NEET-JEE

ULTIMATE KCET CRASH COURSE 2026
CHEMISTRY
CHEMICAL KINETICS, THERMODYNAMICS

DPP: 1

Q1 When one mole of a gas is heated at constant volume, temperature is raised from 298 to 308 K. Heat supplied to gas is 500 J. Then which statement is correct?

(A) $q = W = 500$ J, $\Delta U = 0$

(B) $q = \Delta U = 500$, $W = 0$

(C) $q = W = 500$ J, $\Delta U = 500$

(D) $\Delta U = 0$, $q = W = -500$ J

Q2 In a closed insulated container, a liquid is stirred with a paddle to increase the temperature. Which of the following is true?

(A) $\Delta E = W \neq 0$, $q = 0$

(B) $\Delta E = W = q \neq 0$

(C) $\Delta E = 0$, $W = q \neq 0$

(D) $W = 0$, $\Delta E = q \neq 0$

Q3 In thermodynamics which one of the following is not an intensive property?

(A) Pressure

(B) Density

(C) Volume

(D) Surface tension

Q4 For an isothermal expansion of one mole of an ideal gas from 1 dm^3 to 4 dm^3 at 27°C. The value of U is

(A) 57 calories (B) 0

(C) 8.314 calories (D) 826.6 calories

Q5 Which one of the following is not a characteristic of thermodynamics?

(A) Thermodynamics deals with macroscopic system.

(B) Thermodynamics does not deal with a single molecule.

(C) Thermodynamics predicts the mechanism of reaction.

(D) Thermodynamics cannot predict the rate of chemical reaction.

Q6 Thermodynamics which is the study of different forms of energies mainly deals with

(A) quantitative relationships of different energies

(B) qualitative relationships of different energies

(C) different states of matter

(D) chemical properties.

Q7 A living system is an example of

(A) closed system

(B) open system

(C) isolated system

(D) none of these.

Q8 ΔH and ΔU for the reaction, $2S_{(s)} + 3O_{2(g)} \rightarrow 2SO_{3(g)}$; are related as

(A) $\Delta H = \Delta U - 1.5\ RT$

(B) $\Delta H = \Delta U - 0.5\ RT$

(C) $\Delta H = \Delta U - RT$

(D) $\Delta H = \Delta U + 1.5\ RT$

Q9 Δn values in $\Delta H = \Delta U + \Delta nRT$ may have

(A) integer nature

(B) fractional value

(C) positive or negative

(D) all of these.

Q10 The difference in ΔH and ΔU for the combustion of methane forming water in liquid state at 25^6C would be

(A) zero

(B) 2 × 298 × (–2) cal

(C) 2 × 298 × (–3) cal

(D) 2 × 25 × (–3) cal

Q11 An ideal gas expands from a volume of 6 dm^3 to 16 dm^3 constant external pressure of 2.026×10^5 3 N m^{-2}. Find ΔH if ΔU is 418 J

(A) 3200 J (B) 4000 J

(C) 2444 J (D) 1000 J

Q12 In which of the following reactions will ΔU be equal to ΔH ?

(A) $H_{2(g)} + \frac{1}{2}O_{2(g)} \rightarrow H_2O_{(l)}$

(B) $H_{2(g)} + I_{2(g)} \rightarrow 2\,HI_{(g)}$

(C) $N_2O_{4(g)} \rightarrow 2\,NO_{2(g)}$

(D) $2\,SO_{2(g)} + O_{2(g)} \rightarrow 2\,SO_{3(g)}$

Q13 In which of the following reactions ΔH is greater than ΔU ?

