CHEMISTRY

BOOKS - MBD CHEMISTRY (ODIA ENGLISH)

THERMODYNAMICS

Question Bank

1. In what type of reaction, heat is absorbed ?

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2. Fill up the gap:

For exothermic reaction, $\triangle H$ is ____

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3. In the reaction, $CO(g) + \frac{1}{2}O_2(g) \rightarrow CO_2$ at constant T and P which one of the following is correct ?

(i) $\triangle H = \triangle E$

(ii) $\triangle H > \triangle E$

(iii) $\triangle H < \triangle E$

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4. In an endothermic reaction, $\triangle H$ is always____

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5. The enthalpy of combustion is always _____.

(i) negative, (ii) positive, (iii) zero

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6. Fill up the gap: When ice melts to liquid water, its entropy ____.

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7. In which reaction, the reactants have less energy than the products ?

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8. What is the relationship between enthalpy (H) and internal energy (E) ?

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9. In which of the following changes, there is increase in entropy ?

(i) $S0_2(g) + \frac{1}{2}O_2(g) \rightarrow SO_3(g)$

(ii) Ice $\rightarrow$ Water`

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10. When a reaction at constant temperature and pressure is at equilibrium the value of $\triangle G$____

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11. In which of the following changes, there is increase in entropy ?

(i) $S0_2(g) + \frac{1}{2}O_2(g) \rightarrow SO_3(g)$

(ii) Ice $\rightarrow$ Water`

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12. In which reaction, the reactants have less energy than the products ?

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13. What is the relationship between enthalpy (H) and internal energy (E) ?

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14. In an endothermic reaction, $\triangle H$ is always____

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15. The enthalpy of combustion is always _____.

(i) negative, (ii) positive, (iii) zero

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16. Fill up the gap:

For exothermic reaction, $\triangle H$ is _____

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17. The enthalpy of combustion is always _____.

(i) negative, (ii) positive, (iii) zero

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18. What is exothermic reaction ?

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19. In an endothermic reaction, $\triangle H$ is always_____

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20. In the reaction, $CO(g) + \frac{1}{2}O_2(g) \rightarrow CO_2$ at constant T and P which one of the following is correct ?

(i) $\triangle H = \triangle E$

(ii) $\triangle H > \triangle E$

(iii) $\triangle H < \triangle E$

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21. Define Hess's law.

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22. In what type of reaction, heat is absorbed ?

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23. What is heat of reaction ?

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24. The dissociation energy of CH_4 is 360 kcals/mole. What is the energy associated with C-H bond ?

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25. What is bond energy ?

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26. Define heat of combustion.

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27. Write the equation relating free energy, entropy and enthalpy.

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28. Fill up the gap: When ice melts to liquid water, its entropy ____.

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29. What is the free energy change at equilibrium state ?

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30. Define Hess's law.

Watch Video Solution

31. What is exothermic reaction ?

Watch Video Solution

32. What is exothermic reaction ?

Watch Video Solution

33. What is bond energy ?

Watch Video Solution

34. When a reaction at constant temperature and pressure is at equilibrium the value of $\triangle G$____

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35. What is bond energy ?

Watch Video Solution

36. State and explain Hess's law.

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37. State Hess's law.

Watch Video Solution

38. What is bond energy ?

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39. What do you understand by exothermic and endothermic reaction ? Give one example of each.

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40. What is endothermic reaction. Give example.

Watch Video Solution

41. When a reaction at constant temperature and pressure is at equilibrium the value of $\triangle G$____

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42. Define enthalpy of combustion. Give an example.

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43. $Predict$ whether $\triangle S$ is +ve or -ve for the following reaction.)

$2H_{2(g)} + O_{2(g)} \rightarrow 2H_2O_{(g)}$

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44. Predict whether ΔS is +ve or -ve for the following reaction.

$CaCO_{3(s)} + CaO_{2(s)} \rightarrow 2H_2O_{(g)}$

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45. If $\triangle H$ of the reaction$CH_{4(g)} + C_2H_{4(g)}C_3H_{8(g)}$ is -19.4 kcals, what will be the $\triangle H$ of the reaction $C_3H_{8(g)}CH_{4(g)} + C_2H_{4(g)}$?

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46. How does the free energy change show the feasibility of chemical reaction ?

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47. At constant temperature and pressure, which of the following statement is true for the reaction.$CO[g] + \frac{1}{2}O_2[g] - \rightarrow CO_2[g]$

A. $\triangle H = \triangle E$

B. $\triangle H < \triangle E$

C. $\triangle H > \triangle E$

D. `/_\H is independent to physical state.

Answer: B

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48. Tne relation between internal energy change, $\triangle E$ and enthalpy change' $\triangle H$ and work W is

A. $\triangle H = \triangle E + W$

B. $\triangle E = \triangle H - W$

C. $\triangle E = W - \triangle H$

D. $\triangle H = \triangle E - W$

Answer: A

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49. Which of the following is an intensive property ?

A. Temprature

B. Molarity

C. Density

D. All are correct

Answer: D

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50. The value of enthalpy, H in term of R and T for a monoatomic gas is

A. 3RT

B. $\frac{3}{2}RT$

C. 5RT

D. $\frac{5}{2}RT$

Answer: D

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51. In a spontaneouse process, the system suffers

A. increase in internal energy

B. lowering in free energy

C. no energy change

D. decrease in entropy

Answer: B

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52. 1st law of thermodynamic is represented by the equation.

A. $\triangle E = Q + W$

B. $\triangle E = Q - W$

C. $W = Q + \triangle E$

D. None of these

Answer: B

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53. Thermodynamic equilibrium involes

A. Chemical equilibrium

B. Thermal equilibrium

C. Mechanical equilibrium

D. All the three

Answer: D

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54. 'Heat of neutralisation of a strong dibasic acid in dilute solution by NaOH is'

A. `-27.4 cal/equ

B. `-13.7 cal/equ

C. `+13.7 cal/equ

D. `-13.7 cal/mol

Answer: B

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55. $\triangle H$ and $\triangle E$ for the reaction $S[s] + \frac{2}{3}O_2[g] \rightarrow SO_3[g]$ are related as

A. $\triangle H = \triangle E + 0.33RT$

B. $\triangle H = \triangle E - 1.5RT$

C. $\triangle H = \triangle E + RT$

D. $\triangle H = \triangle E + 1.5RT$

Answer: A

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56. One mole of an ideal at 300 K is expanded isothermaly from an initial volume of 1 liter to 10 liters. The $\triangle E$ for this process is [R= 2 cal $k^{-1}mol^{-1}$]

A. 163.7 cal

B. 1381.1 cal

C. 91 H-atm

D. zero

Answer: B

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57. A well stopped thermosflask contains some ice Cubes. This is an example of a

A. Closed system

B. Open system

C. Isolated system

D. Non-thermodynamic system

Answer: C

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58. For the reaction

$N_2 + 3H_2 = 2NH_3, \ \triangle H = ?$

A. $\triangle E = 2RT$

B. $\triangle E - 2RT$

C. $\triangle E + RT$

D. $\triangle E + 2RT$

Answer: B

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59. For an ideal gas, the relation between the enthalpy change and internal energy at constant temperature is given by

A. $\triangle H = \triangle E + PV$

B. $\triangle H = \triangle E + \triangle nRT$

C. $\triangle H = \triangle E + P \triangle V$

D. $\triangle H = \triangle G + T \triangle S$

Answer: B

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60. If $C(s) + O_2(g) \rightarrow CO_2(g), \triangle H = X$ and $CO(g) + \frac{1}{2}O_2(g) \rightarrow CO_2(g), \quad \triangle H = Y$ then the heat of formation of CO is

A. X+Y

B. X-Y

C. Y-X

D. XY

Answer: B

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61. Enthalpies of elements in their standard states are taken as zero. Hence the enthalpy of formation of a compound

A. shuold always be negative

B. shuold always be positive

C. will be equal to twice the energy of combustion

D. may be +ve or -ve

Answer: D

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62. Which of the following values of heat of formation indicates that the product is least stable ?

A. $-94kcal$

B. $-231kcals$

C. $+21.4kcal$

D. $+64.8kcal$

Answer: D

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63. For an adiabatic process, which of the following is correct.

A. P $\triangle V$=0

B. q=+w

C. $\triangle E$=q

D. q=0

Answer: D

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64. Identify the intensive quantity from the following

A. Enthalpy and temperature

B. Volume and temperature

C. Enthalpy and volume

D. Temperature and refractive index

Answer: D

65. An exothermic reaction is one which

A. takes place on heating

B. is accompanied by flame

C. is accompanied by absorption of heat

D. is accompanied by evolution of heat

Answer: D

66. An endothermic reaction is one in which

A. heat is converted into electicity

B. heat is absorbed

C. heat is evolved

D. heat is converted to machanical work

Answer: B

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67. Which of the following reaction is exothermic ?

A. $CaCO_3 \rightarrow CaO + CO_2$

B. $Fe + S \rightarrow FeS$

C. $NaOH + HCI \rightarrow NaCI + H_2O$

D. $CH_4 + 2O_2 \rightarrow CO_2 + 2H_2O$

Answer: B

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68. Which of the following is an endothermic reaction

A. $2H_2 + O_2 \rightarrow 2H_2O$

B. $N_2 + O_2 \rightarrow 2NO$

C. $2NaOH + H_2SO_4 \rightarrow Na_2SO_4 + 2H_2O$

D. $C_2H_5OH + 3O_2 \rightarrow 2CO_2 + 3H_2O$

Answer: B

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69. In exothermic reaction

A. $\triangle E$ is zero`

B. $\triangle H$ is -ve

C. $\triangle S$ is zero`

D. $\triangle H$ is +ve`

Answer: B

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70. For an endothermic reaction

A. $\triangle H$is -ve

B. $\triangle H$ is +ve`

C. $\triangle E$ is -ve `

D. $\triangle H$ =0`

Answer: B

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71. Enthalpy for the reaction

$C + O_2 \rightarrow CO_2$ is:

A. $= ve$

B. -ve

C. zero

D. none

Answer: B

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72. Enthalpy of a compound is equal to its

A. heat of comustion

B. heat of formation

C. heat of reaction

D. heat of solution

Answer: B

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73. During isothermal expansion of an ideal gas its

A. internal energy increase

B. enthalpy increase

C. enthalpy remains unaffected

D. enthalpy reduces to zero

Answer: C

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74. Heat of neutralisation of a strong acid and strong base is always.

