CHEMISTRY

WORKSHEET-15

STEP

A PROJECT BY PUNJAB GROUP

Worksheet-15

(A. Physical Chemistry)

Chemical Energetics

Q.1 **For the reaction $NaCl_{(s)} \rightleftharpoons^{water} Na^{+}_{(aq)} + Cl^{-}_{(aq)}$ the change in enthalpy is called:**

A) Heat of reaction
C) Heat of formation
B) Heat of combustion
D) Heat of solution

Q.2 **Evaporation of water is an exceptional case of:**

A) Spontaneous
C) Non-spontaneous
B) Decomposition
D) Hydrolysis

Q.3 **Which statement is contrary to the first law of thermodynamics?**

A) Energy can neither be created nor destroyed
B) One form of energy can be converted into other form of energy
C) In an adiabatic process the work done is independent of its path
D) Continuous production of mechanical work without supplying an equivalent amount of heat is possible

Q.4 **Born Haber's cycle enables us to calculate:**

A) Heat energy
C) Lattice energy
B) Heat of hydration
D) Heat of solution

Q.5 **Which statement is not correct about ΔH^{o}?**

A) ΔH^{o} of the reaction depends on temperature
B) ΔH^{o} of reaction can be > or < zero
C) ΔH^{o} of catalyzed and uncatalyzed reaction is same
D) ΔH^{o} is always < 0

Q.6 **Which of the following processes is always endothermic?**

A) Atomization
C) Neutralization
B) Combustion
D) Solution

Q.7 **Which one of the following statements is correct for the neutralization of a strong acid by a strong alkali in aqueous solution at 25°C?**

A) It is an endothermic process
B) It can be represented as $H_3O^{+}_{(aq)} + OH^{-}_{(aq)} \longrightarrow 2H_2O_{(l)}$
C) The enthalpy change per mole of H_2O formed is independent of the acid or alkali used as they are strong
D) Both B and C

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Q.8 **According to Born Haber cycle, ΔH_ℓ^o of ionic compound is determined by the formula ΔH_ℓ^o.**

A) $\Delta H_\ell^o = \Delta H_f^o - \Delta H_x$

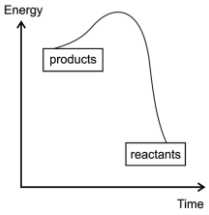
B) $\Delta H_\ell^o = \Delta H_x - \Delta H_f^o$

C) $\Delta H_\ell^o = \Delta H_x + \Delta H_f^o$

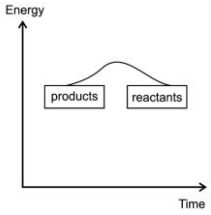
D) $\Delta H_\ell^o = \Delta H_{at}^o - \Delta H_x$

Q.9 **Which of the following energy profile diagrams best shows an endothermic reaction?**

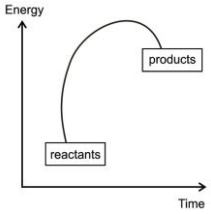
A)



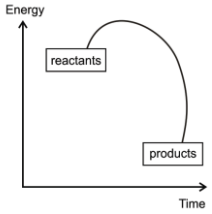
C)



B)



D)



Q.10 **Lattice energy (ΔH_ℓ^o) helps to explain all of the following properties of ionic compounds EXCEPT:**

A) Structure

B) Properties

C) Bonding

D) Dipole Moment

Q.11 **In azeotropic mixture showing positive deviation from Raoult's law, the volume of the mixture is:**

A) Slightly more than the total volume of the components

B) Slightly less than the total volume of the components

C) Equal to the total volume of the components

D) Difficult to predict

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Q.12 **All of the following reactions are exothermic EXCEPT:**

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

B) $C_{(s)} + O_{2(g)} \longrightarrow CO_{2(g)}$

C) $N_{2(g)} + O_{2(g)} \longrightarrow 2NO_{(g)}$

D) $H_{2(g)} + \frac{1}{2} O_{2(g)} \longrightarrow H2O_{(l)}$

Q.13 **For which one of the following compounds standard enthalpy change (ΔH^o) can be measured directly by calorimeter?**

A) CCl_4 C) B_2O_3

B) Al_2O_3 D) MgO

Q.14 **All of the following are state functions EXCEPT?**

A) E C) H

B) G D) q

Q.15 **All of the following standard enthalpy change (ΔH^o) have only positive value EXCEPT:**

