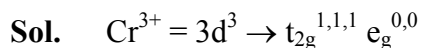


CHEMISTRY

1. Find the ratio of spin magnetic moment for complexes $[\text{Cr}(\text{CN})_6]^{3-}$ & $[\text{Cr}(\text{H}_2\text{O})_6]^{3+}$

Ans. 1



both complex has 3 unpaired electron.

2. 250 g solution containing 25% sugar and 500 g solution containing 40% sugar are mixed. Find the mass percentage of sugar in the resulting solution.

Ans. 35%

Sol. Total mass of solution = 750 g

$$\text{Total mass of sugar} = 250 \times \frac{25}{100} + 500 \times \frac{40}{100}$$

$$= \frac{250}{4} + 200$$

$$= 262.5 \text{ g}$$

$$\text{Mass \% of sugar} = \frac{262.5}{750} \times 100 = 35\%$$

3. Correct order of first ionisation energy for second period elements :

Li, Be, B, C, N, O, F

Sol. $\text{Li} < \text{B} < \text{Be} < \text{C} < \text{O} < \text{N} < \text{F}$

4. In a container at a constant temperature arrange the following gases in increasing order of RMS velocity?

Ne, Cl_2 , UF_6

(1) $\text{UF}_6 < \text{Cl}_2 < \text{Ne}$ (2) $\text{UF}_6 < \text{Ne} < \text{Cl}_2$ (3) $\text{UF}_6 > \text{Cl}_2 > \text{Ne}$ (4) $\text{Ne} < \text{UF}_6 < \text{Cl}_2$

Ans. (1)

Sol. $V_{\text{rms}} = \sqrt{\frac{3RT}{M}}$

$$V_{\text{rms}} \Rightarrow \text{UF}_6 < \text{Cl}_2 < \text{Ne}$$

5. Match the following species with their shapes :

(a) ClO_2^-

(p) Linear

- (b) N_3^- (q) Tetrahedral
 (c) NH_4^+ (r) Bent
 (d) SF_4 (s) See-saw

- | | a | b | c | d |
|-----|---|---|---|---|
| (1) | r | p | q | s |
| (2) | p | q | r | s |
| (3) | r | s | p | q |
| (4) | s | q | r | p |

Ans. (1)



6. Which of the following set contains ambidentate ligands

- (1) Cl^- , Br^- , CN^- (2) Cl^- , OCN^- , NO_2^-
 (3) Ox^{2-} , NO_2^- , F^- (4) OH^- , CN^- , NH_3

Ans. (2)

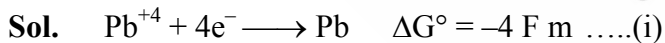
Sol. CN^- , OCN^- and NO_2^- are ambidentate ligand.

7. Given $E_{\text{Pb}^{4+}|\text{Pb}}^\circ = m$
 $E_{\text{Pb}^{2+}|\text{Pb}}^\circ = n$

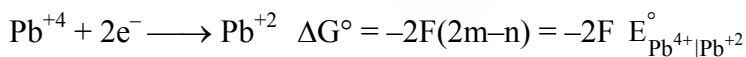
The value of $E_{\text{Pb}^{4+}|\text{Pb}^{2+}}^\circ$ is _____.

- (1) $2m - n$ (2) $2m + n$ (3) $2n - m$ (4) $2m + n$

Ans. (1)



on subtraction



$\Rightarrow E_{\text{Pb}^{4+}|\text{Pb}^{2+}}^\circ = 2m - n$

8. 0.01 molar aqueous solution of glucose is isotonic with 0.008M aqueous solution of K_2SO_4 . Calculate degree of ionisation of K_2SO_4 .

Ans. 0.125

Sol. $\Pi_{\text{glucose}} = \Pi_{\text{K}_2\text{SO}_4}$

$$0.01 = i \times 0.008$$

$$i = \frac{0.01}{0.008}$$

$$i = \frac{5}{4} = 1.25$$

$$i = 1 + \alpha(3 - 1)$$

$$1.25 = 1 + 2\alpha$$

$$2\alpha = 0.25$$

$$\alpha = \frac{0.25}{2} = 0.125$$

9. Correct statement regarding GaAlCl_4 .

(1) EN of Ga is greater than Al

(2) Oxidation number of Ga is +3

(3) Ga is co-ordinated with chlorine

(4) Cl is making bond with Ga and Al

Ans. (1)

Sol. $\text{Ga}^+[\text{AlCl}_4]$

Oxidation no. of Ga = +1

10. When a photon of wavelength ' λ ' strikes on a metal, the ejected photoelectron has stopping potential = V_0 volt. When another photon of wavelength ' 2λ ' strikes on same metal, the ejected photoelectron has stopping potential of ' $\frac{V_0}{4}$ ' volt. The threshold wavelength (λ_0) is

(1) λ

(2) 2λ

(3) 3λ

(4) 4λ

Ans. (3)