A. 13.7 kcal/mole

B. 9.6 kacl/mole

C. 6 kcal/mole

D. 11.4 kacl/mole

Answer: A

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75. The mutual heat of neutralisation of 40 grams NaOH and 60 grams CH_3COOH will be

A. 56.1 kJ

B. less than 56.1 kJ

C. more than 56.1 kJ

D. 13.7 kJ

Answer: B

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76. In which of the following neutralisation reaction, the heat of neutralisation is the highest

A. NH_4OH and H_2SO_4

B. HCl and NaOH

C. CH_3COOH and KOH

D. CH_3COOH and NH_4OH

Answer: B

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77. Hess's law deals with

A. change in heat of reaction

B. rate of reaction

C. equilibrium constant

D. influence of pressure on volume of a gas

Answer: A

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78. Hesss law of heat of summation includes

A. initial reactants only

B. initial reactants and final products

C. final products only

D. intermediates only

Answer: B

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79. $H_2(g) + I_2(g) \rightarrow 2HI(g), \triangle H = -12.40kcals,$ Heat of formation of HI will be

A. 12.4 kcals

B. $-12.4kcals$

C. $-6.20kacls$

D. 6.20 kcals

Answer: C

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80. Combustion of methane

A. is an exothermic process

B. is an endothermic process

C. requires catalyst

D. give H_2

Answer: A

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81. For which reaction, Δ S will be maximum ?

A. $Ca(s) + \frac{1}{2}O_2(g) \rightarrow CaO(s)$

B. $CaCO_3(S) \rightarrow CaO(s) + CO_2(g)$

C. $C(s) + O_2(g) \rightarrow CO_2(g)$

D. $N_2(g) + O_2(g) \rightarrow 2NO(g)$

Answer: B

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82. The total entropy change for a system and its surrounding increases, if the process is

A. reversible

B. irreversible

C. exothermic

D. endothermic

Answer: B

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83. Fill up the gap: When ice melts to liquid water, its entropy _____.

A. becomes zero

B. decreases

C. increases

D. remains same

Answer: C

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84. Heat of combustion is always

A. $= ve$

B. -ve

C. neutral

D. all of the above

Answer: B

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85. Energy required to dissociate 4 gms of gaseous hydrogen into free gaseous atoms is 208 kcals at $25^{\circ}C$. The bond energy of H-H bond will be

A. 104 kcals

B. 10.4 kcals

C. 1040 kcals

D. 104 cals

Answer: A

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86. If a refrigerator door is opend then we get

A. room heated

B. room cooled

C. more heat is passed out

D. no effect on room

Answer: A

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87. When 1 mole of NH_4OH is neutralised by 1 mole of HCl, heat evolved is:

A. 57.2kJ

B. greater than 57.2 kJ

C. less than 57.2 kJ

D. None of these

Answer: C

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88. For the reaction :

$2Cl(g) - . Cl_2(g).$

A. $\triangle H = +ve$ and $\triangle S = -ve$

B. $\triangle H = -ve$ and $\triangle S = +ve$

C. `/_\H= -ve and /_\ S= -ve

D. `/_\H= -ve and /_\S = +ve

Answer: C

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89. The relation $\triangle G = \triangle H - T \triangle S$ was given by

A. Thomson

B. Faraday

C. Blotzman

D. Gibb's-Helmholtz

Answer: D

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90. For the formation of NH_3 from N_2 and H_2, $(\triangle E - \triangle H)$ is :

A. RT

B. -2RT

C. 2RT

D. RT/2

Answer: C

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91. For $H_2(g) + I_2(g) \rightleftharpoons 2HI(g), \ \triangle H = 12.4Kcal.$ The enthalpy of formation of HI is:

A. 12.4 K cal

B. -12.4 K cal

C. 6.2 K cal

D. -6.2 K cal

Answer: C

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92. For the reaction :

$C_2H_4(g) + 5O_2(g) \rightarrow 3CO_2(g) + 4H_2O(l)$ at constant temperature. $\triangle$ H - $\triangle$ U is:

A. RT

B. -3RT

C. $= 3RT$

D. -RT

Answer: B

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93. The bond energies of C-C, C=C, H-H and C-H linkages arev350, 600, 400 and 410 kJ per mol respectively. The heat of hydrogenation of ethylene is:

A. $-170kJmol^{-1}$

B. $-260kJmol^{-1}$

C. $-400kJmol^{-1}$

D. $-450kJmol^{-1}$

Answer: A

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94. Considering entropy (S) as a thermodynamic parameter the criterion for the spontaneity of any process is:

A. $\triangle S_{system} - \triangle S_{surroundings} > 0$

B. $\triangle S > 0$only

C. $\triangle S_{surroundings} > 0$ only

D. $\triangle S_{system} + \triangle S_{surround \in gs} > 0$

Answer: D

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95. A reaction occurs spontaneously if :

A. $T \triangle S > \triangle H$ and $\triangle H$ is +ve and $\triangle Sis - ve$

B. $T \triangle S = \triangle H$and both $\triangle H$and $\triangle S$ are +ve

C. $T \triangle S < \triangle H$ and both $\triangle H$ and $\triangle S$ is +ve

D. $T \triangle S > \triangle H$ and both $\triangle H$ and $\triangle S$are is +ve

Answer: D

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96. For a phase change $H_2O(l) \rightleftharpoons H_2O(s)$

$0^\circ C$,1 bar

A. $\triangle G$=0

B. $\triangle S$=0

C. $\triangle H$=0

D. $\triangle U$=0

Answer: A

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97. In which condition entropy change is not zero ?

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98. What is the relationship between free energy change and enthalpy change a reaction ?

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99. Give two examples of extensive property.

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100. Give examples of macroscopic properties.

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101. what are the units of work and energy and how they are related ?

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102. Write the factors which affect the enthalpy change of a reaction.

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103. Explain enthalpy.

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104. Define enthalpy of neutralization.

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105. State Hess's law of constant heat summation.

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106. Write the relation between heat of sublimation, heat of fusion, heat of vapourisation.

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107. Write the sign of $\triangle S$ for the following changes.

$H_2O(I) \rightarrow H_2O(s)$

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108. Write the sign of $\triangle S$ for the following changes

$Solid CO_2 \rightarrow CO_2(g)$

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109. Write the sign of $\triangle S$ for the following changes

$Steam \rightarrow Water$

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110. What is the sign of $\triangle H$ in exothermic and endothermic reaction ?

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111. Explain "free energy".

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112. Explain why entropies of all pure substances at aboslute zero are zero.

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113. Explain the state of chemical reation.

$\triangle G = 0$

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114. Explain the state of chemical reation.

$\triangle G < 0$

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115. Explain the state of chemical reation.

$\triangle G > 0$

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116. Write down the expressions for standard free energy change in terms of equilibrium constant.

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117. What is the relationship between enthalpy (H) and internal energy (E) ?

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118. Define Hess's law.

Watch Video Solution

119. For a spontaneous process how T $\triangle S$ and $\triangle H$ are related ?

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120. What are the factors on which internal energy depends ?

Watch Video Solution

121. What is the value of $\triangle G$, when a reaction takes place at constant temperature and pressure?

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122. Calculate the entropy of vaporisation for liquid boiling at 300K having enthalpy of vapourisation, 27kJ mol^{-1}.

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123. Write Gibb's Helmholtz equation ?

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124. Why $\triangle G < 0$ is alwasys true for a spontaneous reaction ?

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125. The heat of combustion of $C_{10}H_8(s)$ at constant volume is -5133kJ mol_{-1} at 298K. Calculate the value of enthalpy change. $(R = 8.314JK_{-1}mol_{-1})$

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126. Calculate the entropy of vaporisation for liquid boiling at 300K having enthalpy of vapourisation, 27kJ mol^{-1}.

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127. The equilibrium constant for the reaction is 10 at 300K. What will be the value of $\triangle G^{\circ}$?

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128. Explain the latest sign conventions regarding work and heat as per IUPAC recommendation.

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129. What would be the heat released when 0.5 mole of HCI is neutralised by 0.5 mole of NaOH in aqueous solution.

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130. The enthalpy of combustion of CH_4 at $25^\circ C$ is 890kJ. How much heat liberated when 3.2g of methane is burnt in air ?

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131. Define Hess's law.

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132. Calculate the entropy change when 1 gram of ice is converted to water. Given $\triangle H = 6025$ J/mole

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133. Calculate the heat of formation of benzene from the following data.

$C(s) + O_2(g) \rightarrow CO_2(g) \triangle H = -393.5kJ$

$C_6H_6(l) + \frac{15}{2}O_2(g) \rightarrow 6CO_2(g) + 3H_2O(l) \triangle H = -3267.7kJ$

$H_2(g) + \frac{1}{2}O_2(g) \rightarrow H_2O(l) \triangle H = -286.2kJ$

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134. The enthalpy of combustion of glucose is -2840 kJ. What is the energy evolved for the combustion of 5.2 gm of glucose ?

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135. What do you mean by internal energy ?

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136. Explain the significance of change of enthalpy.

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137. Calculate the enthalpy change($\triangle H$) for the following reaction.

$2C_2H_2(g) + 5O_2(g) \rightarrow 4CO_2(g) + 2H_2O$

Given : Average bond energies of varisous bonds C-H, $C \equiv C$, O=O, C=O, O-H are 414, 814, 499, 724, 640 kJ mol^- respectively.

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138. The standard free energy change for a reaction is $-212.3kJmol_{-1}$. If the enthalpy of the reaction is $216.7kJmol_{-1}$, calculate the change in entropy in the reaction at 298K.

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139. Prove that $\triangle H = \triangle U + \triangle nRT$.

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140. What are the required thermodyanmic criteria for a reaction to be spontaneous ?

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141. Under what condition, enthalpy change is equal to heat of reaction ?

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142. The standard heat of formation of diamond, although an elementary substance, is not taken as zero. Explain why ?

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143. Are the bond energies of all the four C-H bonds in methane molecule equal ? Justify your answer.

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144. Why is entropy of substance taken as zero at absolute zero temperature ?

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145. What is the value of change in entropy at equilibrium ?

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146. Neither q nor w is a state function but (q+w) is a state function. Explain why ?

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147. Arrange water vapour, liquid water and ice in the order of increasing entropy.

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148. Why does a real crystal has more entropy than an ideal crystal ?

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149. How does entropy change with increase in temperature,

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150. How does entropy change with decrease in pressure ?

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151. Do you expect $\triangle S \to be + ve, -ve$ or $zero f$ or $reaction:$

H_2(g)+I_2(g)⇌2HI(g)`

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152. Is the entropy of the universe constant ?

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153. What is mean by macroscopic properties in thermodynamics ?

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154. Define intensive properties and give few examples.

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155. How can you convert an extensive property to an intensive property ?

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156. Give relation betwween internal energy change and enthalpy change.

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157. What are the standard states for various form of matter ?

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158. Define and illustrate standard enthalpy of reaction.

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159. Define and illustrate standard enthalpy of formation.

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160. What is enthalpy of solution ?

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161. What is bond energy ?

Watch Video Solution

162. Define and illustrate bond dissociation energy.

Watch Video Solution

163. How can bond enthalpy data can be used to calculate enthalpy of reaction ?

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164. State Zeroth law of thermodynamics.

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165. Give four statements of first law of thermodynamics.

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166. Give four limitations of first law of thermodynamics.

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167. Define heat capacity of a system and give relationship between C_p and C_v.

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168. Give relation between C_p and C_v.

Watch Video Solution

169. Give Kirchhoff's equation at constant pressure and contant temperature.

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170. Show that maximum work is done in isothermal reversible expansion.