A) ΔH_v C) ΔH^o_{BDE}

B) ΔH^o_{sol} D) ΔH_i

Q.16 **12.0g of graphite is burnt in a bomb calorimeter and temperature recorded is 5K. Calculate the enthalpy of combustion (ΔH^o_c) of graphite if the heat capacity of the calorimeter is 90.0kJmol^{-1}?**

A) -440kJmol^{-1} C) -450kJmol^{-1}

B) -445kJmol^{-1} D) -455kJmol^{-1}

Q.17 **Glass calorimeter is used to determine:**

A) ΔH^o_n C) ΔH^o_{sol}

B) ΔH^o_{at} D) ΔH^o_f

Q.18 **Neutralization of 50cm^3 of 0.5M NaOH at 25^{o}C with 50cm^3 of 0.5M HCl 25^{o}C is raised to 31^{o}C. Find enthalpy of neutralization (ΔH^o_n). Specific heat of water (q) = 5kJ^{-1}kg^{-1}:**

A) -125kJmol^{-1} C) -120kJmol^{-1}

B) -130kJmol^{-1} D) -135kJmol^{-1}

Q.19 **If an endothermic reaction is allowed to take place very rapidly in the air, the temperature of the surrounding air:**

A) Remains constant C) Increases

B) Decreases D) Remains unchanged

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Q.20 **Which of the following statements is not correct for ΔE and ΔH?**

Options	ΔE (Change in internal energy)	ΔH (Change in enthalpy)
A)	$\Delta E = q_v$	$\Delta H = q_p$
B)	$\Delta E = q + P\Delta V$	$\Delta H = \Delta E + P\Delta V$
C)	ΔE is measured at constant volume	ΔH is measured at constant pressure
D)	$q_v > q_p$	$q_p = p_v$

Q.21 **The nature of an aqueous solution of ammonia (NH_3) is:**

A) Amphoteric C) Neutral

B) Basic D) Acidic

Q.22 **An aqueous solution of ethanol in water may have vapour pressure:**

A) Equal to that of water C) More than that of water

B) Equal to that of ethanol D) Less than that of water

Q.23 **The solution which has lower osmotic pressure is called:**

A) Hypotonic solution C) Isotonic solution

B) Hypertonic solution D) Saturated solution

Q.24 **Molal boiling point constant (K_b) is related to:**

A) m C) M

B) ppm D) x

Q.25 **All of the followings are examples of pair of partially miscible liquids except:**

A) Iodine water system C) Nicotine water system

B) Triethyamine water system D) Phenol water system

Q.26 **Which of the following aqueous solutions has the lowest vapour pressure at room temperature?**

A) 0.1m NaCl solution C) 0.1m glucose solution

B) 0.1m $CaCl_2$ solution D) 0.1m urea solution

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Q.27 **To observe the colligative properties, following conditions should be fulfilled by the solution EXCEPT:**

A) Solution should be dilute

B) Solute should be non-electrolyte

C) Solute should be non-volatile

D) Solute can be volatile and non-electrolyte

Q.28 **Which of the following is colligative property?**

A) Osmotic-pressure C) Boiling point

B) Freezing point D) Melting point

Q.29 **Two solutions of NaCl and KCl having 0.1m (molal concentration) of each are prepared separately. Which of the following statement is true for the solution:**

A) KCl solution will have higher boiling point than NaCl solution

B) Both the solutions have different boiling points

C) KCl and NaCl solutions possess same vapour pressure

D) KCl solution possesses lower freezing point than NaCl solution

Q.30 **Mark the correct statement about the relative lowering of vapour pressure:**

A) It is independent of the temperature

B) It depend on the concentration of solute

C) It is constant when equimolecular proportions of different solutes are dissolved in the same mass of same solvent

D) All of these

Q.31 **Internal energy of a system depends on all the factors EXCEPT:**

A) Chemical nature of a substance

B) Temperature

C) Pressure and volume

D) Path

Q.32 **Ionic solid is dissolved in water if:**

A) $\Delta H_{\ell}^{o} > \Delta H_{hyd}$ C) $\Delta H_{hyd} = \Delta H_{\ell}^{o}$

