



SHIFT - 1

QUESTIONS & SOLUTIONS

Reproduced from Memory Retention

 31 JANUARY, 2023

 9:00 AM to 12:00 Noon

Duration : 3 Hours

Maximum Marks : 300

SUBJECT - CHEMISTRY

RESULT JEE ADVANCED 2022

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**MAYANK
MOTWANI**

Roll No. : 20771637
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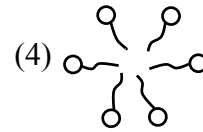
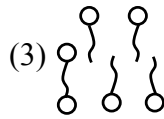
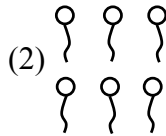
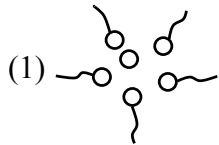
**One Year Classroom Course
for Complete
JEE (Main+Adv) Syllabus**

STARTING FROM :

15 & 29 MARCH'23

CHEMISTRY

1. In a nonpolar solvent arrangement of micelle can be shown by which of the following



Ans. (1)

(Surface chemistry)

2. Match the column

Shapes

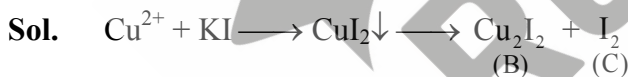
- | | |
|---------------------|-------------------|
| (A) NH_4^+ | (P) Square planar |
| (B) XeF_4 | (Q) See-saw |
| (C) SF_4 | (R) Tetrahedral |
| (D) BrCl_3 | (S) T-shape |

(Chemical Bonding)

- Sol. NH_4^+ : Tetrahedral
 XeF_4 : Square planar
 SF_4 : See-saw
 BrCl_3 : T-shape

3. $\text{Cu}^{2+} + \text{KI} \longrightarrow \text{A} \longrightarrow \text{B} + \text{C}$
 B & C are:

(d-Block Elements)



4. Which transition in hydrogen atom will have the same wavelength as $4 \rightarrow 2$ transition in He^+ ion spectrum?

Ans. $2 \rightarrow 1$

(Atomic Structure)

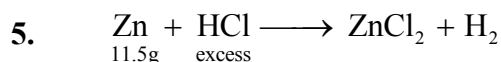
Sol. $\frac{Z_1}{Z_2} = \frac{n_1}{n_3} = \frac{n_2}{n_4}$

for He^+	$Z_1 = 2$	$n_1 = 2$	$n_2 = 4$
H	$Z_2 = 1$	$n_3 = ?$	$n_4 = ?$

$$\frac{2}{1} = \frac{2}{n_3} = \frac{4}{n_4}$$

$n_3 = 1$

$n_4 = 2$



Find volume of H_2 at STP

$$V_m \text{ at STP} = 22.7\text{L},$$

Atomic mass of Zn = 64.5

Ans. 4.047 L

(Mole Concept)



$$\text{Mole of Zn} = \frac{11.5}{64.5}$$

$$\text{Mole of H}_2 = \frac{11.5}{64.5} \text{ mole}$$

$$\begin{aligned} \text{Volume of H}_2 \text{ at STP} &= \frac{11.5}{64.5} \times 22.7 \\ &= 4.047 \text{ L} \end{aligned}$$

6. Oxidation state of phosphorus in Hypophosphoric acid is _____.

Ans. +4

(Chemical Bonding)

Sol. Hypophosphoric acid: $\text{H}_4\text{P}_2\text{O}_6$

O.S. of P \Rightarrow +4

7. Which of the following is/are not a method of concentration of ore?

- (a) Hydraulic washing
- (b) Froth Floatation
- (c) Electrolysis
- (d) Leaching
- (e) Liquefaction

(Metallurgy)

Sol. Except electrolysis and liquefaction all other are methods of concentration of ore.

