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Daily Practice Problems

NEET CHEMISTRY

Topic: Chemical Energetics

Q.1 A hypothetical reaction , A $\rightarrow$ 2B, proceeds through following sequence of steps -

A $\rightarrow$ C; $\Delta H = q_1$

C $\rightarrow$ D; $\Delta H = q_2$

$\frac{1}{2}$ D $\rightarrow$ B; $\Delta H = q_3$

The heat of reaction is :

(A) $q_1 - q_2 + 2q_3$ (B) $q_1 + q_2 - 2q_3$

(C) $q_1 + q_2 + 2q_3$ (D) $q_1 + 2q_2 - 2q_3$

Q.2 In a change from state A to state B -

(A) 'q' depends only on the initial and final state

(B) 'w' depends only on the initial and final state

(C) Δ E depends only on the initial and final state

(D) Δ E depends upon the path adopted by A to change into B

Q.3 The heat of combustion of benzene determined in a bomb calorimeter is – 870 K.cal. mol^{-1} at 298 K. The value of ΔE for the reaction is -

(A) – 1740 K . cal mol^{-1}

(B) + 870 K . cal mol^{-1}

(C) – 870 K . cal mol^{-1}

(D) + 1740 K . cal mol^{-1}

Q.4 How many kcal of heat is evolved by the complete neutralisation of one mole sulphuric acid with NaOH -

(A) 13.7 kcal

(B) 27.4 kcal

(C) 6.85 kcal

(D) None of the above

Q.5 The enthalpy of formation for C_2H_4 (g) , CO_2 (g) and H_2O (*l*) at 25ºC and 1 atm pressure by 52, – 394 and – 286 kJ mol^{-1} respectively. The enthalpy of combustion of C_2H_4 (g) will be -

(A) + 1412 kJ mol^{-1} (B) – 1412 kJ mol^{-1}

(C) + 141.2 kJ mol^{-1} (D) – 141.2kJ mol^{-1}

Q.6 X g of ethanal (CH_3CHO) was subjected to combustion in a bomb calorimeter and the heat produced is Y joules. Then which of following is correct -

(A) $\Delta E_{(comb.)} = -Y$ kJ

(B) $\Delta E_{(comb.)} = -\frac{44Y}{X}$ J mol $^{-1}$

(C) $\Delta H_{(comb.)} = -\frac{44Y}{X}$ J mol $^{-1}$

(D) $\Delta H_{(comb.)} = -Y$ J mol $^{-1}$

Q.7 Latent heat of vaporisation of a liquid at 500 K and 1 atm pressure is 10.00 kcal/mol. What will be the change in internal energy (ΔE) for 3 mol of liquid at same temperature-

(A) 13.0 kcal (B) – 13.0 kcal

(C) 27.0 kcal (D) – 27.0 kcal

Q.8 Given that $\Delta H_{comb.}$ of cyclopropane is – 4000 kJ mol^{-1}. The amount of cyclopropane that needs to be burnt in oxygen for producing 2×10^5 kJ of heat is -

(A) 20 kg (B) 2.1 kg

(C) 21 g (D) 210 mg

Q.9 The latent heats of fusion in J g^{-1} of five substances a (mol. mass = 18) ; b (mol. mass = 20) ; c (mol. mass = 30), d (mol. mass = 60) and e (mol. mass = 30) are respectively 80, 45, 90,45, 45. Which of the following pair has same value of ΔH_{fusion}-

(A) a,c (B) b,e

(C) d,e (D) c, d

Q.10 Heats of combustion of CH_4, C_2H_6, C_3H_8, C_8H_{18} in K. cals mole^{-1} as – 210.8, – 368.4, – 526.3, – 1302.7 respectively. Decide which is a better rocket fuel -

(A) C_8H_{18} (B) CH_4

(C) C_3H_8 (D) C_2H_6

Q.11 $H_2 + Cl_2 \rightarrow 2$ HCl; $\Delta H = -44$K. cals. In this reaction heat of formation of 1 mole of HCl in K. cals is -

(A) – 44.0 (B) + 44.0

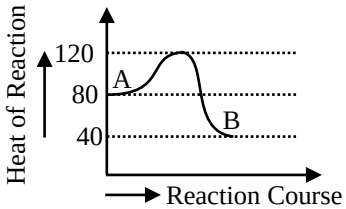
(C) – 22.0 (D) + 22.0

Q.12 The enthalpies of combustion of carbon and carbon monoxide are – 390 KJ and –278 KJ respectively. The enthalpy of formation of CO in kJ is -

(A) 668 (B) 112

(C) – 112 (D) – 668

Q.13 According to the diagram given below, the value of ΔH for conversion of A to B is -



(A) – 40 (B) + 40

(C) –120 (D) + 120

Q.14 Heat evolved in the reaction $H_2+Cl_2 \rightarrow 2HCl$ is 182 KJ. Bond energies H - H =430 KJ/ mole, Cl - Cl = 242 KJ/ mole. The H - Cl bond energy is-