B) $\Delta H_{hyd} > \Delta H_{\ell}^{o}$ D) $\Delta H_{\ell}^{o} \leq > \Delta H_{hyd}$

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Q.33 **The number of moles of solute in 1000g (1kg) of solvent is called:**

A) Molarity
C) Mole fraction
B) Molality
D) ppm

Q.34 **The colligative property that is generally applied preferably for the determination of molecular mass of macromolecule is:**

A) π
C) ΔT_f
B) ΔT_b
D) $\Delta P/P^o$

Q.35 **Which of the following is an example of solution in which solute is in the solid state while solvent is in the liquid state?**

A) Paint
C) Fog
B) Steel
D) Milk

Q.36 **The temperature at which two conjugate solutions merge into one another is called:**

A) Upper consulate temperature
B) Optimum temperature
C) Transition temperature
D) Absolute temperature

Q.37 **If mass of solvent is 100g and molal concentration of its solution is 0.2, the amount of urea dissolved in solvent (molar mass of solute is 60gmol^{-1}) is:**

A) 1.2g
C) 0.5g
B) 1.0g
D) 0.75g

Q.38 **A sample of tooth paste having 100g, was found to contain 0.5g fluoride ions. The concentration of fluoride ions in ppm is:**

A) 1.5×10^3
C) 5×10^3
B) 1.25×10^3
D) 2.5×10^3

Q.39 **18g glucose is dissolved in 90g of water. The relative lowering of vapour pressure is equal to:**

A) $\frac{1}{51}$
C) $\frac{1}{5}$
B) 5.1
D) 6

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Q.40 **A pure solvent has a vapour pressure of 120 torr at 25°C. When 20g of non-volatile solute was dissolved in 300g of benzene, a vapour pressure of 115 torr was observed (molar mass of benzene = 80). What is the molar mass of solute?**

A) 128g C) 140g

B) 160g D) 180g

Q.41 **A colloidal system involves**

A) A state of dissolution

B) A state of homogenous mixture

C) A state of dispersion

D) A state of suspension

Q.42 **Solvent loving colloids are called:**

A) Lyophobic acid C) Lyophilic colloids

B) Hydrophobic colloids D) Mesophobic colloids

Q.43 **The fresh precipitate can be passed in colloidal state by**

A) Peptization C) Coagulation

B) Diffusion D) Effusion

Q.44 **A colloidal solution of $Fe(OH)_3$ in water is:**

A) Hydrophilic colloid C) An emulsion

B) A hydrophobic colloid D) Lyophilic colloid

Q.45 **Which of the following properties is not shown by suspension, colloidal solution and true solution?**

Opt	Properties	Suspension	Colloidal solution	True solution
A)	Particle size	$> 10^{-5}$cm	10^{-7}cm	$< 10^{-7}$cm
B)	Separation with filter paper	Possible	Not possible	Not possible
C)	Nature	Homogenous	Homogeneous	Heterogeneous
D)	Appearance	Opaque	Turbid	Clear

Q.46 **The addition of alcohol to a saturated aqueous solution of calcium acetate first forms a sol and then sets to a gelatinous mass called solid alcohol which is a:**

A) Solid sol C) Aerosol

B) Solid form D) Gel

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Q.47 **A sol is a colloidal solution suspension of very small solid particles (10^{-7} to 2 x 10^{-5} cm) in a continuous liquid medium (dispersion medium). Sols are quite stable. Which of the following is not example of sol:**

A) Blood C) Cell fluid

B) Paint D) Marbles

Q.48 **The colloidal solution of gold prepared by different methods have different colours due to:**

A) Difference in the size of colloidal particles

B) Fact that gold exhibit variable valency

C) Different conc. of gold

D) Presence of different type of foreign particles

Q.49 **Classification of colloidal solution or dispersion can be done on the basis of nature of dispersion medium. Which of the following is not considered colloidal dispersion:**

Options	Dispersion medium (DM)	Type of sols
A)	Water	Hydrosols
B)	Acetone	Acylosols
C)	Alcohol	Alcosols
D)	Air	Aerosol

Q.50 **The amount of solute present in a fixed amount of solvent or solution is called:**

A) Concentration of solution C) Molal solution

B) Molar solution D) ppm Solution

Q.51 **Which of the following is example of colloidal solution in which dispersion phase is in the liquid state and dispersion medium is in the solid state?**

