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OBJECTIVE TEST

Topic – Thermodynamics

Time – 1 Hr. M.M.- 50

Q,1. The universe is an-

(a) Isolated system (b) Open System

(c) Closed System (d) Unpredictable

Q. 2. The human body is an-

(a) Isolated system (b) Open System

(c) Closed System (d) Unpredictable

Q. 3.Which of the following is incorrect about an isothermal reversible expansion of an ideal gas-

(a) $\Delta T = 0$ (b) $q = 0$

(c) $\Delta U = 0$ (d) None

Q. 4. Which of the following is correct about an adiabatic process –

(a) $\Delta T = 0$ (b) $q = 0$

(c) Both (d) None

Q. 5. During isothermal expansion of an ideal gas-

(a) Internal energy increases (b) Enthalpy decreases

(c) Enthalpy remains unchanged (d) Enthalpy reduces to zero

Q. 6. For the reaction-

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

(a) $\Delta U + 2RT$ (b) $\Delta U - 2RT$

(c) $\Delta U + RT$ (d) $\Delta U - RT$

Q,7. For the reaction-

$$2SO_2(g) + O_2(g) \rightleftharpoons 2SO_3(g)$$

Which of the following relation is correct-

(a) $\Delta H = \Delta U$ (b) $\Delta H > \Delta U$

(c) $\Delta H < \Delta U$ (d) Unpredictable

Q.8. Q,7. For the reaction-

$$2NO(g) + O_2(g) \rightleftharpoons 2NO_2(g)$$

The difference of ΔH and ΔU is- -

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(a) RT (b) -RT
(c) -2RT (d) 0

Q.9. For the reaction-

$$Ag_2O\ (s) \rightarrow 2Ag\ (s) + \frac{1}{2}O_2\ (g)$$

Which of the following relation will be true-

(a) $\Delta H = \Delta U$ (b) $\Delta H > \Delta U$
(c) $\Delta H < \Delta U$ (d) $\Delta H = \frac{1}{2}\Delta U$

Q.10. The difference between enthalpy of reaction at constant pressure and that at constant volume for the reaction-

$$2C_6H_6\ (l) + 15O_2 \rightarrow 12CO_2\ (g) + 6H_2O\ (l)$$

At 298 K temperature in kJ will be-

(a) +7.43 (b) +3.72
(c) -7.43 (d) -3.72

Q.11. Consider the following reaction-

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

The enthalpy change during this reaction is-

(a) Enthalpy of formation of CO_2 (b) Enthalpy of reaction
(c) Enthalpy of combustion of Carbon (d) All the above

Q.12. Consider the following reaction-

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

The enthalpy change during this reaction is-

(a) Enthalpy of formation of HCl (b) Enthalpy of reaction
(c) Both the above (d) None of the above

Q.13. Consider the following reaction-

$$CH_4(g) + 2O_2\ (g) \rightarrow CO_2(g) + H_2O(l)$$

The enthalpy change during this reaction is-

(a) Enthalpy of combustion of $CH_4(g)$
(b) Enthalpy of reaction
(c) Both the above
(d) Enthalpy of formation of $CO_2\ (g)$

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Q.14. Given that-

$C(s) + O_2(g) \rightarrow CO_2(g)$; $\Delta H^0 = -x$ kJ

$2CO(s) + O_2(g) \rightarrow 2CO_2(g)$; $\Delta H^0 = -y$ kJ

The enthalpy of formation of carbon monoxide will be-

(a) y - 2x (b) $\frac{2x-y}{2}$

(c) $\frac{y-2x}{2}$ (d) 2x-y

Q.15.- Given that-

(1) $C(s) + O_2(g) \rightarrow CO_2(g)$; $\Delta H = -393.5$ kj

(2) $H_2(g) + \frac{1}{2} O_2(g) \rightarrow H_2O(l)$; $\Delta H = -285.8$ kj

(3) $CH_4(g) + 2O_2(g) \rightarrow CO_2(g) + 2H_2O(l)$; $\Delta H = -890.3$ kj

The enthalpy of formation of CH_4 will be-

(a) -74.8 $kjmol^{-1}$ (b) + 74.8 $kjmol^{-1}$

(c) - 37.4 $kjmol^{-1}$ (d) + 37.4 $kjmol^{-1}$

Q.16.- For which of the following reactions, the enthalpy change would not be equal to the enthalpy of neutralization of acid involved-