(A) $N_{2(g)} + 3H_{2(g)} \rightarrow 2\,NH_{3(g)}$

(B) $PCl_{5(g)} \rightarrow PCl_{3(g)} + Cl_{2(g)}$

(C) $CH_{4(g)} + 2O_{2(g)} \rightarrow CO_{2(g)} + 2H_2O_{(l)}$

(D) $HCl_{(aq)} + NaOH_{(aq)} \rightarrow NaCl_{(aq)} + H_2O_{(aq)}$

Q14 The difference between ΔH and ΔU is equal to

(A) R (B) PΔV

(C) VΔP (D) $\frac{3}{2}R$

Q15 A mixture of two moles of CO and one mole of O_2 in a closed vessel is ignited to convert CO into CO_2 Then,

(A) ΔH – ΔU = 0

(B) ΔH – ΔU > 0

(C) ΔH – ΔU < 0

(D) The relationship depends upon the capacity of the vessel.

Q16 A gas is expanded by supplying 2400 J of heat, the work done is found to be 1337 J. The internal energy of the system is

(A) 600 J (B) 300 J

(C) 1000 J (D) 1063 J

Q17 First law of thermodynamics introduces concept of

(A) temperature

(B) pressure

(C) change of direction of reaction

(D) conservation of energy.

Q18 First law of thermodynamics is

(A) the extension of law of conservation of energy

(B) ΔU = q + W

(C) the algebraic sum of energy or mass changes in any isolated system is unchanged

(D) related to entropy.

Q19 The external pressure needed to compress an ideal gas from 22 dm^3 to 8 dm^3 if work done is of 4.545 kJ is

(A) 3.24×10^5 N m^{-2}

(B) 2.03×10^5 N m^{-2}

(C) 1×10^5 N m^{-2}

(D) -3.4×10^5 N m^{-2}

Q20 Two grams of hydrogen gas at STP expands so that the volume is doubled. The work done during this process is

(A) –11.2 L atm

(B) –22.4 L atm

(C) +44.8 L atm

(D) 11.2 L atm

Q21 The work done when 5 moles of an ideal gas expands isothermally from 45 m^3 to 55 m^3 against a constant pressure of 100 pascal in J/mol is

(A) –500 (B) –1000

(C) –5000 (D) –200

Q22 Two moles of an ideal gas is expanded isothermally from 2.5×10^{-3} m^3 to $8 \times 10{-}3$ m^3 against a constant external pressure of 5×10^5 N m^{-2} The work done in the process is

(A) –2.525 kJ
(B) –2.750 kJ
(C) –0.2525 J
(D) –2.525 J

Q23 A gas expands in volume from 2 L to 5 L against a pressure of 1 atm at constant temperature. The work done by the gas will be

(A) 3 J
(B) –303.9 J
(C) –303.9 L atm
(D) 303.9 L atm

Q24 3 moles of an ideal gas are compressed from 30 dm^3 to 20 dm^3 against a constant pressure of 3.039×10^5 N m^{-2} The work done in calories is (1 J = 0.239 cal)

(A) + 30.39 kcal (B) + 72.63 kcal
(C) + 726.3 kcal (D) + 303.9 kcal

Q25 A gas occupies 3 L at STP. It is provided with 300 J heat so that its volume becomes 3.5 L at 2 atm. Calculate the change in its internal energy.

(A) 249.35 J
(B) 46.75 J
(C) 198.7J
(D) –350.65 J

Q26 Certain gas expands from 10 dm^3 to 35 dm^3 isothermally by absorbing 413 kJ of heat. What is the work done?

(A) –413 kJ (B) 715.8 kJ
(C) 413 kJ (D) 0

Q27 The standard heat of formation at 298 K for $CCl_{4(g)}$, $H_2O_{(g)}$, $CO_{2(g)}$ and $HCl_{(g)}$ are –25.5, –57.8, –94.1 and -22.1Kcal per mole respectively. Then ΔH° at 298 K for the reaction $CCl_{4(g)} + 2H_2O_{(g)}$ $CO_{2(g)} + 4HCl_{(g)}$ is

(A) –32.9 kcal
(B) –41.4 kcal
(C) 99.2 kcal
(D) –323.6 kcal

Q28 The ΔH value for reaction, $\mathrm{C}+\frac{1}{2}\mathrm{O}_2 \rightarrow \mathrm{CO}$ and $\mathrm{CO}+\frac{1}{2}\mathrm{O}_2 \rightarrow \mathrm{CO}_2$ are 100 and 200 kJ respectively. The heat of reaction for C+ O_2 CO_2 will be