Sol. $\frac{hc}{\lambda} - \frac{hc}{\lambda_0} = eV_0$ (1)

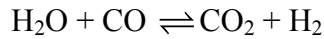
$$\frac{hc}{2\lambda} - \frac{hc}{\lambda_0} = \frac{eV_0}{4}$$
(2)

$$\Rightarrow \frac{\lambda_0 - \lambda}{2\lambda\lambda_0} = 4 \qquad \Rightarrow \frac{\lambda_0 - \lambda}{\lambda_0 - 2\lambda} = 2$$

$$\Rightarrow \lambda_0 - \lambda = 2\lambda_0 - 4\lambda \qquad \Rightarrow \lambda_0 = 3\lambda$$

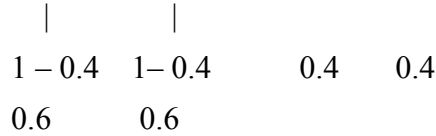
11. 1 mole each of H_2O and CO react to form CO_2 and H_2 if 40% by weight of H_2O react.

K_C for reaction



is $x \times 10^{-2}$ find x.

Ans. 44.4

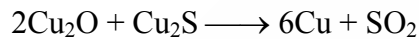
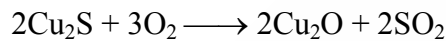


$$K_C = \frac{0.4 \times 0.4}{0.6 \times 0.6}$$

$$= \frac{4}{9}$$

$$= 44.4 \times 10^{-2}$$

12. Which type of copper is formed by the following reactions ?



(1) Blister copper

(2) Copper crisp

(3) Reduced copper

(4) Copper slag

Ans. (1)

Sol. Blister copper is obtained after self-reduction of copper ore.

13. Find the number of atoms per unit cell if edge length is 408 pm, density = 3 g/cm³, molar mass = 40 g. (nearest integer)

Ans. 3

Sol.
$$d = \frac{Z \times 40}{6 \times 10^{23} \times (4.08)^3 \times 10^{-24}}$$

$$3 = \frac{Z \times 40}{6 \times 10^{23} \times 67.92 \times 10^{-24}}$$

$$Z = \frac{3 \times 6 \times 10^{23} \times 67.92 \times 10^{-24}}{40}$$

$$Z = \frac{3 \times 6 \times 67.92}{400}$$

$$Z = 3$$

14. To 25 ml of 1M AgNO₃, 1.05M KI is added dropwise. In the colloidal solution formed fixed and diffused larger consist of respectively.

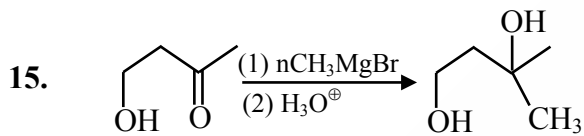
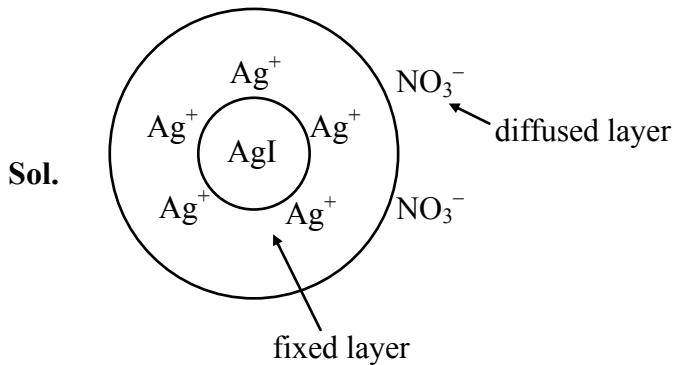
(1) Γ^- and NO_3^-

(2) Ag^+ and NO_3^-

(3) Ag^+ and K^+

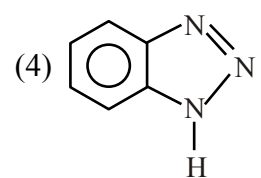
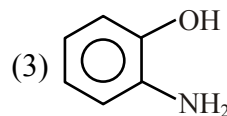
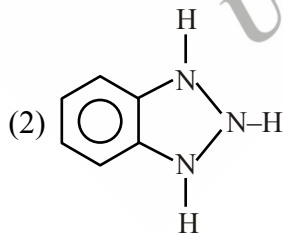
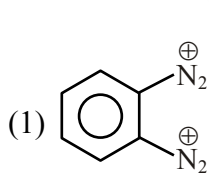
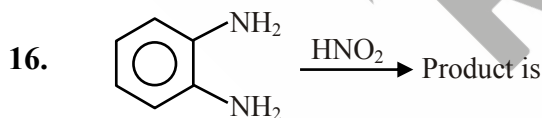
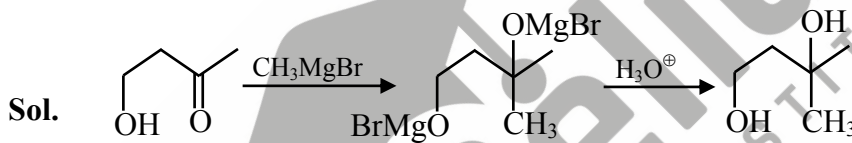
(4) K^+ and Ag^+