8. Lead storage battery contains 38% H_2SO_4 by mass, then find the temperature at which liquid of battery will freeze? ($i = 2.67$, K_f of water = 1.86 k/kg/mole).

Ans. -31.05°C

(Solution & Colligative properties)

Sol. $\Delta T_f = i \times K_f \times m$

$$= 2.67 \times 1.86 \times \frac{38}{98} \times \frac{1000}{62}$$

$$= 31.05^\circ\text{C}$$

$$\Delta T_f = (T_f)_{\text{solvent}} - (T_f)_{\text{solution}}$$

$$31.05 = 0 - (T_f)_{\text{solution}}$$

$$(T_f)_{\text{solution}} = -31.05^\circ\text{C}$$

9. 0.6g x gas (MW = 20g) and 0.45g y gas (MW = 45g) are mix together in non-reacting mixture. If total pressure is 740 mm of Hg, then calculate partial pressure of x gas in mixture.

Ans. 555

(Solution & Colligative properties)

Sol. $n_x = \frac{0.6}{20} = 0.03 \text{ mole}$

$$n_y = \frac{0.45}{45} = 0.01 \text{ mole}$$

$$\text{Total mole} = 0.03 + 0.01 = 0.04 \text{ mole}$$

$$P_x = \frac{n_x}{n_{\text{total}}} \times 740$$

$$= \frac{0.03}{.04} \times 740$$

$$= \frac{3}{4} \times 740$$

$$= 555$$

10. V_2O_5 , V_2O_3 , V_2O_4 basicity order :

Ans. $V_2O_5 < V_2O_4 < V_2O_3$ (basic strength)

(Chemical Bonding)

Sol. $V_2O_5 > V_2O_4 > V_2O_3$

As oxidation number increasing acidic strength increases.

11. The electronic configuration of Nd^{2+} is given as :

(1) $4f^2$ (2) $4f^3$ (3) $4f^4$ (4) $4f^5$

Ans. (3)

(d- & f-Block Elements)

Sol. Neodymium for Nd^{2+} ($Z = 60$) : $[Xe]4f^4$
as Nd : $[Xe]4f^4 6s^2$

12. 2.56 g of a non-electrolyte solute is dissolved in one litre of a solution, it has osmotic pressure equal to 4 bar at 300 K temperature. Then find the molar mass of the compound.

Given $R = 0.083 \text{ bar}$, round off to the nearest integer.

Ans. 16 gm/mole

(Solution & Colligative properties)

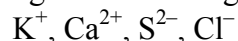
Sol. $\pi = iCST$

$$4 = 1 \times \frac{2.56}{M} \times 0.083 \times 300$$

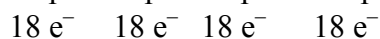
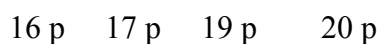
$$M = \frac{2.56 \times 0.083 \times 300}{4}$$

$$= 15.936 \approx 16 \text{ gm/mole}$$

13. Arrange the following isoelectronic species in order of their radius :



(Periodic Table)



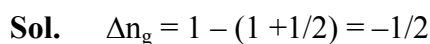
14. $SO_2(g) + \frac{1}{2}O_2(g) \rightleftharpoons SO_3(g)$, $T = 27^\circ C$

If $K_C = 5 \times 10^{-12}$ and $K_P = x \times 10^{-12}$, then find out value of x.

$$\left(R = \frac{1}{12} \text{ atm litre mole}^{-1} \text{K}^{-1} \right)$$

Ans. 1

(Chemical Equilibrium)



$$K_P = K_C (RT)^{\Delta n_g}$$

$$x \times 10^{-12} = 5 \times 10^{-12} \times \left(\frac{1}{12} \times 300 \right)^{-1/2} = 5 \times 10^{-12} \times \left(\frac{1}{5} \right)$$