(A) 50 kJ (B) 100 kJ
(C) 150 kJ (D) 300 kJ

Q29 Given:

$\mathrm{C}_{(s)}+\mathrm{O}_{2(g)} \rightarrow \mathrm{CO}_{2(g)} ; \Delta \mathrm{H}=-395 \mathrm{~kJ}$
$\mathrm{S}_{(s)}+\mathrm{O}_{2(g)} \rightarrow \mathrm{SO}_{2(g)} ; \Delta \mathrm{H}=-295 \mathrm{~kJ}$
$\mathrm{CS}_{2(l)}+3 \mathrm{O}_{2(g)} \rightarrow \mathrm{CO}_{2(g)}+2 \mathrm{SO}_{2(g)} ; \Delta \mathrm{H} = 1110 \mathrm{~kJ}$

The heat of formation of $CS_{2(l)}$ is

(A) 125 kJ mol^{-1}
(B) 31.25 kJ mol^{-1}
(C) 62.5 kJ mol^{-1}
(D) 250 kJ mol^{-1}

Q30 The enthalpy of the reaction, $\mathrm{H}_2(\mathrm{g})+\frac{1}{2}\mathrm{O}_{2(g)} \rightarrow \mathrm{H}_2\mathrm{O}_{(g)}$ is $\Delta \mathrm{H}_1$ and that of $\mathrm{H}_{2(g)}+\frac{1}{2}\mathrm{O}_{2(g)} \rightarrow \mathrm{H}_2\mathrm{O}_{(l)}$ is $\Delta \mathrm{H}_2$ Then

(A) $\Delta \mathrm{H}_1<\Delta \mathrm{H}_2$
(B) $\Delta \mathrm{H}_1+\Delta \mathrm{H}_2=0$
(C) $\Delta \mathrm{H}_1>\Delta \mathrm{H}_2$
(D) $\Delta \mathrm{H}_1=\Delta \mathrm{H}_2$

Q31 Hess's law states that

(A) the standard enthalpy of an overall reaction is the sum of the enthalpy changes in individual reactions

(B) enthalpy of formation of a compound is same as the enthalpy of decomposition of the compound into constituent elements, but with opposite sign

(C) at constant temperature the pressure of a gas is inversely proportional to its volume

(D) the mass of a gas dissolved per litre of a solvent is proportional to the pressure of the gas in equilibrium with the solution.

Q32 The enthalpies of formation of $OH_{(g)}$, $H_{(g)}$ and $O_{(g)}$ are 42, 218 and 248 kJ mol^{-1} respectively. The value of bond enthalpy O – H is

(A) 424 kJ mol^{-1}

(B) –424 kJ mol^{-1}

(C) 212 kJ mol^{-1}

(D) –212 kJ mol^{-1}

Q33 The heats of neutralization of CH_3COOH HCOOH, HCN and H_2S are –13.2, –13.4, –2.9 and –3.8 kcal per equivalent respectively. The correct increasing order of acid strength is

(A) $HCOOH < CH_3COOH < H_2S < HCN$

(B) $HCN < H_2S < CH_3COOH < HCOOH$

(C) $HCOOH < CH_3COOH < HCN < H_2S$

(D) $CH_3COOH < H_2S < HCN < HCOOH$

Q34 The absolute enthalpy of neutralisation of the reaction;

$$MgO_{(s)} + 2\,HCl_{(aq)} \rightarrow MgCl_{2(aq)} + H_2O_{(l)}$$ will be

(A) less than –57.33 kJ mol^{-1}

(B) –57.33 kJ mol^{-1}

(C) greater than –57.33 kJ mol^{-1}

(D) 57.33 kJ mol^{-1}

Q35 The total entropy change for a system and its surroundings increases, if the process is

(A) reversible (B) exothermic

(C) irreversible (D) endothermic.

Q36 Which of the following has highest entropy ?