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171. Give an expression for work done in a reversible isothermal expression of an ideal gas.

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172. How much work is done in an irreversible isothermal free expansion of an ideal gas in vacuum ?

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173. For reversible adiabatic expansion of an ideal gas, give an expression for work done.

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174. what is Joule Thomson Coefficient ? How does it account for the heating and cooling effect on J.T. expansion ?

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175. Define intensive property and show its importance.

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176. What is the efficiency of a heat engine ?

Watch Video Solution

177. How is entropy change measured in a reversible isothermal process ?

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178. Give four different ststements of second law of thermodynamics.

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179. Explain why the enthalpy of formation and the entropy of formation of an element in its standard state at 298 K and 1 bar pressure are not equal ?

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180. State third law of thermodynamics with few exceptius.

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181. Give relationship between entropy and probability.

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182. What is integral enthalpy solution ?

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183. What is molar integral enthalpy of solution ?

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184. Define molar differential enthalpy of solution.

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185. Explain the significance of molar enthalpy of solution at infinite dilution.

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186. What is integral enthalpy of dilution ?

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187. Explain molar integral enthalpy of dilution.

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188. Define molar differential enthalpy of dilution.

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189. State and explain Nernst heat theorem.

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190. State third law of thermodynamics, what is the importance of this law ?

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191. When water is converted to ice, its entropy_____.

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192. Heat of combustion is also known as _____.

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193. In endothermic reaction $\triangle$ is _____ and in exothermic reaction $\triangle H$ is _____.

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194. What is the relationship between enthalpy (H) and internal energy (E) ?

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195. Measurement of disorderness or randommess of the system is _____.

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196. The enthalpy change during chemical reaction remains the same whether the reaction takes place in one step or in several steps is known as _____.

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197. Gibb's Helmholtz equation is _____.

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198. What is the free energy change at equilibrium state ?

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199. The energy required to break down all the bonds in one compound is known as _____.

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200. Ice is converted to water, then entropy_____.

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201. Entropy of ice is _____ than entropy of water vapour.

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202. For spontaneous process $\triangle S$ is _____ and $\triangle G$ is _____.

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203. The system in which exchange of both matter and energy with surroundings takes place is known as____.

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204. The properties which do not depend on the quantity of matter present in the system are called____.

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205. Number of moles, mass, volume, enthalpy, entropy and free energy are examples of _____ properties.

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206. All natural processes are _____ process.

Watch Video Solution

207. S.I. Unit of caloric value is given by____.

Watch Video Solution

208. Entropy is a measure of disoder. For perfect crystalline substance at 0 K, entropy becomes:

A. Minus

B. Zero

C. Constant

D. Very low

Answer: B

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209. For the reversible vaporisation of water at $100^{\circ}C$ and 1 atmospheric pressure, $\triangle G$ is equal to:

A. $\triangle H$

B. $\triangle S$

C. zero

D. $\triangle \frac{H}{T}$

Answer: C

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210. The total amount of energy in the universe is fixed, but:

A. Matter is increasing

B. Gravitation is decreasing

C. Disorder is increasing

D. Lightening is increasing

Answer: C

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211. Gibbs free energy G, enthalpy H and entropy S are related by:

A. G=H+TS

B. G=H-TS

C. G-TS=H

D. S=H-G

Answer: B

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212. For the precipiyation of AgCl by Ag^{+} ions and HCl:

A. $\triangle H = 0$

B. $\triangle G = 0$

C. $tr \in ag \leq G = -ve$

D. $\triangle H = \triangle G$

Answer: C

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213. Least random state of water is:

A. Ice

B. Liquid water

C. Steam

D. All present in same random state

Answer: A

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214. The matter has highest entropy in:

A. Solid state

B. Liquid state

C. Gaseous state

D. Equal in all

Answer: C

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215. In a reversible isothermal process the change in internal energy is:

A. Zero

B. Positive

C. Negative

D. None

Answer: A

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216. The total entropy change for a system and its surrounding increases, if the process is

A. reversible

B. irreversible

C. exothermic

D. endothermic

Answer: B

Watch Video Solution

217. When the value of entropy is greater, then the ability for work is:

A. Maximum

B. Minimum

C. Medium

D. None of these

Answer: A

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218. A well stopped thermosflask contains some ice Cubes. This is an example of a

A. Closed system

B. Open system

C. Isolated system

D. None

Answer: C

Watch Video Solution

219. Change in entropy is negative for:

A. $Bro\ \min e(l) \rightarrow Bro\ \min e(g)$

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

C. $N_2(g, 10atm) \rightarrow N_2(g, 1atm)$

D. $Fe(1mol, 400K) \rightarrow Fe(1mol, 300K)$

Answer: D

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220. At a certain temperature T, the endothermic reactiion $A \rightarrow B$ proceeds almost to completion.

The entropy change is:

A. $\triangle S = 0$

B. $\triangle S < 0$

C. $\triangle S > 0$

D. Cannot be predicted

Answer: C

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221. The enthalpy change for the process $C(s) \rightarrow C(g)$ corresponds to enthalpy of:

A. Fusion

B. Vaporisation

C. Combustion

D. Sublimation

Answer: D

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222. For the process, $CO_2(s) \rightarrow CO_2(g)$:

A. Both $\triangle H$ and $\triangle S$ are +ve

B. $\triangle H$ is negative and $\triangle S$ is +ve`

C. $\triangle H$ is +ve and $\triangle S$ is -ve`

D. Both $\triangle H$ and $\triangle S$ are -ve`

Answer: A

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223. Maximum work done by a system is given by:

A. Decrease in Helmholtz free energy $(\triangle A)$

B. Decrease in Gibb's free energy $(\triangle G)$

C. Decrease in internal energy

D. Decrease in heat energy

Answer: B

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224. The final temperature in an adiabatic expansion is:

A. Greater than the initial temperature

B. Same as the initial temperature

C. Half of the initial temperature

D. Less than the initial temperature

Answer: D

Watch Video Solution

225. In an adiabatic process:

A. The system exchanges heat with surrounding

B. Pressure is maintained constant

C. There is perfect heat insulation

D. The gas is isothermally expanded

Answer: C

Watch Video Solution

226. The work done by a system in an expansion against a constant external pressure is :

A. $\triangle P.\ \triangle V$

B. $-P.\ \triangle V$

C. Q

D. $V.\ \triangle P$

Answer: B

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227. An endothermic reaction is one in which

A. Heat is liberated

B. heat is absorbed

C. Temperature remains constant

D. None of these

Answer: B

Watch Video Solution

228. The mathematical form of the first law of thermodynamics when heat(q) is supplied and W is work done by the system(+ve) is:

A. $\triangle U = q + W$

B. $\triangle U = q - W$

C. $\triangle U = -q + W$

D. $\triangle U = -q - W$

Answer: B

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229. Which one is not a state function:

A. Internal energy(U)

B. Volume

C. Heat (q)

D. Enthalpy

Answer: C

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230. Thermodynamic is concerned with:

A. Total energy of a system

B. Energy changes in a system

C. Rate of chemical change

D. Mass change in nuclear reactions

Answer: B

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231. When no heat energy is allowed to enter or leave the system it is called:

A. Isothermal process

B. Reversible process

C. Adiabatic process

D. Irreversible process

Answer: C

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232. The $\triangle G$ in the process of melting of ice at - $156 \circ C$ is:

A. $\triangle G < 0$

B. $\triangle G > 0$

C. $\triangle G = 0$

D. All

Answer: B

Watch Video Solution

233. The entropy change for vaporisation of liquid water to steam at $100^{\circ}C$ is ____$JK^{-1}mol^{-1}$, Given that heat of vapori-sation is $40.8kJmol^{-1}$.

A. 109.38

B. 100.38

C. 110.38

D. 120.38

Answer: A

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234. The work done by 100 calorie of heat is:

A. 481.4 J

B. 4.184J

C. 41.84J

D. None

Answer: A

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235. The work done by a system is 8 J, when 40 J heat is supplied to it.

The change in internal energy of the system during the process:

A. 32 J

B. 40 J

C. 36 J

D. 44 J

Answer: A

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236. The work done during the process when 1 mole of gas is allowed to expand freely into vacuum is:

A. Zero

B. $+ve$

C. $-ve$

D. Either of these

Answer: A

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237. The maximum work done in expanding 16 g oxygen at 300K and occupying a volume of 5 dm^3 isothermally until the volume become 25 dm^3 is:

A. $2.01X10^3J$

B. $+2.81X10^{3}J$

C. $2.01X10^{-3}J$

D. $+2.01X10^{-6}J$

Answer: A

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238. If temperature remains contant during a reaction the process is called:

A. Isothermal

B. Isochoric

C. Isobaric

D. Adiabatic

Answer: A

Watch Video Solution

239. A gaseous system change form state A $(P_1, V_1, T_1) \rightarrow B(P_2, V_2, T_2), B \rightarrow C(P_3, V_3, T_3)$ and finally from C to A. The whole procoess may be called:

A. Reversible process

B. Cyclic process

C. Isobaric process

D. Spontaneous process

Answer: B

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240. Work done by the system on surrounding is

A. Postive

B. Negative

C. Zero

D. None of these

Answer: B

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241. During isothermal transformation of an ideal gas, internal energy:

A. Increase as the pressure increases

B. Decreases as the volume decreases

C. Decreases as the pressure decreases

D. remains fixed

Answer: D

Watch Video Solution

242. When a solid is changed into liquid the entropy

A. Decrease

B. Increases

C. Remains constant

D. None of these

Answer: B

Watch Video Solution

243. Write van't Hoffequation ?

A. $\triangle G = RT \log_g K_p$

B. $-tr \in ag \leq G = RT \log_g K_p$

C. $\triangle G = RT^2 \in K_p$

D. None of these

Answer: B

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244. 1 litre - atmosphere is equal to:

A. 101.3 J

B. 24.206 cal

C. $101.3x10^7 erg$

D. All

Answer: D

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245. Decrease in free energy of a reacting system indicates to:

A. Exothermic reaction

B. Equilibrim reaction

C. Spontaneous reaction

D. Slow reaction

Answer: C

Watch Video Solution

246. An ideal gas undergoing expansion in vacuum shows:

A. $\triangle U = 0$

B. W=0

C. q=0

D. All

Answer: D

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247. It is impossible to attain the lowest temperature known as zero degree absolute. This is a simple statement of:

A. First law of thermodynamics

B. Second law of thermodynamics

C. Third law of thermodynamics

D. None

Answer: C

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248. An example of extensive property is:

A. Temprature

B. Internal energy

C. Viscosity

D. Surface tension

Answer: B

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249. It is a general principle that the less energy of a system then it is:

A. More stable

B. Less stable

C. Unstable

D. More unstable

Answer: A

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250. $\triangle S$ for the reaction,