$$x = 1$$

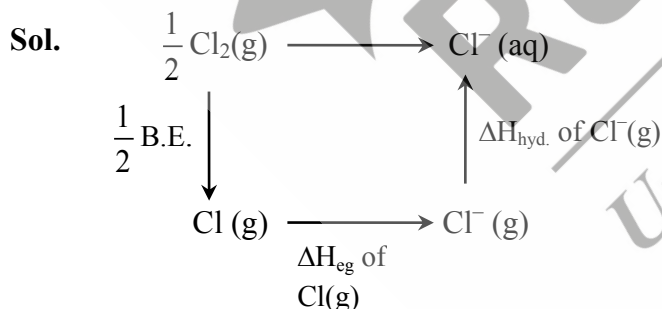
15. Determine ΔH_r° for $\frac{1}{2}Cl_2(g) \longrightarrow Cl^-(aq)$

Given Bond enthalpy of Cl-Cl = 240 kJ/mole

Electron gain enthalpy of Cl(g) = -350 kJ/mole

Hydration enthalpy of $Cl^-(g)$ = -360 kJ/mole

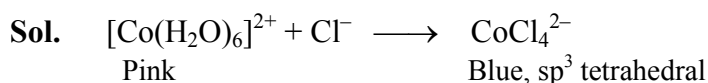
(Thermochemistry)



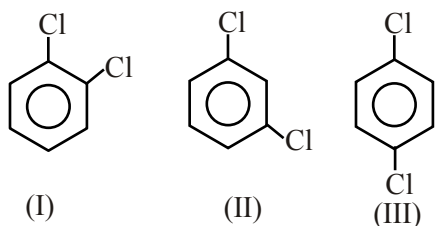
$$\Delta H_r^\circ = \frac{1}{2} \times 240 + (-350) + (-360) = -590 \text{ kJ/mole}$$

16. A compound of Co^{2+} on dissolution in water gives pink coloured octahedral compound (X), which on reaction with Cl^- gives blue coloured compound (Y) of shape 'Z'. X, Y & Z are

(Coordination Compounds)

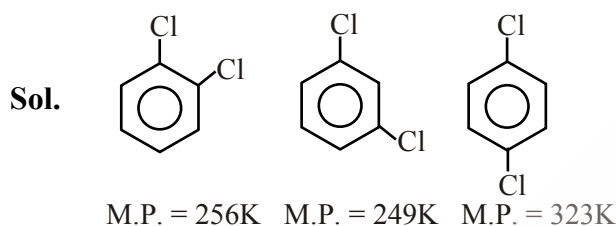


17. The correct order of melting point of following compound is [Haloalkanes & Haloarene]

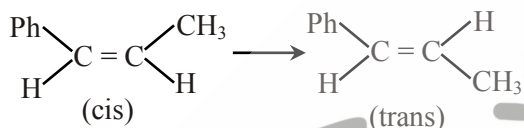


- (1) I > II > III (2) III > I > II
(3) III > II > I (4) I > II > III

Ans. (2)



18. Choose correct option for following conversion [Haloalkanes & Haloarene Part-2]



- (1) Br₂/CCl₄, alc. KOH followed by NaNH₂/Δ, Na/NH₃(ℓ)
(2) Br₂/CCl₄, alc. KOH followed by NaNH₂/Δ, H₂/Pd-BaSO₄
(3) Br₂/CCl₄, Na/NH₃(ℓ), H₂/Pd-BaSO₄
(4) Br₂/CCl₄, alc. KOH/Δ, H₂/Pd-BaSO₄

Ans. (1)

19. Which artificial sugar have highest sweetness value in comparison to cane sugar ?

[Chemistry in every day life]