(A) 763 kJ $mole^{-1}$ (B) 427 kJ $mole^{-1}$

(C) 336 kJ $mole^{-1}$ (D) 154 kJ $mole^{-1}$

Q.15 The work done on the system when one mole of an ideal gas at 500 K is compressed isothermally and reversibly to 1/10th of its original volume (R = 2 cal) -

(A) 500 kcal (B) 1.51 kcal

(C) – 23.03 kcal (D) 2.303 kcal

Q.16 For a certain reaction the change in enthalpy and change in entropy are 40.63 kJ mol^{-1} and 100 JK^{-1}. What is the value of ΔG at 27ºC and indicate whether the reaction is spontaneous or not -

(A) +10630 J mol^{-1}; spontaneous

(B) + 10630 J mol^{-1}; non spontaneous

(C) – 7990 J mol^{-1}; spontaneous

(D) + 7900 J mol^{-1}; spontaneous

Q.17 Heat of neutralisation of HF is -

(A) 57.32 kJ (B) > 57.32 kJ

(C) < 57.32 (D) None

Q.18 The heat of neutralisation is constant when dilute solution of -

(A) strong acid and strong base react

(B) strong acid and weak base react

(C) strong base and weak acid react

(D) in all the cases

Q.19 For an endothermic reaction ΔS is positive. The reaction is -

(A) Spontaneous at all temperatures

(B) Spontaneous when $T\Delta S > \Delta H$

(C) Spontaneous when $\Delta H > T\Delta S$

(D) Non Spontaneous at all temperature

Q.20 How much heat is liberated when 100 mL of 0.1 M NaOH are completely neutralised by 100 mL of 0.1 M HCl -

(A) – 57 kJ (B) – 0.57 kJ

(C) – 5.7 kJ (D) – 0.05 kJ

Q.21 Calculate the bond energy of C-H bond from the following data :

(a) $C(s) + 2H_2(g) \rightarrow CH_4(g)$; $\Delta H = -74.8$ KJ

(b) $H_2(g) \rightarrow 2H(g)$; $\Delta H = 435.4$ KJ

(c) $C(s) \rightarrow C(g)$; $\Delta H = 718.4$ KJ.

(A) 316.0 KJ/mol (B) 416 KJ/mol

(C) 516 KJ/mol (D) 616.0 KJ/mol

Q.22 The heat of combustion of solid benzoic acid at constant volume is – 321.30 kJ at 27ºC. The heat of combustion at constant pressure is -

(A) – 321.30 – 300 R (B) – 321.30 + 300 R

(C) – 321.30 – 150 R (D) – 321.30 + 900 R

Q.23 The enthalpy of the reaction

H_2O_2 (ℓ) $\rightarrow$ H_2O (ℓ) + 1/2 O_2 (g) is

– 23.5 kcal mol^{-1} and the enthalpy of formation of H_2O (ℓ) is – 68.3 kcal mol^{-1}. The enthalpy of formation of H_2O_2 (ℓ) is -

(A) – 44.8 kcal mol^{-1} (B) 44.8 kcal mol^{-1}

(C) – 91.8 kcal mol^{-1} (D) 91.8 kcal mol^{-1}

Q.24 The heat of combustion of ethanol determined in a bomb calorimeter is – 670.48 K. cals $mole^{-1}$ at 25^0 C. What is ΔE at 25^0 C for the reaction -

(A) – 335.24 K cals (B) – 669.28 K.cals

(C) – 670.48 K.cals (D) + 670.48 K.cals

Q.25 The difference between Δ H and Δ E at constant volume is equal to -

(A) R (B) PΔ V

(C) VΔ P (D) 3/2 R.

Q.26 Enthalpy change of the reaction

2H (g) $\rightarrow$ H_2(g) is - 104 kcal

The H - H bond dissociation energy is-

(A) 104 kcal (B) –104 kcal

(C) – 52 kcal (D) + 52 kcal

Q.27 If for H_2 (g) + $\frac{1}{2}$ O_2 (g) $\rightarrow$ H_2O (g);

ΔH_1 is enthalpy of reaction and for

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

ΔH_2 is enthalpy of reaction. Then magnitude of-

(A) $\Delta H_1 > \Delta H_2$ (B) $\Delta H_1 = \Delta H_2$

(C) $\Delta H_1 < \Delta H_2$ (D) $\Delta H_1 + \Delta H_2 = 0$.

Q.28 The heat change for the reaction

C (s) + 2S (s) $\rightarrow$ CS_2(ℓ) is called -

(A) Heat of transition

(B) Heat of fusion

(C) Heat of formation

(D) Heat of combustion.

Q.29 The solubility of NaCl in water at 25° C is about 6 moles per litre. Suppose you add 1 mole of NaCl to a litre of water. For the reaction, NaCl $+H_2O \rightarrow$ Salt solution -

(A) $\Delta G > 0, \Delta S > 0$ (B) $\Delta G < 0, \Delta S > 0$

(C) $\Delta G > 0, \Delta S < 0$ (D) $\Delta G < 0, \Delta S < 0$

Q.30 For a reversible reaction at equilibrium, ΔG is -

(A) positive

(B) negative

(C) zero

(D) may be positive or negative

ANSWER KEY

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