A) Muddy water C) Blood

B) Cheese D) Fog

ANSWER KEY (Worksheet-15)											
1	D	11	A	21	B	31	D	41	C	51	B
2	A	12	C	22	C	32	B	42	C		
3	D	13	D	23	A	33	B	43	A		
4	C	14	D	24	A	34	A	44	B		
5	D	15	B	25	A	35	A	45	C		
6	A	16	C	26	B	36	A	46	D		
7	C	17	A	27	D	37	A	47	D		
8	A	18	C	28	A	38	C	48	A		
9	B	19	B	29	C	39	A	49	B		
10	D	20	D	30	D	40	A	50	A		

ANSWERS EXPLAINED

Q.1 **(D)** The **standard enthalpy of a solution (ΔH^o_{sol})** is the amount of heat absorbed or evolved when one mole of a substance is dissolved in so much solvent that further dilution results in no detectable heat change. **e.g.** ΔH_{sol} of **NaCl** is **(+4.98kJmol^{-1}).**

Q.2 **(A)** **Evaporation is a spontaneous, unidirectional, irreversible, and real process**. It takes place continuously and it is **surface phenomena**.

Q.3 **(D)** Continuous production of mechanical work without supplying an equivalent amount of heat is **not** possible, because **input ≠ output.**

Q.4 **(C)** **Born Haber's cycle** is an application of **Hess's law.** It enables us to calculate the ΔH_{latt} of **binary ionic compounds** such as $M^+ X^-$.

Q.5 **(D)** The value of **ΔH is < 0** in case of **exothermic reaction** but not always, because in **endothermic reaction ΔH is > 0**. So heat of reaction **$\Delta H > 0$ or < 0.**

Q.6 **(A)** ΔH^o_{at} is the amount of heat **absorbed** when **one mole** of gaseous atoms are formed from the element under standard condition. **e.g. ΔH^o_{at} of hydrogen is given below.**

$$\tfrac{1}{2}H_{2(g)} \longrightarrow H_{(g)} \qquad \Delta H^o_{at} = 218 kJmol^{-1}$$

Q.7 **(C)** The enthalpy change per mole of **H_2O** formed is independent of the acid or alkali used as they are strong, because **ΔH_n** is merely the heat of formation of one mole of water from neutralization its strong acids and strong bases. Its value is always negative.

$$H^+_{(aq)} + OH^-_{(aq)} \rightleftharpoons H_2O_{(l)}$$

$$\Delta H^o_n = -57.4 \text{ kJ mol}^{-1}$$

ΔH_n for any strong acid with a strong base is approximately the same i.e. - 57.4kJmol^{-1}.

Q.8 **(A)** **Lattice energy (ΔH^o_ℓ)** of binary ionic compound is determined by the formula $\Delta H^o_\ell = \Delta H^o_f - \Delta H_x$

Q.9 **(B)** It is **endothermic reaction** in which products are at **higher energy level than reactants** as shown in diagram and for such reactions a continuous **source of energy** is needed to complete the reaction.

Q.10 **(D)** **The polarity of a polar molecule is quantitatively measured in term of dipole moment. The dipole moment (μ) of a molecule may be defined as the product of the electric charge (q) and the distance between the positive and negative centers (r).**

Mathematically it can be shown as $\mu_{diatomic} = q \times r$

The unit of dipole moment is Debye 1D = 3.336 x 10^{-30}mC.

Q.11 **(A)** In azeotropic mixture showing positive deviation from Raoult's law the volume of the mixture is slightly more than the total volume of the components.

Q.12 **(C)** To predict whether the reaction is **endothermic** or **exothermic,** it all depends on enthalpy change **i.e.** if ΔH = + value then it is endothermic

reaction and if **ΔH = -** then it is exothermic reaction. In options **A, B** and **D ΔH have negative values,** so they are **exothermic** reaction. **Only in case C ΔH is positive** so it is **endothermic as shown in the reaction.**

$$N_{2(g)}+O_{2(g)} \rightarrow 2NO_{(g)} \Delta H=+180.51 kJmol^{-1}$$

Q.13 (D) **Calorimeter** is that **device** which is used to **measure ΔH°.** It is only used for those reactions which **complete** in **one step.** Since **in case of A, B and C** reactions **do not** complete in **one step,** so their **ΔH cannot** be measured **directly.** But **in case of option D formation** of **MgO completes** in **one step. So its ΔH° can be measured by calorimeter.**