(A) $Al_{(s)}$ (B) $CaCO_{3(s)}$

(C) $H_2O_{(l)}$ (D) $CO_{2(g)}$

Q37 For an isothermal, reversible expansion of an ideal gas

(A) $\Delta S_{System} > \Delta S_{Surroundings}$

(B) $\Delta S_{System} < \Delta S_{Surroundings}$

(C) $\Delta S_{System} = \Delta S_{Surroundings}$

(D) $\Delta S_{System} > -\Delta S_{Surroundings}$

Q38 For which of the following reactions ΔS is negative?

(A) $Mg(s) + Cl_{2(g)} \rightarrow MgCl_{2(s)}$

(B) $H_2O_{(l)} \rightarrow H_2O_{(g)}$

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

(D) $I_{2(\ g)} \rightarrow 2I_{(\ g)}$

Q39 For the reaction, $2H_{2(g)} + O_{2(g)} \quad 2H_2O_{(l)}$ at room temperature, the value of ΔS is

(A) positive (B) negative

(C) zero (D) unpredictable.

Q40 For a reversible isothermal process in equilibrium, the entropy change is given by the expression

(A) $\Delta S = \frac{T}{q_{rev}}$

(B) $\Delta S = \frac{q_{rev}}{T}$

(C) $\Delta S = \frac{\Delta U}{T}$

(D) $\Delta S = \frac{\Delta H}{T}$

Q41 The equilibrium constant for certain reaction is 100. If the value of R is given to be 2 cal K^{-1} mol^{-1}, then standard Gibbs' free energy change will be

(A) –2.754 kcal

(B) 2.674 kcal

(C) 2.764 kcal

(D) none of these

Q42 Which has the least entropy ?

(A) Graphite

(B) Diamond

(C) $N_{2(g)}$

(D) $N_2O_{(g)}$

Q43 The favourable conditions for a spontaneous reaction are

(A) $T\Delta S > \Delta H, \Delta H = +ve, \Delta S = +ve$

(B) $T\Delta S > \Delta H, \Delta H = +ve, \Delta S = -ve$

(C) $T\Delta S = \Delta H, \Delta H = -ve, \Delta S = -ve$

(D) $T\Delta S = \Delta H, \Delta H = +ve, \Delta S = +ve$

Q44 Entropy of a system

(A) is a measure of disorder in the system

(B) is a measure of randomness in the system

(C) is a measure of energy content of the system

(D) both (a) and (b).

Q45 Mark the correct statement.

(A) For a chemical reaction to be feasible, ΔH should be zero.

(B) Entropy is a measure of order in a system.

(C) For a chemical reaction to be feasible, ΔG should be positive.

(D) The total energy for an isolated system is constant.

Q46 Which one of the following has $\Delta S°$ greater than zero?

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

(B) $NaCl_{(aq)} \rightarrow NaCl_{(s)}$

(C) $NaNO_{3(s)} \rightarrow Na^{+}_{(aq)} + Na^{-}_{3(aq)}$

(D) $N_{2(g)} + 3H_{2(g)} \rightarrow 2NH_{3(g)}$

Answer Key

Q1	B
Q2	A
Q3	C
Q4	B
Q5	C
Q6	C
Q7	B
Q8	C
Q9	D
Q10	B
Q11	C
Q12	B
Q13	B
Q14	B
Q15	C
Q16	D
Q17	D
Q18	B
Q19	A
Q20	B
Q21	D
Q22	B
Q23	B
Q24	C
Q25	C
Q26	A
Q27	B
Q28	D
Q29	A
Q30	A
Q31	A
Q32	A
Q33	B
Q34	C
Q35	C
Q36	D
Q37	D
Q38	A
Q39	B
Q40	B
Q41	A
Q42	B
Q43	A
Q44	D
Q45	D
Q46	C

Hints & Solutions

Note: scan the QR code to watch video solution

Q1 **Text Solution:**

As volume is constant $\Delta V = 0$

$W = -P\Delta V = 0$, $\therefore \Delta E = q = +500$ J.