$MgCO_3(s) \rightarrow MgO(s) + CO_2(g)$ will be

A. Zero

B. $-ve$

C. $+ve$

D. ∞

Answer: C

Watch Video Solution

251. The intensive property is:

A. Freezing point

B. Temperature

C. Refractive index

D. All

Answer: D

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252. An isolated system is that system in which:

A. There is no exchange of energy with the surroundings

B. There is exchange of mass and energy with the surroundings

C. There is no exchange of mass or energy with the suroundings

D. There is exchanges of mass with the surroundings

Answer: C

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253. For two mole of an ideal gas:

A. $(C_p - C_v) = R$

B. $(C_p - C_v) = \frac{R}{2}$

C. $(C_v - C_p) = -2R$

D. $(C_p - C_v) = 0$

Answer: A

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254. When an ideal gas is compressed adiabatically and reversibly, the final temperature is:

A. Higher than the initial temperature

B. Lower than the initial temperature

C. The same as the initial temperature

D. Dependent on the rate of compression

Answer: C

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255. Above the inversion temperature, μ(J.T. coefficient):

A. Is positive

B. Is zero

C. Is nagative

D. Depends on the gas

Answer: C

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256. For the adiabatic expansion of an ideal gas:

A. PV^{γ}=constant

B. $TV^{\gamma-1} = cons\tan t$

C. $T^{\gamma}P^{1-\gamma} = cons\tan t$

D. All

Answer: D

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257. The inversion temperature for a van der Waals' gas is:

A. $T_i = 2\frac{a}{Rb}$

B. $T_i = \frac{a}{Rb}$

C. $T_i = \frac{a}{2}(Rb)$

D. T_i =0.5T Boyle

Answer: A

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258. Which is not a spontaneous process:

A. Expansion of a gas into vacum

B. Water flowing down hill

C. Heat flowing from colder body to a hotter body

D. Evaporation of water from clothes during drying

Answer: C

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259. The equilibrium constant for the reaction is 10 at 300K. What will be the value of $\triangle G^{\circ}$?

A. Standard free energy change$tra \in g \leq G^{\circ}$

B. temperature T

C. Heat enthalpy

D. None

Answer: A

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260. When ice melts into water, entropy:

A. becomes zero

B. Decreases

C. increases

D. Remains the system

Answer: C

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261. Human body is an example of:

A. Open system

B. Closed system

C. Isolated system

D. None

Answer: B

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262. A closed flask contains water in all its three states, solids, liquid and vapour at $0 \circ C$. In this situation the average KE of the water molecule will be:

A. Maximum in vapour state

B. Maximum in solid state

C. Greater in the liquid than in vapour state

D. Same in all the three states

Answer: D

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263. Which gas shows a heating effect when expanded into a region of low pressure:

A. O_2

B. NH_3

C. F_2

D. H_2

Answer: D

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264. On dissolving NaCl in water there occurs:

A. becomes zero

B. Increases in entropy

C. Decrease in entropy

D. No change in entropy

Answer: B

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265. When hydrogen and oxygen burn to from water in an oxyhydrogen torch, the entropy change is:

A. Negative

B. Positive

C. Zero

D. may be +ve or -ve

Answer: A

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266. Joule Thomson co-efficient for ideal gas is:

A. Zero

B. Positive

C. Negative

D. Infinite

Answer: A

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267. $\triangle S$ is postive for the change:

A. Mixing of two gases

B. Boiling of liquid

C. Melting of Solid

D. All

Answer: D

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268. The heat change in a chemical reaction at constant pressure is:

A. $\triangle H$

B. $\triangle U$

C. $\triangle T$

D. $\triangle V$

Answer: A

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269. A thermally isolated gaseous system can exchange energy with the surrounding. The mode of transference of energy can be:

A. Heat

B. Work

C. Heat and radiation

D. None of these

Answer: B

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270. Which correctly represents the physical significance of free energy change:

A. $\triangle G = W_{\exp a}nsion$

B. $\triangle G = W_n o \neq xpansion$

C. $\triangle G = -W_C ompression$

D. $\triangle G = W_c ompression$

Answer: C

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271. A reaction taking palce with absorption of energy is:

A. Burning of a candle

B. Electrolysis of water

C. Digestion of food

D. Rusting or iron

Answer: B

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272. All the naturally occuring process i.e., spontaneous proceed spontaneously in a direction which leads to:

A. Decrease of free energy

B. Increase of free energy

C. Decrease of entropy

D. Increase of entropy

Answer: A

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273. Work done by the system in a cyclic process is equal to:

A. Zero

B. $\triangle U$

C. $\triangle H$

D. q

Answer: D

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274. Internal energy of an ideal gas depends on:

A. Pressure

B. Temperature

C. Volume

D. None

Answer: B

Watch Video Solution

275. A spontaneous change is one in which the system suffers:

A. An increase in internal energy

B. A lowering of entropy

C. A lowering of free energy

D. No energy

Answer: C

Watch Video Solution

276. Heat given to a system under isochoric process is equal to:

A. W

B. q_p

C. $\triangle E$

D. $\triangle H$

Answer: A

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277. The apparatus generally used for measuring heat changes is:

A. Voltameter

B. Voltmeter

C. Calorimeter

D. Coulometer

Answer: C

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278. In which of the following case entropy decreases:

A. Solid changing to liquid

B. Expansion of a gas

C. Crystals dissolve

D. Polymerisation

Answer: D

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279. In which case, a spontaneous reaction is impossible at any temperature:

A. $\triangle H > 0, \triangle S > 0$

B. $\triangle H > 0, \triangle S < 0$

C. $\triangle H < 0, \triangle S < 0$

D. In all cases

Answer: B

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280. In which case, a spontaneous reaction is possible at any temperature:

A. $\triangle H < 0,\ \triangle S > 0$

B. $\triangle H < 0,\ \triangle S < 0$

C. $\triangle H > 0,\ \triangle S > 0$

D. In none of the cases

Answer: A

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281. In a reaction, $\triangle H$ and $\triangle S$ both are more than zero. In which of the following cases, the reaction would not be spontaneous:

A. $\triangle H > T \triangle S$

B. $\triangle S = \triangle \frac{H}{T}$

C. $\triangle H = T \triangle S$

D. All

Answer: D

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282. In which reaction $\triangle S$ is positvive:

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

B. $3O_2(g) \rightarrow 2O_3(g)$

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

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

Answer: C

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283. Change in entropy for a reaction is given by:

A. 2.303 nR $\frac{\log_{10}(v_2)}{v_1}$

B. nR $\frac{\log_e(v_2)}{v_1}$

C. nR $\frac{\log_e(P_1)}{P_2}$

D. All

Answer: D

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284. The efficiency of heat engine is maximum when:

A. Temprature of source greater than temperature of sink

B. Temprature of sink greater than temperature of source

C. Temprature difference of source and sink is minimum

D. Temprature difference of source and sink is maximum

Answer: D

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285. In a chemical reaction $\triangle H$=150kJ and $\triangle S$= 100JK^-1 $at 300K$. ThetriangleG` for the reaction is :

A. Zero

B. 300 kJ

C. 330kJ

D. 120 kJ

Answer: D

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286. A system is provided 50 joule of heat and work done on the system is 10 J. The change in internal energy during the process is:

A. 40 J

B. 60 J

C. 80 J

D. 50 J

Answer: B

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287. Enthalpy of vaporisation for water is 186.5kJ mol^{-1}. The entropy change during vaporisation is___kJ $K^{-1}mol^{-1}$:

A. 0.5

B. 1

C. 1.5

D. 2

Answer: A

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288. A system is changed from state A to state B by one path and from B to A by another path. If U and U_2 are the corresponding change in internal energy, then:

A. $U_1 + U_2 = +ve$

B. $U_1 + U_2 = -ve$

C. $U_1 + U_2 = 0$

D. None

Answer: C

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289. The cooling in refrigerator is due to:

A. The work of compressor

B. The expansion of gas in the refrigerator

C. Expansion of ice

D. Reaction of the refrigerator

Answer: B

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290. If $\triangle G^{\circ} > 0$, for a reaction then:

A. $K_p > 1$

B. $K_p < 1$

C. The products predominate in the equilibrium mixture

D. None

Answer: B

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291. Highest entropy at the same temperature is in:

A. Water

B. Hydrogen

C. Mercury

D. Graphite

Answer: B

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292. During an adiabatic process:

A. Pressure is maintained constant

B. Gas is isothermally expanded

C. There is perfect heat insulation

D. The system change heat with surroundings

Answer: C

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293. The process in which pressure remains constant throughout a change is:

A. Adiabatic

B. Isochoric

C. Isobaric

D. Isothermal

Answer: C

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294. Which statements is/are correct:

A. $(\delta H / \delta T)_p - (\delta U / \delta T)_v = R$

B. $(\delta H / \delta T)_p > (\delta U / \delta T)_v$

C. $(\delta E / \delta V)_T$ for ideal gas is zero

D. All

Answer: D

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295. In an irreversible process, the value of $\triangle S_system + \triangle S_surr$ is :

A. greater than 0

B. less than 0

C. equal 0

D. All

Answer: A

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296. The entropy change at a given temperature is expressed as:

A. $\triangle S = q - T$

B. $\triangle S = q / \triangle T$

C. $q = T \triangle S$

D. S=q/T

Answer: C

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297. The temperature of the system increases during an:

A. Isothermal expansion

B. Adiabtic compression

C. Adiabtic expansion

D. Isothermal compression

Answer: B

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298. Enthalpy is same as:

A. Heat content

B. Entropy

C. Heat

D. Volume

Answer: A

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299. The relation $\triangle G = \triangle H - T \triangle S$ was given by

A. Boltzmann

B. Faraday

C. Gibbs-Helmholtz

D. Thomson

Answer: C

Watch Video Solution

300. Entropy decreases during:

A. Crystallisation of sucrose from solution

B. Rusting of iron

C. Melting of ice

D. Vaporisation of camphor

Answer: A

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301. The spontaneous nature of a reaction is impossible if:

A. $\triangle His + ve$, $\triangle S$ is also +ve

B. $\triangle H$ is -ve, $\triangle S$ is also -ve

C. $\triangle H$ is -ve, $\triangle S$ is +ve

D. $\triangle H$ is +ve, $\triangle S$ is -ve

Answer: D

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302. For an adiabatic process :

A. Q=+w

B. Q=0

C. $\triangle E = q$

D. $P \triangle V = 0$

Answer: B

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303. Energy equivalent to one erg, one joule and one calorie are in order:

A. 1 erggt1 Jgt1 cal

B. 1 erggt1 calgt1 J

C. 1 calgt 1 Jgt1 erg

D. 1 Jgt1 cal gt 1 erg

Answer: C

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304. A boiled egg show a/an_in entropy:

A. Increase

B. Decreases

C. No change

D. None

Answer: A

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305. Molar heat capacity at constant P for substance is equal to:

A. $(\delta E / \delta T)_v$

B. $(\delta H / \delta T)_v$

C. $(\delta E / \delta T)_p$

D. $(\delta H / \delta T)_p$

Answer: D

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306. The work done by a weightless piston in causing an expansion $\triangle V$(at constant temperature), when the opposing pressure, P is variable, is given by:

A. $W = -\int P \triangle V$

B. W=0

C. $W = -P \triangle V$

D. None

Answer: A

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307. An adiabatic process is one in which:

A. The system is not closed to energy transfer

B. The system is not closed to heat transfer

C. There is no enthalpy change

D. There is no change in mass of the system

Answer: C

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308. Which is the intensive property:

A. Temperature

B. Viscosity

C. Density

D. All

Answer: D

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309. Warming ammonium chloride with sodium hydroxide in a test tube is an example of:

A. Closed system

B. Isolated system

C. Open system

D. None of these

Answer: C

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310. The unit of entropy are:

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

B. $kJ^{-1}mol^{-1}$

C. $kJmol^{-1}$

D. $J^{-1}K^{-1}mol^{-1}$

Answer: A

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311. At absolute zero, the entropy of a perfect cyrstal is zero. This is which law of thermodynamics ?