Q.14 (D) **A state function** is a **macroscopic property** of a system which has some definite values for **initial** and **final states** and which is independent of the path **followed by the system. A, B and C** are state functions **because** they only **depend** on **initial** and **final** state **whereas q and w** are **not state function** because they **depend** on the **path followed by the system.**

Q.15 (B) The standard enthalpy of a solution is the amount of heat **absorbed or evolved** when **one mole** of a substance is dissolved in so much solvent that further dilution **results in no** detectable heat change.

e.g. ΔH_{sol} of LiCl = -35.0kJmol^{-1} and for ΔH_{sol} of NaCl = + 4.98kJmol^{-1}.

Q.16 (C) **Given data:**

- Heat capacity of calorimeter (c)

$$= 90.0 kJmol^{-1}$$

$$\Delta T = 5K$$

Heat gained by the system q = c x ΔT

= 90.0 x 5 = 450kJ

Number of moles of graphite = $\frac{12}{12} = 1$

ΔH^{o}_{c} of graphite per mol = $\frac{450}{1}$

= 450kJmol^{-1}

Since heat is evolved during combustion, so sign of the answer would be negative

i.e. ΔH^{o}_{c} = - 450kJmol^{-1}

Q.17 (A) Glass calorimeter is used to measure heat of neutralization.

Q.18 (C) **Solution: Specific heat of water (s) = 5JK^{-1}g^{-1}**

Density of water is around 1gcm^3, so 100cm^3 (50 cm^3+50cm^3 =100cm^3) of total solution is approximately = 100g (m = d x V = 1 x 100 =100g)

- Total mass of reaction mixture = 100g

Rise in temperature (ΔT) = $T_2 - T_1$ **= 31.0°C – 25.0°C = 6°C = 6K**

Amount of total heat evolved

q = m x s x ΔT (i)

$=100 \times 5 \times 6$

= 3000J

= 3.0kJ

So the reaction is exothermic

q = -3.0kJ

So 50cm^3 of 0.5M solution is = 0.05moles of HCl and NaOH respectively

($M_1 \times 1000 = 0.5 \times 50$)

$\therefore$ **M_1** = $0.5 \times \frac{50}{1000}$ **= 0.025M**

= 0.025mole (ii)

When this heat is divided by number of moles, the ΔH^{o}_{n} is for one mole

Heat of neutralization

(ΔH^{o}_{n}) = $\frac{-3.0kJ}{0.025mol} = -120 kJmol^{-1}$ **(iii)**

Q.19 (B) Since in endothermic reaction heat energy is absorbed by the system from the surrounding that is why energy of

the surrounding decreases while the energy of the system increases **i.e.** $\Delta H > 0$.

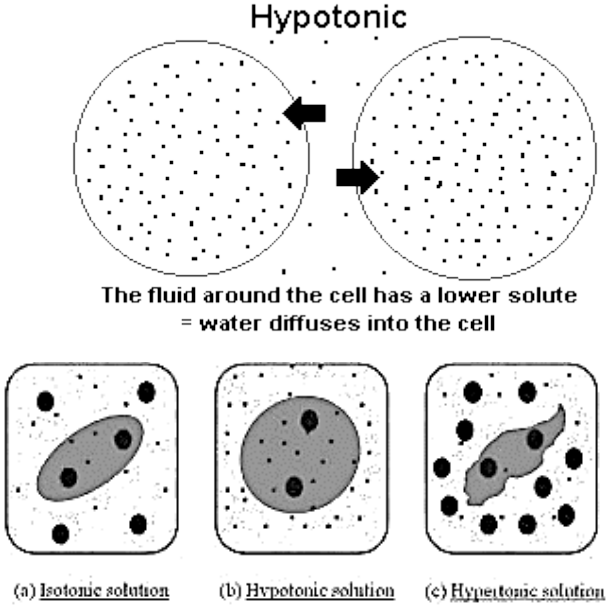
Q.20 (D)

- $\Delta E = q_v$ This shows that a change in internal energy of a system, at constant volume is equal to heat absorbed by the system **(q_v).**
- $\Delta H = q_p$ This shows that change in enthalpy is equal to heat of reaction at constant pressure. The reactions are carried out at constant pressure more frequently than at constant volume. So, working with ΔH is more convenient rather than ΔE.
- In fact, $\Delta H = \Delta E + P\Delta V$.
- Therefore it can be concluded that $q_p > q_v$.

Q.21 (B) Since ammonia is a base so when it is dissolved in water, the solution becomes basic in nature. It turns red litmus paper blue. It has pH greater than 7.

Q.22 (C) Since alcohol is more volatile than **water** because **boiling point** of **alcohol (78.5°C)** is **less than** that of **water (100°C)** and it has **weaker** hydrogen bonding. Because of this reason an aqueous solution of **ethanol** in **water** has more vapour pressure more than that of **water.**

Q.23 (A) The solution which has lower osmotic pressure is called hypotonic solution.



Q.24 (A) K_b is related to **molality.** The molal **boiling point constant (K_b)** is the ratio of the elevation in boiling point to molality. **Mathematically** it can be shown as $K_b = \frac{\Delta T_b}{m}$. Kb **depends** upon the **nature of solvent** and **not upon** the **nature of solute. e.g. K_b of water (0.52°C/m).**

Q.25 (A) Iodine is a **non-polar** while **water** is a **polar.** So **iodine** is **not** soluble in **water** because like is **dissolved** by like. Those **liquids** which **do not** dissolve into each other in any proportion are called immiscible liquids. **Examples of immiscible liquid pair is as follow:**

- **Water and benzene ($H_2O + C_6H_6$)**
- **Water and carbon disulphide ($H_2O + CS_2$)**

Q.26 (B) As **0.1m $CaCl_2$** solution has **greater number** of solute particles as **compared** to other solutions **(A, C and D),** therefore **0.1m $CaCl_2$** solution has **low** vapour pressure as compared to others **at room temperature.**

Q.27 (D) If the solute is volatile and non-electrolyte it would not follow **colligative properties** because it **does**

not fulfill the **conditions** of colligative properties.

Q.28 (A) **Osmotic pressure** is a colligative property like **elevation** in **boiling point (ΔT_b),** depression in **freezing point (ΔT_f)** and **lowering** in **vapour pressure (ΔP). But melting point, boiling point and freezing point are not colligative properties.**

Q.29 (C) Since **two solutions (NaCl and KCl)** have same number of solute particles. **Therefore they possess same vapour pressure.**

Q.30 (D) **All of the following statements are correct about relative lowering of vapour pressure:**

- It is independent of the temperature
- It depend on the concentration of solute
- It is constant when equimolecular proportions of different solutes are dissolved in the same mass of same solvent

Q.31 (D) Since **internal energy** is a state **function** like **P, T, V, G, H, and S** and they all depend upon **initial** and **final stage** of the system **but not** on the **path** of the **system.**

Q.32 (B) **Ionic solid** is **soluble** in **water** if $\Delta H_{hyd} > \Delta H_{latt}$.

Q.33 (B) The number of moles of solute in 1000g (1kg) of solvent is called molality. The **symbol** for molality is **"m"**.

$$\text{Molality (m)} = \frac{\text{Mass of solute}}{\text{Molar mass of solute}} \times \frac{1}{\text{Mass of solvent in kg}}$$

Q.34 (A) For determining the **molecular mass** of the **polymers (macromolecules), osmotic pressure** is preferred over other **methods** as the **pressure measurement** is around the **room temperature.** Its mainly because **biomolecules** are **not stable** at **higher temperatures** and the polymers have poor solubility.

Q.35 (A) **Paint** is an example of solution in which solute is in the solid state while solvent is in the liquid state.

Q.36 (A) **For example phenol** and **water** are partially **miscible** liquids. **At 25°C** the upper layer is **5%** solution of **phenol in water** and the **lower layer** is **30% water** in **phenol. These two solutions** are conjugate solution to **each other.** When the temperature of **water phenol** system is **increased,** the compositions of **both layer change. Water starts travelling from upper** to the **lower layer** and **phenol travels** from **lower** to the **upper layer.** When the temperature of this system approaches **65.9°C,** a homogeneous mixture of **two components** is **obtained.** This homogenous **mixture contains 34% phenol and 66% water.** The temperature of **65.9°C** at which two conjugate solutions merge into **one another,** is **called critical solution temperature or upper consulate temperature.**

Q.37 (A)

$$W_2 = \frac{\text{m} \times \text{molarmass of solute} \times \text{mass of solvent}}{1000}$$

$$= \frac{0.2 \times 60 \times 100}{1000} = 1.2 \text{ g}$$

$\therefore$ **the amount of urea dissolved = 1.2g.**

Q.38 (C) $\text{ppm} = \frac{\text{mass of solute}}{\text{mass of solution}} \times 10^6$

$$= \frac{0.5}{100} \times 10^6 = \frac{5}{1000} \times 10^6 = 5 \times 10^3$$

$\therefore$ **Concentration of fluoride in ppm = 5×10^3**

Q.39 (A)

Glucose		Water
$\frac{18}{180}$		$\frac{90}{18}$
0.1	**:**	**5.0**

$n_t = 0.1 + 5.0 = 5.1$

∴ **relative lowering of vapour pressure of glucose solution**

$$\frac{\Delta p}{p^o} = x_2 = \frac{n_2}{n_1 + n_2} = \frac{0.1}{5.1} = \frac{1}{51}$$

Striking Information

In chemistry, the **mole fraction** or **molar fraction** (x_i) is defined as the amount of a constituent (expressed in moles), n_i, divided by the total amount of all constituents in a mixture (also expressed in moles), n_{tot}.

The sum of all the mole fractions is equal to 1:

$$\sum_{i=1}^{N} n_i = n_{tot}; \sum_{i=1}^{N} x_i = 1$$

Q.40 (A) $M_2 = \frac{p}{\Delta p} \times \frac{W_2 M_1}{W_1}$

$$M_2 = \frac{120}{5} \times \frac{20 \times 80}{300} = 128g$$

Molar mass of solute = 128g

Q.41 (C) **Colloidal system** or **colloidal** dispersion is a heterogeneous **system** which is made up of dispersed phase and dispersion medium. In **colloidal** dispersion one substance is dispersed as very fine particles in another substance called dispersion medium.

Q.42 (C) **Solvent loving** colloids are called **lyophilic collides.**

Q.43 (A) **Peptization** is the process responsible for the formation of stable dispersion of colloidal particles in dispersion medium. In other words, it may be **defined** as a process of converting a precipitate into colloidal sol by shaking it with dispersion medium in the presence of small amount of electrolyte.

Q.44 (B) **A colloidal solution of $Fe(OH)_3$ in water is a hydrophobic colloid. A hydrophobic colloid**, or emulsion, is **defined** as a **colloid** system where the **colloid** particles are hydrophobic particle. **Hydrophobic colloids** do not interact with water, so they are inherently unstable and generally do not form spontaneously.

Q.45 (C) **The statement about suspension colloidal solution and true solution are as:**

- Suspension is heterogeneous
- Colloidal solution is heterogeneous
- True solution is homogenous

Q.46 (D) **The addition of alcohol to a saturated aqueous solution of calcium acetate first forms a sol and then sets to a gelatinous mass called solid alcohol which is a gel. Gels are a dispersion of molecules of a liquid within a solid in which the solid is the continuous phase and the liquid is the discontinuous phase. The word gel was coined by 19th-century Scottish chemist Thomas Graham.**

Q.47 (D) **It is incorrect statement. In fact, Marbles is a example of solid sol (in which dispersion medium is in the solid state), while in blood, paint and cell fluid the dispersion medium is in the liquid state.**

Q.48 (A) The colloidal solution of **gold** prepared by **different methods** have **different colours due** to **difference** in the **size of colloidal particles.**

Q.49 (B) **Acetone is not sol which is mentioned in the form of acylosol.**

Q.50 (A) **The amount of solute present in a fixed amount of solvent or solution is called concentration of solution.**

Q.51 (B) Cheese is a example of colloidal solution in which **dispersion medium (D.M)** is in the solid state while water contents are in the **dispersed phase (D.P).**

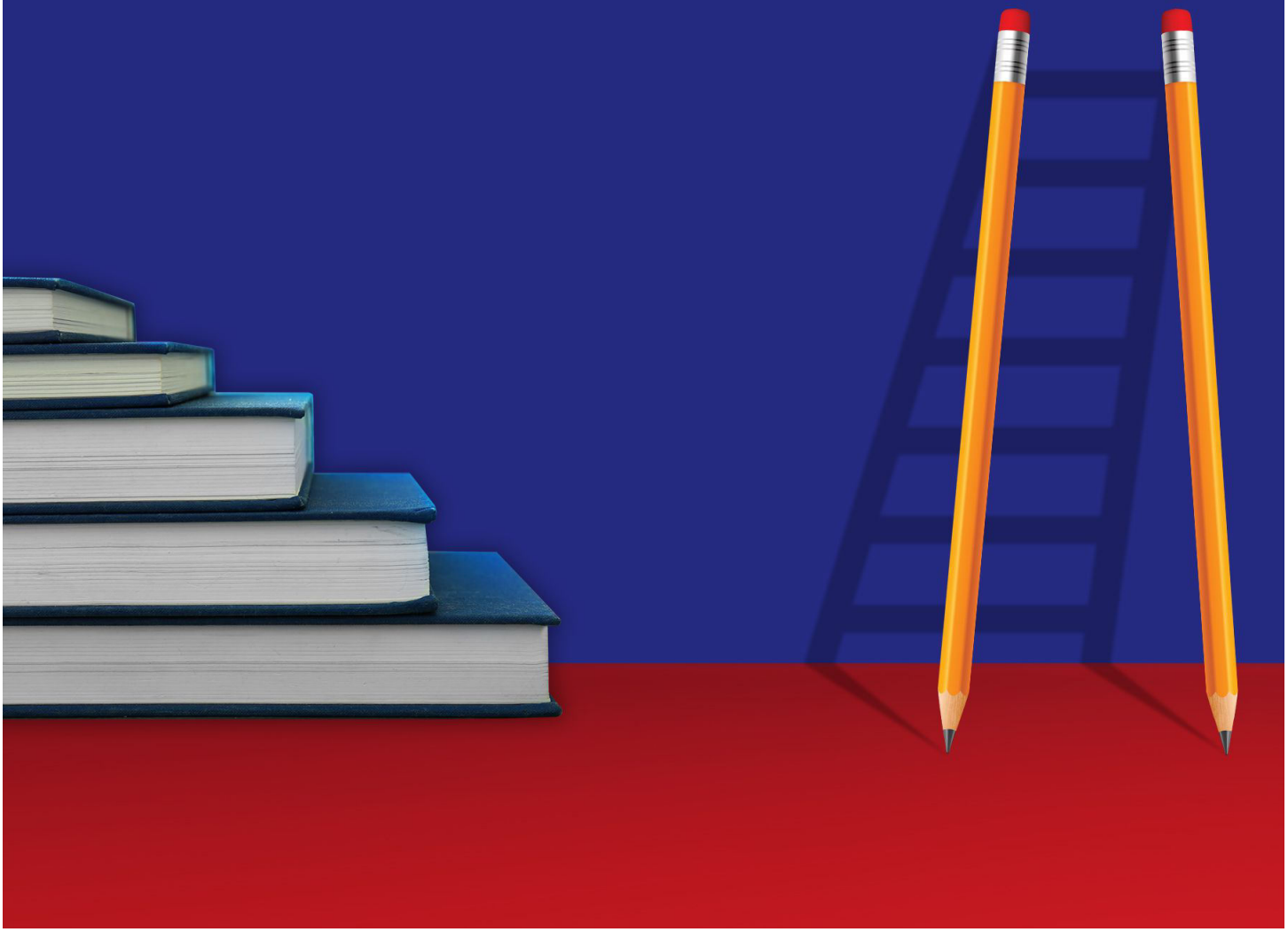
Opt.	DP States	DM States	Colloidal name	Example
A)	Solid	Liquid	Sols	Muddy water
B)	Liquid	Solid	Gels	Cheese
C)	Liquid	Liquid	Emulsion	Blood
D)	Liquid	Gas	Aerosol of liquid	Fog

Colloidal solution can be classified on the basis of:

- **Dispersion medium.**
- **Nature of charge.**
- **Affinity of D.P for D.M.**
- **Physical state of D.P and D.M.**

Note:

- **D.P stands for internal phase or dispersion phase.**
- **D.M stands for dispersion medium.**

STEP

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