Q1 2021 (01 Sep Shift 2)

Match List –I with List –II.

List -I (Colloid Preparation Method)		List -II (Chemical Reaction)	
(a)	Hydrolysis	(i)	$2AuCl_3 + 3HCHO + 3H_2O \rightarrow 2Au(sol) + 3HCOOH + 6HCl$
(b)	Reduction	(ii)	$As_2O_3 + 3H_2S \rightarrow As_2S_3(sol) + 3H_2O$
(c)	Oxidation	(iii)	$SO_2 + 2H_2S \rightarrow 3S(sol) + 2H_2O$
(d)	Double Decomposition	(iv)	$FeCl_3 + 3H_2O \rightarrow Fe(OH)_3(sol) + 3HCl$

Choose the most appropriate answer from the options given below.

(1) (a)-(i), (b)-(iii), (c)-(ii), (d)-(iv)

(2) (a)-(iv), (b)-(i), (c)-(iii), (d)-(ii)

(3) (a)-(iv), (b)-(ii), (c)-(iii), (d)-(i)

(4) (a)-(i), (b)-(ii), (c)-(iv), (d)-(iii)

Q2 2021 (31 Aug Shift 2)

CH_4 is adsorbed on 1 g charcoal at $0^\circ C$ following the Freundlich adsorption isotherm. 10.0 mL of CH_4 is adsorbed at 100 mm of Hg, whereas 15.0 mL is adsorbed at 200 mm of Hg. The volume of CH_4 adsorbed at 300 mm of Hg is 10^x mL. The value of x is ____ $\times 10^{-2}$.

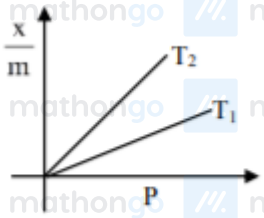
(Nearest integer)

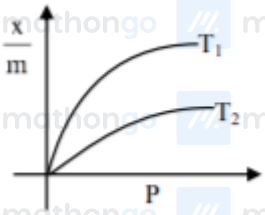
[Use $\log_{10} 2 = 0.3010, \log_{10} 3 = 0.4771$]

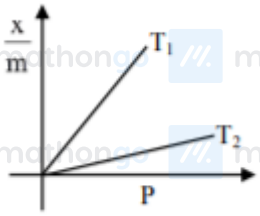
Q3 2021 (31 Aug Shift 1)

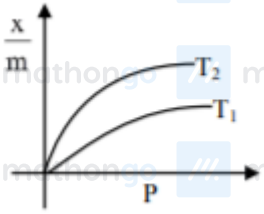
Select the graph that correctly describes the adsorption isotherms at two temperatures T_1 and T_2 $(T_1 > T_2)$ for a gas :

(x– mass of the gas adsorbed ; m– mass of adsorbent ; P - pressure)

(1) 

(2) 

(3) 

(4) 

Q4 2021 (27 Aug Shift 2)

Lyophilic sols are more stable than lyophobic sols because :

(1) there is a strong electrostatic repulsion between the negatively charged colloidal particles.

(2) the colloidal particles have positive charge.

(3) the colloidal particles have no charge.

(4) the colloidal particles are solvated.

Q5 2021 (27 Aug Shift 1)

Tyndall effect is more effectively shown by:

(1) true solution

(2) lyophilic colloid

(3) lyophobic colloid

(4) suspension

Q6 2021 (26 Aug Shift 2)

The sol given below with negatively charged colloidal particles is :

(1) $FeCl_3$ added to hot water

(2) KI added to $AgNO_3$ solution

(3) $AgNO_3$ added to KI solution

(4) $Al_2O_3 \cdot xH_2O$ in water

Q7 2021 (26 Aug Shift 1)

Which one of the following is correct for the adsorption of a gas at a given temperature on a solid surface?

(1) $\Delta H > 0, \Delta S > 0$

(2) $\Delta H > 0, \Delta S < 0$

(3) $\Delta H < 0, \Delta S < 0$

(4) $\Delta H < 0, \Delta S > 0$

Answer Key

Q1 (2) **Q2** (128) **Q3** (4) **Q4** (4)

Q5 (3) **Q6** (3) **Q7** (3)

Q1 (2)

According to type of reactions for preparation, colloids have been classified.

Q2 (128)

We know

$\frac{x}{m} = KP^{1/n}$; using $(x \propto V)$

$\Rightarrow \quad \frac{10}{1} = K \times (100)^{1/n}$ ...(1)

$\frac{15}{1} = K \times (200)^{1/n}$ ...(2)

$\frac{V}{1} = K \times (300)^{1/n}$ ...(3)

Divide

(2) / (1)

$\frac{15}{10} = 2^{1/n}$

$\log\left(\frac{3}{2}\right) = \frac{1}{n}\log 2$

$\frac{1}{n} = \frac{\log 3 - \log 2}{\log 2} = \frac{0.4771 - 0.3010}{0.3010}$

$\frac{1}{n} = 0.585$

Divide

(3) / (1)

$\frac{V}{10} = 3^{1/n}$

$\log\left(\frac{V}{10}\right) = \frac{1}{n}\log 3$

$\log\left(\frac{V}{10}\right) = 0.585 \times 0.4771 = 0.2791$

$\frac{V}{10} = 10^{0.279} \Rightarrow V = 10 \times 10^{0.279}$

$\Rightarrow V = 10^{1.279} = 10^{x}$

$\Rightarrow x = 1.279$

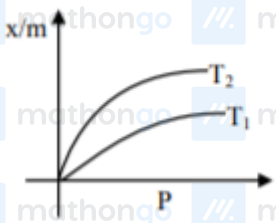
$\Rightarrow x = 128 \times 10^{-2}$ (Nearest integer)

Q3 (4)

$\frac{x}{m} \alpha P^{1/n} \left(0 < \frac{1}{n} < 1\right)$

On Increasing temperature $\frac{x}{m}$ decreases.

$\because$ adsorption is generally exothermic



$(T_1 > T_2)$

Q4 (4)

In the lyophilic colloids, the colloidal particles are extensively solvated.

Q5 (3)

Tyndall effect is observed in lyophobic colloids.

Q6 (3)

$AgNO_3$ added to KI solution

Q7 (3)

(i) Adsorption of gas at metal surface is an exothermic process so $\Delta H < 0$

(ii) As the adsorption of gas on metal surface reduces the free movement of gas molecules thus restricting its randomness hences $\Delta S < 0$