A. First law of thermodynamics

B. Second law

C. Third law

D. None

Answer: C

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312. Net work done by a system is given by:

A. Decrease in Helmholtz free energy $(\triangle A)$

B. Decrease in Gibb's free energy $(\triangle G)$

C. Decrease in internal energy

D. Decrease in heat enthalpy

Answer: A

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313. The process of evaporation of a liquid is accompanied by:

A. Increase in enthalpy

B. Decrease in free energy

C. Increase in entropy

D. All

Answer: D

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314. $\triangle S^{\circ}$ will be highest for the reaction

A. $Ca(s) + 1/2O_2(g) \rightarrow CaO(S)$

B. $CaCO_3(S) \rightarrow CaO(s) + CO_2(g)$

C. $C(s) + O_2(g) \rightarrow CO_2(g)$

D. $N_2(g) + O_2(g) \rightarrow 2NO(g)$

Answer: B

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315. The free energy change for a reversible reaction at equilibrium is:

A. Zero

B. Small positive

C. Small negative

D. Large positive

Answer: A

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316. Which is not a state function:

A. Internal energy

B. Entropy

C. Work

D. Enthalpy

Answer: C

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317. The temperature of the system decreases in an:

A. Adiabatic expansion

B. Isothermal compression

C. Isothermal expansion

D. Adiabatic compression

Answer: A

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318. The second law of thermodynamic introduced the concept of:

A. Third law of thermodynamics

B. Work

C. Entropy

D. Internal energy

Answer: C

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319. Select the correct limitations of III law of thermodynamics:

A. Glassy solids at zero Kelvin has entropy greater than zero

B. Solids having mixture of isotopes do not have entropy zero at Kelvin

C. Crystals of CO,N_2O,NO, H_2O,` etc., do not have zero entropy at zero Kelvin.

D. All

Answer: D

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320. Which of the following have same units:

(i) Work, (ii) Heat, (iii) Energy (iv) Entropy

A. (i), (ii) and (iii)

B. (i), (ii) and (iv)

C. (ii), (iii) and (iv)

D. (iii) and (iv)

Answer: A

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321. When two atoms of hydrogen combine to form a molecule of hydrogen gas, the energy of the molecule is:

A. Greater than that of separate atoms

B. Equal to that of separate atoms

C. Lower than that of separate atoms

D. Sometimes lower than sometimes higher

Answer: C

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322. A gas on subjecting to adiabatic expansion gets cooled due to:

A. Fall in temperature

B. Loss of Kinetic energy

C. Decrease in velocity

D. Energy used in doing work

Answer: D

Watch Video Solution

323. In a spontaneouse irreversible process, the total entropy of the system and surroundings:

A. Remains constant

B. Increases

C. Decreases

D. Zero

Answer: B

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324. If a refrigerator door is opend then we get

A. Room cooled

B. Room heated

C. more heat is passed out

D. no effect on room

Answer: B

Watch Video Solution

325. During isothermal expansion of an ideal gas its

A. Q=0

B. $\triangle V = 0$

C. W=0

D. $\triangle U = 0$

Answer: D

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326. A gas expands isothermally and reversibly. The work done by the gas is:

A. Zero

B. Minimum

C. Maximum

D. Equal to work done

Answer: C

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327. Temperature and heat are:

A. Extensive properties

B. Intensive properties

C. Intensive amd extensive properties respectively

D. Extensive and intensive properties respectively

Answer: C

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328. Internal energy and pressure of a gas of unit volume are related as:

A. $P = 2/3U$

B. $P = 3/2U$

C. $P = U/2$

D. P=2U

Answer: A

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329. The internal energy of one mole of a gas is:

A. $3/2RT$

B. $KT/2$

C. $RT/2$

D. $3KT/2$

Answer: A

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330. The heat measured for a reaction in a bomd calorimeter is:

A. $\triangle G$

B. $\triangle H$

C. $\triangle U$

D. $P \triangle V$

Answer: C

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331. Give an expression for work done in a reversible isothermal expression of an ideal gas.

A. $2.303RT\log\frac{V_2}{V_1}$

B. $\frac{nR}{(\gamma-1)}(T_2-T_1)$

C. $2.303RT\log\frac{P_2}{P_1}$

D. None

Answer: A

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332. Work done in reversible adiabatic process is given by:

A. $2.303RT\log\frac{V_2}{V_1}$

B. $\frac{nR}{(\gamma-1)}(T_2-T_1)$

C. $2.303RT\log\frac{V_1}{V_2}$

D. None

Answer: B

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333. The bond dissociatin energy of C-H bond in CH_4 from the equation,

$C(g) + 4H(g) \rightarrow CH_4, \ \triangle H$=-397.8kcal is:

A. $+397.8kcal$

B. $+198.9kcal$

C. $+99.45kcal$

D. $-99.45kcal$

Answer: D

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334. The enthalpy of formation of water from hydrogen and oxygen is - 286 kJ mol^{-1}. The enthalpy of decomposition of water into hydrogen and oxygen is:

A. $-286kJmol^{-1}$

B. $-143kJmol^{-1}$

C. $+286kJmol^{-1}$

D. $+143kJmol^{-1}$

Answer: C

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335. For a gaseous reaction,

$A(g)+3B(g)\rightarrow 3C(g)+3D(g)$

$\triangle U$ is 17 kcal at $27^{\circ}C$. Assuming R=2cal K^-1 mol^-1, $thevalueof$ triangleH` for the above reaction will be:

A. 15.8 kcal

B. 16.4 kcal

C. 18.2 kcal

D. 20.0 kcal

Answer: C

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336. The heat of combustion of methane is, -880kJ mol^{-1}. If 3.2 g of methane is burnt:

A. 176 kJ of heat is evolved

B. 176 kJ of heat is absorbed

C. 88 kJ of heat is evolved

D. None of the above

Answer: A

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337. IfH_2(g)+Cl_2(g)→ 2HCl, ^@=-44 kcal2Na(s)+2HCl(g→)2NaCl(s)+H_2(g),△ H =-152 kcal$then$, Na(s)+0.5Cl_2(g)→ NaCl(s),△ H $= ?$

A. 108 kcal

B. 196 kcal

C. $-98kcal$

D. 54 kcal

Answer: B

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338. The heat of formation of CO(g) and $CO_2(g)$ are -26.4 kcal and -94.0 kcal respectively. Heat of combustion of carbon monoxide will be:

A. $+26.4kcal$

B. $-67.6kcal$

C. $-120.6kcal$

D. $+52.8kcal$

Answer: B

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339. The standard heat of formation of $NO_2(g)$ amd $N_2O_4(g)$ are 8.0 2.0 kcal mol^{-1} respectively. The heat of dimerization of NO_2 in kcal is:

A. 10

B. -6.0

C. -12.0

D. -14.0

Answer: D

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340. 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:

A. $-42kJ$

B. $-202kJ$

C. $+202kJ$

D. $-288kJ$

Answer: D

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341. The heat of combustion of rhombic and momoclinic sulphur are 70.96 and 71.03 kcal. The heat of transition of $S_{R \to M}$ is:

A. 70.96 kcal

B. 71.03 kcal

C. $-70cal$

D. $+70cal$

Answer: D

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342. The heat of combustion for C, H_2 and CH_4 are-349.0, -241.8 and -906.7 kJ respectively.The heat of formation CH_4 is:

A. 174.1 kJ

B. 274 kJ

C. 374.1 KJ

D. 74.1 kJ

Answer: D

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343. $\triangle n$, the change in the number of mole for the reaction, $C_{12}H_{22}O_{11}(s) + 12O_2(g) \rightarrow 12CO_2(g) + 11H_2O(l)$ at $25^\circ C$ is

A. Zero

B. -1

C. 2

D. 4

Answer: A

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344. The enthalpy change of a reaction does not depand on:

A. State of reactants and products

B. Nature of reactants and products

C. Different intermediate reaction

D. Initial and final enthalpy change of reaction

Answer: C

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345. The $\triangle H$ for the process,

$CH_3COOH \rightarrow CH_3COO^- + H^+$ is:

A. Positive

B. Negative

C. Zero

D. Unpredicatable

Answer: A

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346. The bond enerhies of F_2, Cl_2, Br_2 and I_2 are 155.4, 243.6, 193.2 and 151.2 kJ mol^{-1} respectively.The strongest bond is:

A. F-F

B. Cl-Cl

C. Br-Br

D. I-I

Answer: B

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347. For the reaction, $N_2(g) + 3H_2(g) \rightarrow 2NH_3(g)$, which is true:

A. $\triangle H = \triangle U$

B. $\triangle H < \triangle U$

C. $\triangle H > \triangle U$

D. None

Answer: B

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348. Hess's law is related to:

A. Change in heat during of reaction

B. Rates of reaction

C. equilibrium constant

D. influence of pressure on volume of a gas

Answer: A

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349. The heat released during neutralisation is constant for the reaction of aqueous solutions of:

A. Strong acid and strong base

B. Strong acid and weak base

C. Strong base and weak acid

D. In all the cases

Answer: A

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350. Evaporation of water is:

A. An exothermic change

B. An endothermic change

C. A process where no heat change occurs

D. A process accompanied by chemical change

Answer: B

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351. At constant P and T which statement is correct for the reaction, $CO(g) + 1/2O_2(g) \rightarrow CO_2(g)$:

A. $\triangle H = \triangle U$

B. $\triangle H < \triangle U$

C. $\triangle H > \triangle U$

D. $\triangle H$ is independent for physical state of reaction.

Answer: B

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352. The difference between $\triangle H$ and $\triangle U$ is equal to:

A. R

B. $P \triangle V$

C. $V \triangle P$

D. $\frac{3}{2}R$

Answer: B

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353. 1 mole of gas occupying 3 litre volume is expanded against a constant external pressure of 1 atm to a volume of 15 litre . The work done by the system is:

A. $1.215xX10^3J$

B. 12.15510^3J

C. 1.215×10^3J

D. None

Answer: A

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354. For a reaction at $25^{\circ}C$ enthalpy change ($\triangle H$) and entropy change ($\triangle S$) are-$11.7 \times 10^{3} Jmol^{-1}$ and -105 J $mol^{-1}K^{-1}$ respectively. The reaction is:

A. Spontaneous

B. Non-Spontaneous

C. Instantaneoous

D. None

Answer: B

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355. 1 mole of an ideal gas at $25^{\circ}C$ is subjected to expand reversibly ten times of its intial volume. The change in entropy of expansion is:

A. $19.15 JK^{-1}mol^{-1}$

B. $16.15JK^{-1}mol^{-1}$

C. $22.15JK^{-1}mol^{-1}$

D. None

Answer: A

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356. The entropy change for the reaction given below is:

$2H_2(g) + O_2(g) \rightarrow 2H_2O(l)$ is __ at 300K. Standard entropies of $H_2(g), O_2(g)$ and H_2O(l) are 126.6, 201.20 and 68.0JK^{-1}mol^-1` respectively.