Ans. 2

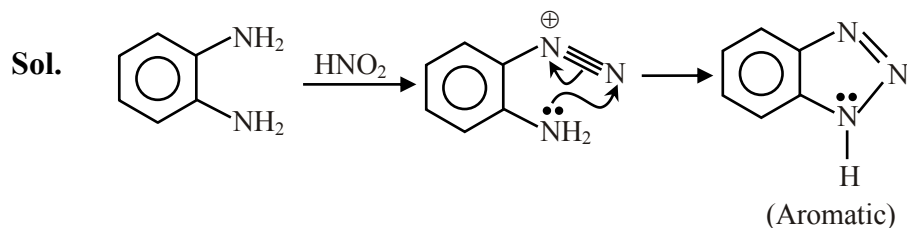


How many moles of CH_3MgBr are used ?

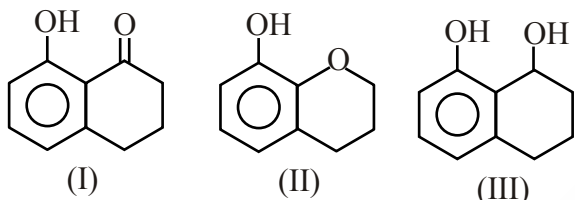
Ans. 2



Ans. (4)



17. The increasing order of electrophilic aromatic substitution reaction is



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

Ans. (2)

Sol. Rate of electrophilic substitution reaction \propto stability of σ -complex
 \propto +I and +m group on benzene ring.

18. Statement-I : If BOD of water body is 4 ppm is a good quality drinking

Statement-II : If Zn and NO_3^- concentration is 5ppm. It is a good quality of drinking water.

- (1) Both Statement-I and Statement-II are correct.
(2) Both Statement-I and Statement-II are incorrect.
(3) Statement-I is correct but Statement-II is incorrect.
(4) Statement-I is incorrect but Statement-II is correct.

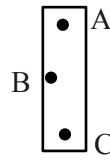
Ans. (1)

19. Which of the following polymer formation is catalysed by $\text{AlEt}_3 + \text{TiCl}_4$?

- (1) Low density polythene (LDPE)
(2) High density polythene consists of linear molecules
(3) Cross linked polymers of phenol & formaldehyde.
(4)

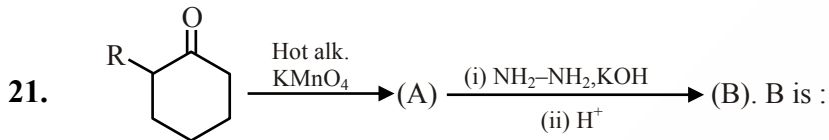
Ans. (2)

20. In given chromatograph what is the correct increasing order of eluting power



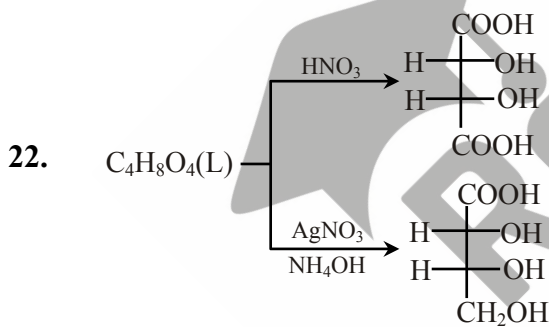
- (1) $C < B < A$ (2) $B < C < A$ (3) $C < A < B$ (4) $A < C < B$

Ans. (1)



- (1) (2)
 (3) (4)

Ans. (4)

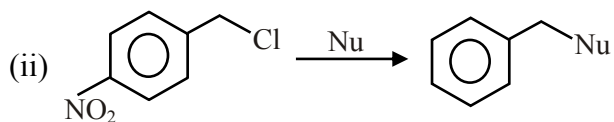
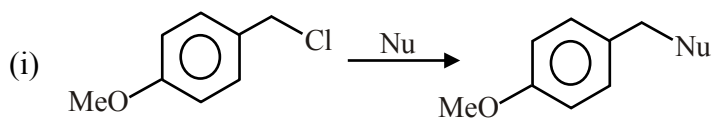


Compound (L) is :

- (1) (2) (3)

Ans. (2)

23. Correct option for the given reactions



(1) (i) 1st order (ii) 2nd order

(2) (i) 2nd order (ii) 1st order

(3) (i) and (ii) are 1st order

(4) (i) & (ii) are 2nd order

Ans. (1)



SATYAM CHAKRAVORTY

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