2)_3$

B. Mg_2C_3

C. B_4C

D. La_4C_3

Answer: 1

Watch Video Solution

26. Bond energies are equal to dissociation energies in case of :

A. $(NH_4)_2SO_4.\ Fe(SO_4)_3.24H_2O$

B. $K_2SO_4.\ Al_2(SO_4)_3.24H_2O$

C. $MnSO_4.\ Al_2(SO_4)_3.24H_2O$

D. None

Answer: 3

Watch Video Solution