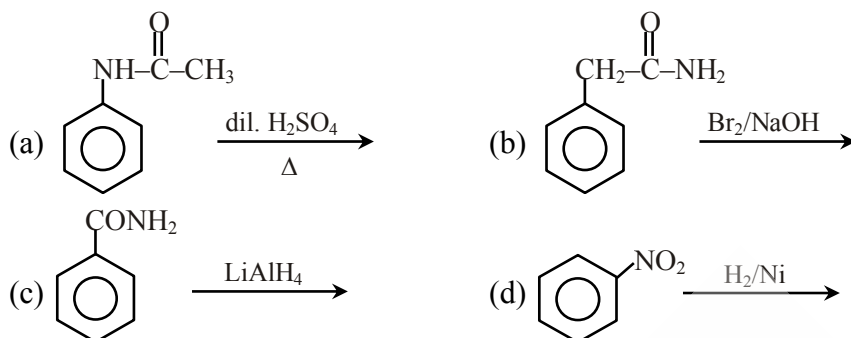
- (1) Aspartame (2) Saccharin (3) Sucralose (4) Alitame

Ans. (4)

Artificial sweetener	Sweetness value in comparison to cane sugar
Aspartame	100
Saccharin	550
Sucralose	600
Alitame	2000

20. In how many of the following reactions aromatic amine is formed?

[Aromatic compounds]



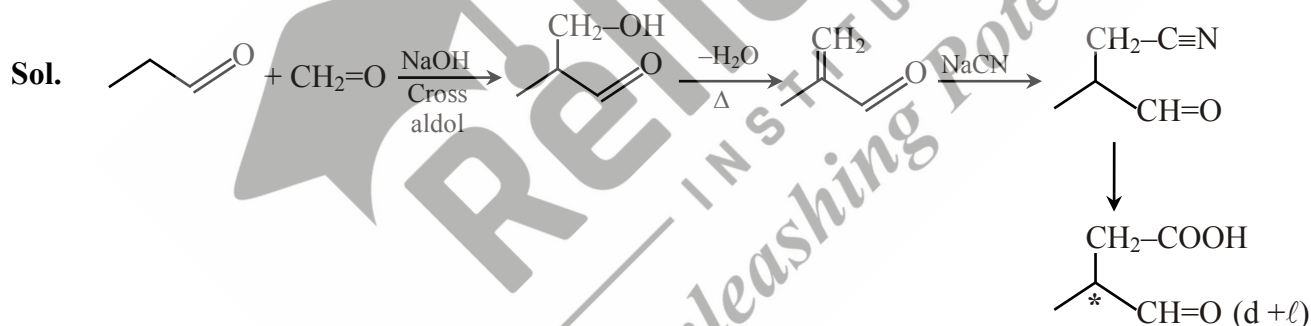
Ans. (2)

21. Propanal + Methanal $\xrightarrow{\text{NaOH}}$ $\xrightarrow{\Delta}$ $\xrightarrow{\text{NaCN}}$ $\xrightarrow{\text{H}_3\text{O}^+}$ Final product

[Aldehydes and ketones]

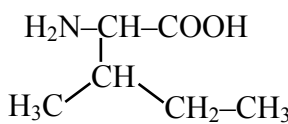
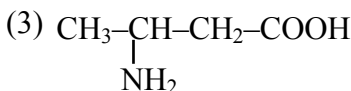
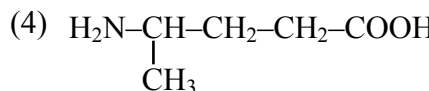
- (1) Final product is optically active.
- (2) Final product is racemic mixture and releases gas with NaHCO_3 .
- (3) Final product is racemic mixture and gives ppt with Lucas reagent.
- (4) Final product is achiral.

Ans. (2)



22. A protein with molecular mass 70000 u on hydrolysis gives amino acids. Which amino acid will be obtained from the followings ?

[Biomolecules]

- (1) $\text{H}_2\text{N}-\text{CH}_2-\text{CH}_2-\text{CH}_2-\text{CH}_2-\text{COOH}$
- (2) 
- (3) 
- (4) 

Ans. (2)

Sol. Only one of the given amino acids is α -amino acid.

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