A. $-318.4JK^{-1}mol^{-1}$

B. $318.4JK^{-1}mol^{-1}$

C. $31.84JK^{-1}mol^{-1}$

D. None

Answer: A

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357. The temperature at which the reaction, $Ag_2O(s) \rightarrow 2Ag(s) + I/2O_2(g)$ is at equilibrium is....., Given $\triangle H$=30.5 kJ mol^{-1} and $\triangle S$=0.066 kJ $K^{-1}mol^{-1}$:

A. 462.12 K

B. 362.12 K

C. 262.12 K

D. 562.12 K

Answer: A

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358. The ionisation energy of solid NaCl is 180 kcal, per mol. The dissolution of the solid in water in the from of ions is endothermic to the extent of 1 kcal per mol, If the solvation energies of Na^+ and Cl^- ions are in the rstio 6:5, what is the enthalpy of hydration of sodium ion:

A. $-85.6kca\frac{l}{m}ol$

B. $-97.5kca\frac{l}{m}ol$

C. $82.6kca\frac{l}{m}ol$

D. $+100kca\frac{l}{m}ol$

Answer: B

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359. If the enthalpy change for the reaction $CH_4(g) + Cl_2(g) \rightarrow CH_3Cl(g) + HCl(g)$, $\triangle H$=-25 kcal. Bond

energy of C-H is 20kcal/mol greater than the bond energy of C-Cl and bond energies of H-H and H-Cl are same in magnitude, then for the reaction: $1/2H_2(g) + 1/2Cl_2(g) \rightarrow HCl(g) \ \triangle H$ is

A. $-22.5kca\frac{l}{m}ol$

B. $-20.5kca\frac{l}{m}ol$

C. $-32.5kca\frac{l}{m}ol$

D. $-12.5kca\frac{l}{m}ol$

Answer: A

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360. The standard heat of formation of sodium ions in aqueous solution from the following data: Heat of formation of NaOH(aq) from NaOH(s) at $25^\circ C = -470kJ$

Heat of formation of OH-(aq) from OH-(s) at $25^\circ C = -228.8kJ$.

A. -251.9

B. 241.9 kJ

C. $-241.9kJ$

D. 151.9 kJ

Answer: C

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361. For a diatomic molecule AB, the electronegativity difference between A and B=$0.2028\sqrt{\triangle}\, where\ \triangle$ =[Bond energy of AB-Geometric mean of the bond energies of A_2 and B_2]. The electonegativities of fluorine and chlorine are 4.0 and 3.0 respectively and the bond energies are of F-F : 38 kcal mol^{-1} and Cl-Cl : 58 kcal mol^{-1}. The bond energy of Cl-F is:

A. 71 kcal/mol

B. 61 kcal/mol

C. 48 kcal/mol

D. 75 kcal/mol

Answer: A

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362. If heat of neutralisation is -13.7 k cal and $H_f^\circ H_2O$=-68 k cal , $thenenthalpyof$OH^- `would be:

A. 54.3 k cal

B. $-54.3kcal$

C. 71.3 k cal

D. None

Answer: B

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363. The dissociation energy of CH_4 and C_2H_6 are respectively 360and 620 kcal/mole. The bond energy of C-C bond is:

A. 260 kcal/mol

B. 180 kcal/mol

C. 130 kcal/mol

D. 80 kcal/mol

Answer: D

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364. 2.1 g of Fe combines with S evolving 3.77 kJ of heat. The heat of formation of FeS in kJ/mol is:

A. -3.77

B. -1.79

C. -100.5

D.

Answer: C

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365. The heat of neutralisation of HCl by NaOH is-55.9 kJ/mol. If the heat of neutralisation of HCN by NaOH is -12.1 kJ/mol. The energy of disso-ciation of HCN is:

A. $-43.8kJ$

B. 43.8kJ

C. 68 kJ

D. $-68kJ$

Answer: B

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366. When a certain amount of ethylene was burnt 6226 kJ heat was evolved. If heat of combustion of ethylene is 1411 kJ, the volume of O_2 (at NTP) that entered into the reaction is:

A. 296.5 mL

B. 296.5 litre

C. 622x22.4 litre

D. 22.4 litre

Answer: B

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367. The heat evolved during the combustion of 112 litre of water gas (mixture of equal volume of H_2 and CO) is : Given H 2 (g)+1/2O 2 (g)=H 2 O(g);ΔH=−241.8kJ CO(g)+1/2O 2 (g)=CO 2 (g);ΔH=−283kJ

A. 241.8 kJ

B. 283 kJ

C. 1312 kJ

D. 1586 kJ

Answer: C

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368. Heat of combustion of CH_4, C_2H_4, C_2H_6 are-890, -1411 and -1560 kJ/mol respectively. Which has the lowest calorific fuel value in kJ/g:

A. CH_4

B. C_2H_4

C. C_2H_6

D. All same

Answer: B

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369. $\triangle H$ for $CaCO_3(s) \rightarrow CaO(s) + CO_2(g)$ is 176 kJ mol^{-1} at 1240 K. The $\triangle U$for the change is equal to:

A. 160 kJ

B. 165.6 kJ

C. 186.3 kJ

D. 180.0 kJ

Answer: B

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370. Energy required to dissociate 4 gms of gaseous hydrogen into free gaseous atoms is 208 kcals at $25^{\circ}C$. The bond energy of H-H bond will be

A. 104 kcal

B. 10.4 kcal

C. 1040 kcal

D. 104 kcal

Answer: A

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371. Energy change during neutralisation of NH_4OH and HCl is :

A. $-1.5kJ$

B. $+1.5kJ$

C. $+3.0kJ$

D. $-3.0kJ$

Answer: B

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372. From the thermochemical reactions, $C_gra\phi te + 1/2O_2 = CO$,

$\triangle H = -110.5kJ$

$CO + 1/2O_2 = CO_2, \quad \triangle H = -283.2kJ$

$\triangle H$ for the reaction, $C_gra\phi te + O_2 = CO_2$ is:

A. $-393.7kJ$

B. $+393.7kJ$

C. $-172.7kJ$

D. $+172.7kJ$

Answer: A

Watch Video Solution

373. Energy change during neutralisation of NH_4OH and HCl is :

A. 13.7 kcal/eq.

B. less than13.7 kcal/eq.

C. greater than13.7 kcal/eq.

D. Zero

Answer: B

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374. $\triangle H$ for thermal decomposition process is:

A. Positive

B. Negative

C. Zero

D. Positive or negative

Answer: A

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375. Hess's law of constant heat summation is an application of:

A. Kirchhoff's law

B. First law of thermodynamic

C. Second law of thermodynamics

D. Third law of thermodynamics

Answer: B

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376. Bond energy of a molecule:

A. Is always negative

B. Is always positive

C. Either positive or negative

D. Depends upon the physical state of the system

Answer: B

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377. For the reaction, $3O_2 \rightarrow 2O_3,\ \triangle H = +ve$. We can say that:

A. Ozone is more stable than oxygen

B. Ozone is less stable than oxygen and ozone decomposes forming oxygen readily

C. Oxygen is less stable than ozone and oxygen readily forms ozone.

D. None

Answer: B

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378. Which of the following is incorrect about the reaction,

A. Heat of combustion of $C_D = -94.3kcal.$

B. Heat of formation of $CO_2 = -94.3kcal$

C. $\triangle H = \triangle U$

D. Standard heat of formation of CO_2

Answer: D

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379. The exchange of heat energy during chemical reaction at constant temperature and pressure occurs in from of:

A. Free energy

B. Internal energy

C. Enthalpy

D. Bond energy

Answer: C

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380. Molar heat capacity of water in equilibrium with the ice at constant pressure is:

A. Zero

B. ∞

C. $40.45kjK^{-1}mol^{-1}$

D. $75.48JK^{-1}mol^{-1}$

Answer: B

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381. Heat energy change during the chemical reaction, $CO + 1/2O_2 \rightarrow CO_2$ is known as:

A. Heat of combustion of CO

B. Latent heat of CO_2

C. Latent heat of vaporisation

D. Heat of formation of CO_2

Answer: A

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382. When an exothermic is reversed, it:

A. Becomes another exothermic reaction

B. Becomes an endothermic reaction

C. Shows no change at all

D. Attains equilibrium

Answer: B

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383. Heat of formation of $H_2O(g)$ at 1 atm and $25^\circ C$ is -243 kJ. $\triangle E$ for the reaction, $H_2(g) + \frac{1}{2}O(g) \rightarrow H_2O(g) at 25^\circ C$ is

A. 241.8 kJ

B. $-241.8kJ$

C. $-243kJ$

D. 243 kJ

Answer: B

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384. The H-H bond energy is 430 kJ mol^{-1} and Cl-Cl bond energy is 240 kJmol^{-1}. $\triangle H$ for HCl is -90 kJ. The H-Cl bond energy is about:

A. 425 kJ mol^{-1}

B. 213 kJ mol^{-1}

C. 360 kJ mol^{-1}

D. 180 kJ mol^{-1}

Answer: A

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385. $S + 3/2O_2 \rightarrow SO_3 + 2xkcal$

$SO_2 + \frac{1}{2}O_2 \rightarrow SO_3 + ykcal$:

The heat of formation of SO_2 is :

A. y-2x

B. (2x+y)

C. (x+y)

D. 2x-y

Answer: A

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386. Given , $NH_3(g) + 3Cl_2(g) \rightleftharpoons NCl_3(g) + 3HCl(g), \ - \ \triangle \ H_1$

$N_2(g) + 3H_2(g) \rightleftharpoons 2NH_3(g), \ \triangle \ H_2$

$H_2(g) + Cl_2(g) \rightleftharpoons 2HCl(g), \ + \ \triangle \ H_3$ The heat of formation of $NCl_3(g)$ in the terms of $\triangle \ H_1, \ \triangle \ H_2$ and $\triangle_3$ is:

A. $\triangle \ H_f = \ - \ \triangle \ H_1 + \frac{\triangle_2}{2} \ - \frac{3}{2} \triangle \ H_3$

B. $\triangle \ H_f = \ \triangle \ h_1 + \ \triangle \ \frac{H_2}{2} - \frac{3}{2} \triangle \ H_3$

C. $\triangle \ H_f = \ \triangle \ h_1 + \ \triangle \ \frac{H_2}{2} - \frac{3}{2} \triangle \ H_3$

D. None

Answer: A

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387. AB, A_2 and B_2 are diatomic molecules. If the bond enthalpies A_2AB and B_2 are in the ratio 1:1:0.5 and the enthalpy of formation of AB fron A_2 and B_2 is -100 kJ mol^{-1}, what is the bond enthalpy of A_2:

A. 200 kJ mol^{-1}

B. 200 kJ mol^{-1}

C. 100 kJ mol^{-1}

D. 300 kJ mol^{-1}

Answer: A

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388. $H_2(g) + Cl_2(g) \rightarrow 2HCl(g)$, $\triangle H$298K=-22.06 kcals, For this reaction, `$\triangle$U is equal to:

A. $-22.06+2\times10^{-3}\times298\times2kcal$

B. $-22.06-2\times298kcal$

C. $-22.06-2\times298\times4kcal$

D. $-22.06kcl$

Answer: D

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389. For the reaction, $H_2(g)+\frac{1}{2}O_2(g)\rightarrow H_2O(l)$,

A. $7.63\times(373-297)-68.3$

B. $7.63\times10^{-3}\times(373-298)-68.3$

C. $7.63\times10^{-3}\times(373-298)+68.3$

D. $7.63\times(373-297)+68.3$

Answer: B

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390. According to the equation, $C_6H_6(l) + \frac{15}{2}O_2(g) \rightarrow 3H_2O(l) + 6C_2(g) \quad \triangle H$=-3264.4kJ/mol, the energy evolved when 7.8 g of benzene is burnt in air will be:

A. 163.22 kJ/mol

B. 326.4 kJ/mol

C. 32.64 kJ/mol

D. 3.264 kJ/mol

Answer: B

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391. Given that standard heat enthalpy of CH_4, C_2H_4 and C_3H_8 are -17.9, 12.5, -24.8 kcal/mol. The $\triangle H$ for $CH_4 + C_2H_4 \rightarrow C_3H_8$ is:

A. $-55.2kcal$

B. $-30.2kcal$

C. 55.2 kcal

D. $-19.4kcal$

Answer: D

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392. Given, $C + O_2 \rightarrow CO_2 + 94.2kcal.$

(i)$H_2 + \frac{1}{2}O_2 \rightarrow H_2O + 68.3kcal$

(ii)$CH_4 + 2O_2 \rightarrow CO_2 + 2H_2O + 210.8kcal$ The heat of formation of methane in kcal will be:

A. 45.9

B. 47.8

C. 20.0

D. 47.3

Answer: C

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393. When 1mole of carbon is converted into 1mole of CO_2 the heat liberated is same:

A. Irrespective of whether the volume is kept constant or pressure is kept constant

B. Irrespective of the temperature at which the reaction is carried out

C. Whether the carbon is in the form of diamond or garphite

D. None

Answer: A

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394. Calorific value of carbohydrates is approximately:

A. 4.0 kcal/g

B. 16.0 kcal/g

C. 20 kcal/g

D. 9.0 kcal/g

Answer: B

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395. If $H^+ + OH \rightarrow H_2O + 13.7$ kcal then the heat of neutralisation for complete neutralisation of one mole of H_2SO_4 by a base will be:

A. $13.7kcal$

B. $27.4kcal$

C. $6.85kcal$

D. 3.425 kcal

Answer: B

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396. $If H_2(g) = 2H(g), \triangle H$=104 cal, then heat of atomisation of hydrogen is:

A. 52 kcal

B. 104 kcal

C. 208 kcal

D. Nove of these

Answer: A

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397. Given $N_2(g) + 3H_2(g) = 2NH_3(g)$, $\triangle H^\circ$=-22kcal. The standard enthalpy of formation of NH_3 gas is:

A. $-11kca\frac{l}{m}ol$

B. $11kca\frac{l}{m}ol$

C. $-22kca\frac{l}{m}ol$

D. $22kca\frac{l}{m}ol$

Answer: A

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398. $\triangle H$ for the reaction, $H(g) + H(g) \rightarrow H_2(g)$ will be,

A. Zero

B. $+ve$

C. $-ve$

D. infinite

Answer: C

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399. Which one of the following bonds has the highest average bond energy(kcal/mol):

A. S=O

B. C=C

C. C-=C

D. N-=N

Answer: D

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400. The Kirchhoff's equation given the effect of____ on heat of reactions:

A. Pressure

B. Temperature

C. Volume

D. Molecularity

Answer: B

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401. Hess's law is used in the determination of:

A. Heat of recation

B. Heat of transition

C. Heat of formation

D. All of these

Answer: D

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402. When ammonium chloride is dissolved in water, the solution becomes cold.The change is:

A. Endothermic

B. Exothermic

C. Super cooling

D. None

Answer: A

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403. A cannot engine operates between temperature T and 400 K(T>400K). If efficiency of engine is $25\ \%$, the temperature T is:

A. 400 K

B. 500 K

C. 533.3 K

D. 600 K

Answer: C

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404. The work done in an open vessel at 300K, when 112 g iron reacts with dil HCl is:

A. -1.2 kcal

B. 0.6 kcal

C. -0.3 kcal

D. 0.2 kcal

Answer: A

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405. 16kg oxygen gas expands at STP to occupy double of its original volume. The work done during the process is:

A. 260 kcal

B. 187.6 kcal

C. 130 kcal

D. 272.8 kcal

Answer: D

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406. Boiling point of a liquid is 50 K at 1 atm and $\triangle H_vap = 460.6$ calmol^{-1} What will be its boiling point at 10 atm.

A. 150 K

B. 75 K

C. 100 K

D. 200 K

Answer: C

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407. For which change $\triangle H \neq \triangle U$:

A. $H_2 + I_2 \rightleftharpoons 2HI$

B. $HCl + NaOH \rightarrow NaCl + H_2O$

C. $C(s) + O_2(g) \rightleftharpoons CO_2(g)$

D. $N_2 + 3H_2 \rightarrow 2NH_3$

Answer: D

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408. The heat of combustion of ethanol determined by a bomb calorimeter is -670.48 kcalmol^{-1} at $25^\circ C$. What is $\triangle U$ at $25^\circ C$ for the reaction, $C_2H_5OH(l) + 3O_2(g) \rightarrow 2CO_2 + 3H2O(g)$ is:`

A. $-335.24kcal$

B. $-669.28kcal$

C. $-670.48kcal$

D. $+670.48kcal$

Answer: C

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409. A person requires 2870 kcal of energy to lead normal daily life. If heat of combustion of cane sugar is - 1349 kcal, then his daily consumption of sugar is:

A. 728 g

B. 0.728 g

C. 342 g

D. 0.342 g

Answer: A

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410. The difference in $\triangle H$ and $\triangle E$ for the combustion of methane forming water in liquid state at $25^{\circ}C$ would be:

A. Zero

B. $2 \times 298 \times (-2)cal$

C. $2 \times 298 \times (-3)cal$

D. $2 \times 25 \times (-3)cal$

Answer: A

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411. The heat change taking place during the reaction $H_2O(l) \to H_2O(g)$ is ?[Given $\triangle H_1 = H_2O(g) = -57kal$, $Tri\angle H_f = H_2O(l) = -68.3kcal]$:

A. $+11.3kcal$

B. $-11.3kcal$

C. $-115.3kcal$

D. $+115.3kcal$

Answer: A

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412. If, $C(s) + O_2(g) \to CO_2(g)$, $\triangle H = R$ and $CO(g) + \frac{1}{2}O(g) \to CO_2(g)$, $\triangle H = S$, then the heat of formation of CO is:

A. R+S

B. R-S

C. S-R

D. RXS

Answer: B

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413. The enthalpies of formation of N_2O and NO are 28 and $90kJmol^{-1}$ respectively. The enthalpy of the reactioin, $2N_2O(g) + O_2(g) \rightarrow 4NO(g)$is equal to:

A. 8 kJ

B. 88 kJ

C. $-16kJ$

D. 304 kJ

Answer: D

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414. The enthalpy of formation of ammonia gas at 298 K is -46.11kJ mol^{-1}. The equation to which this value related is:

A. $\frac{1}{2}N_2(g) + \frac{3}{2}H_2(g) \rightarrow NH_3(g)$

B. $N(g) + 3H(g) \rightarrow NH_3(g)$

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

D. $\frac{1}{2}N_2(g) + \frac{3}{2}H_2(g) \rightarrow NH_3(l)$

Answer: A

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415. The heat of formation of methane$C(s) + 2H_2(g) \rightarrow CH_4(g)$ at constant is 18500 cal at $25^\circ C$. The heat of reaction at constant volume would be:

A. 19096 cal

B. 18798 cal

C. 18202 cal

D. 17904 cal

Answer: A

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416. $H_2 + \frac{1}{2}O_2 \rightarrow H2O, \ \triangle \ H$=-68.39 kcal (i)

$K + aq \rightarrow KOH(aq) + \frac{1}{2}H_2, \ \triangle \ H = \ -48kcal$

(ii) KOH+aqrarrKOH(aq):triangleH=-14 kcal `(iii)T he heat of formation(in kcal) of KOH is:

A. $-68.39+48-14$

B. $-68.39-48-14$

C. $68.39-48+14$

D. 68.39+48+14

Answer: B

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417. The enthalpy of formation of ammonia is -46.0kJ mol^{-1}. The enthalpy change for the reaction, $2NH_3(g) \rightarrow N_2(g)+3H_2(g) is:$

A. $46.0kJmol^{-1}$

B. $92.0kJmol^{-1}$

C. $-23.0kJmol^{-1}$

D. $-92.0kJmol^{-1}$

Answer: B

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418. A positive change in enthalpy occurs in:

A. $H_2(g) + \frac{1}{2}O_2(g) \rightarrow H_2O(g)$

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

C. $MgCO_3(s) \rightarrow MgO(s) + CO_2(g)$

D. $H_2(g) + \frac{1}{2}O_2(g) \rightarrow H_2O(l)$

Answer: C

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419. The amount of heat evolved when one mole of H_2SO_4 reacts with two mole of NaOH is:

A. 57.3 KJ

B. 2x57.3 KJ

C. 57.3/2 KJ

D. None

Answer: C

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420. If $CH_3COOH + OH \equiv CH_3COO^- + H_2O + q_1$ and $H^+ OH \equiv H_2O + q_2$ then the enthalpy change for the reaction, $CH_3COOH = CH_3COO^- + H^+$, is equal to:

A. $q_1 + q_2$

B. $q_1 - q_2$

C. $q_2 - q_1$

D. $-q_1 - q_2$

Answer: B

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421. The heats of neutralisation of four acids A, B, C, D are -13.7, -9.4, -11.2 and -12.4 kcal respectively when they are neutralised by a common base. The acidic character obeys the order:

A. AgtBgtCgtD

B. AgtDgtCgtB

C. DgtCgtBgtA

D. DgtBgtCgtA

Answer: B

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422. In a chemical reaction if all reactants and products are in liquid state then:

A. $\triangle H > \triangle U$

B. $\triangle H < \triangle U$

C. $\triangle H = \triangle U$

D. None

Answer: C

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423. Standard molar enthalpy of formation of CO_2 is equal to:

A. Zero

B. The standard molar enthalpy of combustion of gaseous carbon

C. The sum of standard molar enthalpies formation of CO and O_2

D. The standard molar enthalpy of combustion of carbon (graphite)

Answer: D

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424. Which is correct about the heat of combustion:

A. The combustion be exothermic in some cases and endothermic in other cases.

B. Heat of combustion is always exothermic

C. Its value change with temperature

D. All

Answer: D

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425. If $C(s) + O_2(g) \rightarrow CO_2(g), \triangle H = X$ and $CO(g) + \frac{1}{2}O_2(g) \rightarrow CO_2(g), \quad \triangle H = Y$ then the heat of formation of CO is

A. $C_{gra\phi te} + O_2(g) = CO_2(g)$

B. $CH_4(g) + 2O_2(g) = CO_2(g) + 2H_2O(l)$

C. $CO(g) + \frac{1}{2}O_2(g) = CO(g)$

D. $C_6H_6(l) + 7\frac{1}{2}O_2(g) = 6CO_2(g) + 3H_2O(l)$

Answer: A

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426. $\triangle H$ for the reaction given below represents:

$CO_2(g) + H_2(g) \rightarrow CO(g) + H_2O, \ \triangle H = 40$ kJ

A. Enthalpy of formation

B. Enthalpy of combustion

C. Enthalpy of neutralisation

D. Enthalpy of reaction

Answer: D

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427. Molar heat capacity of a gas at constant temperature and pressure is:

A. (3/2) R

B. (5/2) R

C. ∞

D. Depends upon atomicity of gas

Answer: C

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428. If 50 calorie are added to a system and system does work of 30 calorie on surroundings, the change in internal energy of system is:

A. 20 cal

B. 50 cal

C. 40 cal

D. 30 cal

Answer: A

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429. If S° for H_2, Cl_2 and HCl are 0.13, 0.22 and 0.19 kJ $K^{-1}mol^{-1}$ respectively. The total change in standard entropy for the reaction, $H_2 + Cl_2 \rightarrow 2HClis$:

A. $30JK^{-1}mol^{-1}$

B. $40JK^{-1}mol^{-1}$

C. $60JK^{-1}mol^{-1}$

D. $20JK^{-1}mol^{-1}$

Answer: A

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430. The enthalpy and entropy change for a chemical reaction are $-2.5x10^3$ cal and 7.4 cal K^{-1} respectively. Predict that nature of reaction at 298 K is:

A. Spontaneous

B. Reversible

C. Irreversible

D. None-spontaneous

Answer: A

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431. One mole of an ideal at 300 K is expanded isothermaly from an initial volume of 1 liter to 10 liters. The $\triangle E$ for this process is [R= 2 cal $k^{-1}mol^{-1}$]

A. 163.7 cal

B. 1381.1 cal

C. 9 litre-atm

D. Zero

Answer: D

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432. Latent heat of vaporisation of a liquid at 500K and 1 atm pressure is 10.0 kcal/mol. What will be the change in internal energy $(\triangle E)$ of 3 mole of liquid at same temperature:

A. 13.0 kcal

B. $-13.0kcal$

C. 27.0 kcal

D. $-27.0kcal$

Answer: C

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433. Give the bond energies of N equiv N, H-H and N-H bonds as 945, 436 and 391 kJmol^{-1} respectively, the enthalpy of the following reaction N 2(g) +3H 2(g) $\rightarrow$2NH 3(g) is:

A. $-93kJ$

B. 102 kJ

C. 90 kJ

D. 105 kJ

Answer: A

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434. If heat of formation of CCl_4 is 316 kcal mol^{-1} the dissociation energy of C-Cl is :

A. $79kcalmol^{-1}$

B. $316 kcal mol^{-1}$

C. $97 kcal mol^{-1}$

D. $158 kcal mol^{-1}$

Answer: A

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435. For the reaction,

$C_2H_4(g) + 3O_2(g) \rightarrow 2CO_2(g) + 2H_2O(l), \ \triangle U = -1414 kJ.$

Then $\triangle Hat 27^\circ Cis$:

A. $-1410 kJ$

B. $-1420 kJ$

C. $+1420 kJ$

D. $+1410 kJ$

Answer: B

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436. $H_2(g) + I_2(g) \rightarrow 2HI(g), \triangle H = -12.40kcals,$ Heat of formation of HI will be

A. 12.4 kcal

B. $-12.4kcal$

C. $-6.20kcal$

D. 6.20 kcal

Answer: D

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437. Heat evolved in the reaction, $H_2 + Cl_2 \rightarrow 2HCl$ is 182 kJ. Bond energies of H-H and Cl-Cl are 430 and 242 kJ/mol respectively. The H-Cl bond energy is:

A. $245 kJ mol^{-1}$

B. $427 kJ mol^{-1}$

C. $336 kJ mol^{-1}$

D. $154 kJ mol^{-1}$

Answer: A

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438. The heat of formation of CO(g) and CO 2 (g) are ΔH=−110 and ΔH=−393kJmmol −1 respectively. What is the heat of reaction(ΔH) (in kJ mol −1) for the following reaction? CO(g)+ 1/2 O 2 (g) → CO 2 (g)

A. -50

B. -283

C. -150

D. -300

Answer: D

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439. If, $S + O_2 \rightarrow SO_2, \ \triangle H = -298.2kJ$

(i)$SO_2 + \frac{1}{2}O_2 \rightarrow SO_3, \ \triangle H = -98.7kJ$

(ii)$SO_3 + H_2O \rightarrow H_2SO_4, \ \triangle H = -130.2kJ$

(iii)$H_2 + \frac{1}{2}O_2 \rightarrow H_2O, \ \triangle = -287.3kJ$ The enthalpy of formation of H_2SO_4 at 298 K will be:

A. $-754.4kJ$

B. $-814.4kJ$

C. $-650.3kJ$

D. $-433.7kJ$

Answer: A

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440. $H_2(g) + Cl_2(g) = 2HCl(g), \quad \triangle H$=-44.12 kcal` The enthalpy of hydrogen cholride at 298 K is:

A. -44.12

B. -22.06

C. 44.12

D. 22.06

Answer: B

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441. $H_2(g) + \frac{1}{2}O_2(g) = H_2O(l)$,

$\triangle H_{298}k$=-68.32 kcal. Heat of vaporisation of water at 1 atm and $25^\circ C$is 10.52 kcal. The standard heat of formation(in kcal) of 1 mole of water vapour at $25^\circ C$ is:

A. -78.84

B. 78.84

C. $+57.80$

D. -57.80

Answer: D

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442. Standard heat of formation of $CH_4(g), CO_2(g)$and water at $25^\circ C$ are -17.9, -94.1 K and -68.3 kcal mol^{-1} respectively. Calculate the

heat change (in kcal) in the following reaction at $25^{\circ}C$:

$$CH_4(g) + 2O_2(g) = CO_2(g) + 2H_2O(g)$$

A. -144.5

B. -180.3

C. -248.6

D. -212.8

Answer: D

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443. Molar heat capacity is given by:

A. dQ/dT

B. dqxdT

C. sumQ 1/dT

D. None

Answer: A

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444. Heat of neutralisation of a strong acid and strong base is always.

A. $CH_3COOH + NaOH$

B. $HCl + NH_4OH$

C. $HCOOH + KOH$

D. $HNO_3 + LiOH$

Answer: D

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445. Endothermic compounds are generally:

A. Less stable

B. Have weaker bonds

C. Have positive enthalpies of formation

D. All are correct

Answer: D

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446. The heat evolved during neutralisation is maximum in the reaction of:

A. NH_4OH and CH_3COOH

B. NH_4OH and HCl

C. $NaOH$ and CH_3COOH

D. $NaOH$ and HCl

Answer: D

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447. For the reaction, $CaCO_3(s) \rightarrow CaO(s) + CO_2(g)$

A. $\triangle H = \triangle U$

B. $\triangle H < \triangle U$

C. $\triangle H \neq \triangle U$

D. $\triangle H = 0$

Answer: C

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448. $\triangle H$ for transition of cardon in the diamond from to carbon in the graphite form, is -453.5 cal. This suggests that:

A. Graphite is chemically different from diamond.

B. Graphite is as stable as diamond

C. Graphite is more stable than diamond

D. Diamond is more stable than graphit.

Answer: C

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449. Which represents the largest amount of energy :

A. calorie

B. joule

C. erg

D. electron volt

Answer: A

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450. In the combustion of hydrocarbons, $\triangle H$ is:

A. Negative

B. Zero

C. Positive

D. Undeterminate

Answer: A

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451. For an endothermic reaction

A. $CaCO_3 \rightarrow CaO + CO_2$

B. $Fe + S \rightarrow FeS$

C. $NaOH + HCI \rightarrow NaCI + H_2O$

D. $CH_4 + 2O_2 \rightarrow CO_2 + 2H_2O$

Answer: A

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452. The enthalpies of formation of organic substances can be conveniently determined from:

A. Heats of combustion data

B. Boiling point

C. Melting point

D. A catalytic reaction

Answer: A

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453. Entropy of vaporisation of water at $100^{\circ}C$, if molar heat of vaporisation is 9710 cal mol^{-1} will be:

A. 20 cal $mol^{-1}K^{-1}$

B. 26.0 cal $mol^{-1}K^{-1}$

C. 24 cal $mol^{-1}K^{-1}$

D. 28.0 cal $mol^{-1}K^{-1}$

Answer: B

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454. One mole of ice is converted into water at 273 K. The entropies of $H_2O(s)$ and $H_2O(l)$ are 38.20 and 60.01 J $mol^{-1}K^{-1}$ respectively. The enthalpy change for the conversion is:

A. $59.54Jmol^{-1}$

B. $5954Jmol^{-1}$

C. $595.4Jmol^{-1}$

D. $320.6Jmol^{-1}$

Answer: B

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455. One mole of a gas absorbs 200 J of heat at constant volume. Its temperature rises from 298 K to 308 K. The change in internal energy is:

A. 200 J

B. $-200J$

C. 200 x 308/297 J

D. 200 x 298/308 J

Answer: A

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456. A system absorbs 10 kJ of heat at contant volume and its temperature riess from $27^\circ C$ to $37^\circ C$. The $\triangle U$ of reaction is:

A. 100 kJ

B. 10 kJ

C. Zero

D. 1 kJ

Answer: B

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457. One mole of a gas occupying 3 dm^3 expands against constant external pressure of 1 atm to a volume of 13 dm^3. The work done is:

A. $-10 atm dm^3$

B. $-20 atm dm^3$

C. $-39 atm dm^3$

D. $-48 atm dm^3$

Answer: A

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