Video Solution:

Q2 **Text Solution:**

Since the system is insulated, hence heat is not allowed to enter or leave from system. Thus $q = 0$

$\Delta E = q + W \Rightarrow \Delta E = W$

Video Solution:

Q3 **Text Solution:**

Volume is an extensive property.

Video Solution:

Q4 **Text Solution:**

For isothermal expansion $\Delta T = 0$

Since ΔU is a function of temperature,

$\therefore \Delta U = 0$.

Video Solution:

Q5 **Text Solution:**

Deals with the flow of energy in macroscopic systems which comprises of multiple molecules and cannot predict the rate of chemical reaction or mechanism. Mechanism and rate of chemical reactions are dealt in chemical kinetics rather than thermodynamics.

Video Solution:

Q6 **Text Solution:**

Thermodynamics which is the study of different forms of energies mainly deals with energy changes in different states of matter either quantitively or qualititively or both

Video Solution:

Q7 Text Solution:

Living system is an example of an open system as it can exchange both matter and energy with the surroundings

Video Solution:

Q8 Text Solution:

Δn = number of moles of product - number of moles of reactant = 2 – 3 – 1

By the definition of enthalpy:

$\Delta H = \Delta U + \Delta nRT$ i.e., $\Delta H = \Delta U + (-1)RT$

$\Delta H = \Delta U - RT$

Video Solution:

Q9 Text Solution:

Δn depends on stoichiometry of the reaction.

Video Solution:

Q10 Text Solution:

$\Delta H - \Delta U = \Delta nRT$

Also, $CH_{4(g)} + 2O_{2(g)} \rightarrow CO_{2(g)} + 2H_2O_{(l)}$

$\therefore \Delta n = -2$

$\Delta H - \Delta U = -2 \times 298 \times (2\,\text{cal})$

Video Solution:

Q11 Text Solution:

$\Delta H = \Delta U + P\Delta V = \Delta U + P(V_2 - V_1)$

Assuming $p_{ex} = P, P = 2.026 \times 10^5\ Nm^{-2}$

$\Delta U = 418\ J$

$V_1 = 6\ dm^3 = 6 \times 10^{-3}\ m^3$

$V_2 = 16\ dm^3 = 16 \times 10^{-3}\ m^3$

$\Rightarrow \Delta H = 418 + 2.026 \times 10^5 \left(16 \times 10^{-3} - 6 \times 10^{-3}\right)$

$= 2444\ J$

Video Solution:

Q12 Text Solution:

$H_{2(g)} + I_{2(g)} \rightarrow 2\,HI_{(g)}$

$\Delta n = 2 - (1 + 1) = 0$

$\Delta H = \Delta U + \Delta nRT \Rightarrow \Delta H = \Delta U + (0)RT$

$\therefore \Delta H = \Delta U$

Video Solution:

Q13 **Text Solution:**

$PCl_{5(g)} \rightarrow PCl_{3(g)} + Cl_{2(g)}$

Video Solution:

Q14 **Text Solution:**

$\Delta H = \Delta U + P\Delta V$

Video Solution:

Q15 **Text Solution:**

$2\,CO_{(g)} + O_{2(g)} \rightarrow 2\,CO_{2(g)}$

$\Delta n = n_p - n_r = 2 - (2+1) = -1$

$\Rightarrow \Delta H < \Delta U \therefore \Delta H - \Delta U < 0$

Video Solution:

Q16 **Text Solution:**

1063 J

Video Solution:

Q17 **Video Solution:**

Q18 **Video Solution:**

Q19 **Text Solution:**

Work done, W = 4.545 kJ = 4545 J

$\Delta V = 22 - 8 = 14 \text{ dm}^3 = 14 \times 10^{-3} \text{ m}^3$

$W = P\Delta V \Rightarrow P = \frac{W}{\Delta V} = \frac{4545}{14\times10^{-3}},$

$P = 3.24 \times 10^5 \text{ Nm}^{-2}$

Video Solution:

Q20 **Text Solution:**

$2 \text{ grams } H_2 = 1 \text{ mol},$

$\text{Volume at STP} = 22.4\text{ L}(V_1);$

$V_2 = 2 \times 22.4\text{ L}$

$V_2 - V_1 = 22.4\text{ L};$

$W = -P\Delta V = -1\text{ atm} \times 22.4\text{ L} = -22.4$
L atm

Video Solution:

Q21 **Text Solution:**

$$W = -P\Delta V = -100(55-45) = -1000\ \text{J}$$
$$\therefore 5\ \text{mole of gas},\ W = -1000\ \text{J}$$
$$\therefore 1\ \text{mole of gas},\ W = -200\ \text{J/mol}$$

Video Solution:

Q22 **Text Solution:**

$$W = -p_{ex}\Delta V = -5\times10^5\left(8-2.5\right)$$
$$\times 10^{-3}$$
$$= -5\times5.5\times10^2 = -2.750\ \text{kJ}$$

Video Solution:

Q23 **Text Solution:**

–303.9 J

Video Solution:

Q24 **Text Solution:**

$$W = -P_{ex}\times\Delta V = -3.039\times10^5$$
$$\times\left(20-30\right)$$
$$= 30.39\times10^5\text{J}\times30.39\times10^5\times0.239\ \text{cal}$$
$$= 7.263\times10^5 = 726.3\ \text{kcal}$$

Video Solution:

Q25 **Text Solution:**

$$\Delta V = V_2 - V_1 = 3.5 - 3 = 0.5\ \text{L}$$
$$p_{ex} = 2\ \text{atm.}$$
$$W = -p_{ex}\ \Delta V = -2\times0.5 = -1\ \text{L atm.}$$
$$W = -\frac{1\times8.314}{0.082} = -101.3\ \text{J}$$
$$\Delta U = q + W = 300 + (-101.3) = 198.7\ \text{J}$$

Video Solution:

Q26 **Text Solution:**

q = 413 kJ. In isothermal expansion, $\Delta U = 0$

$$\Delta U = q + W$$
$$\therefore q = -W$$
$$W = -q = -413\ \text{kJ}$$

Video Solution:

Q27 **Text Solution:**

$$\underbrace{CCl_{4(g)} + 2H_2O_{(g)}} \rightarrow CO_{2(g)} + 4\,HCl_{(g)}$$

ΔH_f° (kcal)   -25.5 2 × -57.8   -94.1   4×-22.1

$$\Delta H^\circ_{\text{Reaction}} = \Delta H^\circ_{f(\text{Products})} - \Delta H^\circ_{f(\text{Reactants})}$$
$$= -94.1 + 4(-22.1)$$
$$- [-25.5 + 2(-57.8)]$$

$$= -182.5 + 141.1 = -41.4\,\text{kcal}\ \ \text{mol}^{-1}$$

Video Solution:

Q28 **Text Solution:**

Reaction C + O_2 CO_2 is a reaction of formation of CO_2. CO_2. Heat Heat of this reaction is actually heat of formation of CO_2.

$$CO + \tfrac{1}{2}O_2 \rightarrow CO_2;\Delta H = 200\ \text{kJ}$$
$$\Delta H_f\left(\text{kJ}\right) : 100 \quad 0 \quad ?$$
$$\Delta H = \Delta H_{f(\text{Products})} - \Delta H_{f(\text{Reactants})}$$
$$200 = \Delta H_{f(CO_2)} - 100$$
$$\Delta H_{f(CO_2)} = 200 + 100 = 300\ \text{kJ}$$

Video Solution:

Q29 **Text Solution:**

$$CS_{2(f)} + 3O_{2(\ g)} \rightarrow CO_{2(\ g)} + 2SO_{2(\ g)};$$
$$\Delta H = -1110\,\text{kJ}$$
$$\Delta H_f(\ \text{kJ}) : \quad ? \qquad 0 \qquad -395 \qquad 2\times -295$$
$$\Delta H_{\text{Reaction}} = \Sigma\Delta H_{f(\text{Products})} - \Sigma H_{f(\text{Reactants})}$$
$$-1110 = -395 + 2\left(-295\right) - \Delta H_{f(CS_2)}$$
$$\Delta H_{f(CS_2)} = -395 - 590 + 1110 = 125\ \text{kJ}$$
$$\text{mol}^{-1}$$