(a) $HCl(aq.) + NaOH(aq.) \rightarrow NaCl(aq.) + H_2O(l)$

(b) $CH_3COOH(aq.) + NaOH(aq.) \rightarrow CH_3COONa(aq.) + H_2O(l)$

(c) $CH_3COOH(aq.) + NH_4OH(aq.) \rightarrow CH_3COONH_4(aq.) + H_2O(l)$

(d) $H_2SO_4(aq.) + 2NaOH(aq.) \rightarrow Na_2SO_4(aq.) + 2H_2O(l)$

Q.17.- For which of the following reactions, the enthalpy neutralization will be the least-

(a) $HCl(aq.) + NaOH(aq.) \rightarrow NaCl(aq.) + H_2O(l)$

(b) $CH_3COOH(aq.) + NaOH(aq.) \rightarrow CH_3COONa(aq.) + H_2O(l)$

(c) $CH_3COOH(aq.) + NH_4OH(aq.) \rightarrow CH_3COONH_4(aq.) + H_2O(l)$

(d) $HCl(aq.) + NH_4OH(aq.) \rightarrow NH_4Cl(aq.) + H_2O(l)$

Q.18.- Consider following data-

$HCl(aq.) + NaOH(aq.) \rightarrow NaCl(aq.) + H_2O(l)$; $\Delta H = -57.32$kJ

$CH_3COOH(aq.) + NaOH(aq.) \rightarrow CH_3COONa(aq.) + H_2O(l)$; $\Delta H = -55.23$kJ

The enthalpy of dissociation of CH_3COOH will be-

(a) + 2.09 kJ (b) – 2.09 kJ

(c) - 55.23 kJ (d) – 57.32 kJ

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Q.19.- Consider following data-

$HCl\ (aq.) + NaOH\ (aq.) \rightarrow NaCl\ (aq.) + H_2O\ (l);\ \Delta H = -57.32kJ$

The enthalpy of dissociation of H_2O will be-

(a) + 57.32 kJ (b) – 57.32 kJ

(c) 0 kJ (d) Unpredictable

Q.20.- Consider the reaction-

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

If the bond dissociation enthalpy of gaseous H_2, Cl_2 and HCl are 104, 58 and 103 $kcalmol^{-1}$ respectively. Then the enthalpy of the reaction will be-

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

(a) + 44 kcal (b) – 44 kcal

(c) + 22 kcal (d) Unpredictable

Q.21.- Consider the reaction-

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

If the bond dissociation enthalpy of gaseous H_2, Cl_2 and HCl are 104, 58 and 103 $kcalmol^{-1}$ respectively. Then the enthalpy of the formation of HCl will be-

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

(a) + 44 kcal mol^{-1} (b) – 44 kcal mol^{-1}

(c) + 22 kcal mol^{-1} (d) -22 kcal mol^{-1}

Q.22. For an endothermic reaction, where ΔH represents the enthalpy of reaction, the minimum value of activation energy will be-

(a) Less than ΔH (b) More than ΔH

(c) Equal to ΔH (d) Zero

Q.23. Consider the following reaction-

$$C(graphite) + CO_2\ (g) \rightarrow 2CO\ (g)$$

The value of ΔH and ΔS for the reaction are 170 kJ and 170 $Jmol^{-1}$ respectively. The reaction will be spontaneous at-

(a) 910 K (b) 1110 K

(c) 510 K (d) 710 K

Q.24. Which of the following is sufficient criteria for a process to be spontaneous-

(a) ΔG = -ve (b) $T\Delta S_{Total}$ = +ve

(c) Both (d) None

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Q.25. For which of the following condition the process will be spontaneous at all the temperatures-

(a) ΔH = -ve , ΔS = -ve (b) ΔH = -ve , ΔS = +ve

(c) ΔH = +ve , ΔS = -ve (d) ΔH = +ve , ΔS = +ve

ANSWERS

1. (a)	2. (b)	3. (b)	4. (b)	5. (c)
6. (b)	7. (c)	8. (b)	9. (b)	10. (c)
11. (d)	12. (b)	13. (c)	14. (c)	15. (a)
16. (d)	17. (c)	18. (a)	19. (a)	20. (b)
21. (d)	22. (c)	23. (b)	24. (c)	25. (b)

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