Video Solution:

Q30 **Text Solution:**

Heat released in the formation of $H_2O_{(g)}$ i.e., ΔH_l is lesser than heat released in the formation of $H_2O_{(l)}$, ΔH_2 ($\Delta H_1 < \Delta H_2$) This is because some additional amount of heat is released in the formation of $H_2O_{(l)}$ form $H_2O_{(g)}$.

Video Solution:

Q31 **Text Solution:**

According to Hess's law the standard enthalpy of an overall reaction is the sum of the enthalpy changes in individual reactions.

Video Solution:

Q32 **Text Solution:**

Bond enthalpy i.e., bond dissociation energy of O – H corresponds to ΔH of the reaction

$$\mathrm{O-H} \rightarrow \mathrm{O} + \mathrm{H}$$

$$\Delta H_f : \quad 42 \qquad 248 \quad 218$$

$$\Delta H = \Sigma \Delta H_{f(\text{Products})} - \Sigma H_{f(\text{Reactants})}$$

$$\Delta H = 248 + 218 - 42 = 424 \text{ kJ } \text{mol}^{-1}$$

Video Solution:

Q33 **Text Solution:**

More strong the acid, more will be heat of neutralization. Negative sign signifies evolution of heat.

Video Solution:

Q34 **Text Solution:**

There are few reactions for which absolute value of enthalpy of neutralization is greater than –57.33 kJ mol^{-1}. Here, this is due to high heat of hydration of Mg^{2+} ions. ΔH for this reaction is nearly –146 kJ. Thus enthalpy of neutralization per mole of H^+ ions is nearly –73 kJ, which is obviously greater than enthalpy of neutralization of strong acid vs strong base i.e., –57.33 kJ.

Video Solution:

Q35 **Text Solution:**

For irreversible process, ΔS increases.

Video Solution:

Q36 **Text Solution:**

$CO_{2(g)}$

Video Solution:

Q37 Text Solution:

For a reversible, isothermal expansion, temperatures of system and surrounding are same. Heat absorbed by the system is equal to heat lost by surrounding so that total entropy change is zero.

i.e., $\Delta S_{\text{System}} + \Delta S_{\text{Surrounding}} = 0$

$\Delta S_{\text{System}} = -\Delta S_{\text{Surrounding}}$

Video Solution:

Q38 Text Solution:

$\mathrm{Mg(s)} + \mathrm{Cl}_{2(g)} \rightarrow \mathrm{MgCl}_{2(s)}$

Video Solution:

Q39 Text Solution:

Liquids have less entropy than gases.

Video Solution:

Q40 Text Solution:

The change in entropy during the process is defined as the ratio of heat absorbed by the system isothermally and reversibly to the temperature at which it is absorbed.

Video Solution:

Q41 Text Solution:

Free energy is related to equilibrium constant as

AG = –2.303 RT log K

= –2.303 × 2 × 298 log 100

= –2.745 kcal

Video Solution:

Q42 Text Solution:

Graphite possesses sp^2 hybridisation and has flat layer structure whereas diamond possesses sp^3-hybridisation and has rigid tetrahedral nature.

Video Solution:

Q43 **Text Solution:**

$\Delta G = \Delta H - T\Delta S$

For a spontaneous reaction, ΔG = negative.

If ΔH = positive, ΔS = positive, then $T\Delta S$ should be ΔH to make ΔG negative.

Video Solution:

Q44 **Text Solution:**

both (a) and (b).

Video Solution:

Q45 **Text Solution:**

The total energy for an isolated system is constant.

Video Solution:

Q46 **Text Solution:**

Entropy for liquid > solid.

Video Solution: