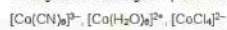


1. Arrange the following complex in increasing order of intensity of colour.



Sol. (1)

| | Complex | Colour |
|----|--|--------|
| 1. | $[\text{Co}(\text{CN})_6]^{3-}$ | Yellow |
| 2. | $[\text{Co}(\text{H}_2\text{O})_6]^{2+}$ | Pink |
| 3. | $[\text{CoCl}_4]^{2-}$ | Blue |

2. Which of the following does not disproportionate



Ans. (4)

Sol. In BrO_4^- , Br is in maximum oxidation state. So it can only reduce

3. A metal M on reaction with excess oxygen give MO_2 type oxide (as main product) then possible metal is.

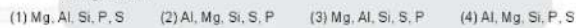
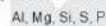


Ans. (3)

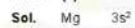


Potassium on reaction with excess oxygen give superoxide

4. Identify the correct increasing order of 1st ionisation energy of following



Ans. (2)



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5. Four moles of a diatomic gas is heated from 0°C to 50°C, find the heat supplied to the gas if work done by it is zero.

- (1) 780 R (2) 500 R (3) 100 R (4) 650 R

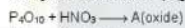
Ans. (2)

Sol. $w = 0$

$$\Delta E = q_v = nC_v\Delta T$$

$$4 \times \frac{5R}{2} \times 50 = 500 R$$

6. HNO_3 on reaction with P_4O_{10} gives an oxide 'A'



Nature of oxide A is

- (1) acidic (2) Basic (3) Neutral (4) Amphoteric

Sol. $\text{P}_4\text{O}_{10} + 4\text{HNO}_3 \rightarrow 2\text{N}_2\text{O}_5 + 4\text{HPO}_3$

'A'

Nature of oxide 'A' is 'acidic'.

7. An equimolar mixture of benzene ($P^{\circ}_{\text{Benzene}} = 70$ torr) and methyl benzene ($P^{\circ}_{\text{Methyl Benzene}} = 20$ torr) is prepared, then find mole fraction of benzene in vapour phase.

Ans. 0.7

Sol. $P_{\text{Total}} = P^{\circ}_{\text{Benzene}} \times X_{\text{Benzene}} + P^{\circ}_{\text{Toluene}} \times X_{\text{Toluene}}$

$$= (70) \frac{1}{2} + (20) \frac{1}{2}$$

$$= 35 + 10$$

$$= 45$$

$$\frac{1}{P_{\text{Total}}} = \frac{Y_{\text{Benzene}}}{P^{\circ}_{\text{Benzene}}} + \frac{Y_{\text{Toluene}}}{P^{\circ}_{\text{Toluene}}}$$

$$\frac{1}{45} = \frac{Y_{\text{Benzene}}}{70} + \frac{1 - Y_{\text{Benzene}}}{20}$$

$$\frac{1}{45} = \frac{2Y_{\text{Benzene}} + 7(1 - Y_{\text{Benzene}})}{140}$$

$$\frac{1}{45} = \frac{2Y_{\text{Benzene}} + 7 - 7Y_{\text{Benzene}}}{140}$$

$$\frac{1}{45} = \frac{7 - 5Y_{\text{Benzene}}}{140}$$

8. Find total number of lone pair of electron on central atom in I_3^-

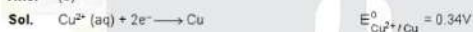
Ans. 3



Total lone pair on central atom = 3.

9. Which of the following have positive electrode potential for reaction $M^{2+}(aq) + 2e^- \rightarrow M$.
(1) Co (2) Ni (3) Cu (4) Zn

Ans. (3)



10. Which of the following is most easily economically refined by Fractional distillation.
(1) Zn (2) Ni (3) Cu (4) Fe

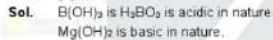
Ans. (1)

Sol. "Theory Based"

Fractional distillation process utilizes the boiling point difference between metal and that of impurity. Using this process, crude zinc containing Cd, Fe and Pb as impurities can be refined.

11. Among the following pairs which is incorrect regarding similarity in properties.
(1) $Be(OH)_2$, $Al(OH)_3$ (2) $NaOH$, $Ca(OH)_2$ (3) $B(OH)_3$, H_3PO_4 (4) $B(OH)_3$, $Mg(OH)_2$

Ans. (4)



12. **Statement-1** : Dihedral angle of H_2O_2 in gas is around 90° .
Statement-2 : Dihedral angle of H_2O_2 in solid is around 111.5° .
are the statements true or false.
(1) True, True (2) True, False (3) False, True (4) False, False

Ans. (4)



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13. 4.5 gram mass of a substance [molar mass = 90 g/mol] is dissolved in 250 ml solution, then molarity of solution is -

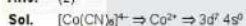
Ans. 0.2

Sol. Molarity (M) = $\frac{W_{\text{substance}} \times 1000}{\text{GMM}_{\text{substance}} \times V_{\text{sol}}}$

$$M = \frac{4.5 \times 1000}{90 \times 250} = \frac{4.5 \times 4}{90} = 0.2 \text{ M.}$$

14. What is the magnetic moment (Spin only) of complex $[\text{Co}(\text{CN})_6]^{3+}$:
[Report your answer to nearest integer]

Ans. (2)



So number of unpaired electrons = 1.

$$\mu = \sqrt{n(n+2)} = \sqrt{3}$$

$$\mu = 1.73 \text{ BM} \approx 2 \text{ BM.}$$

15. 10000 KJ energy is needed per day, if heat of combustion of glucose is 2700 KJ/Mole. Then how many gram of glucose is needed per day for this: [Report your answer to nearest integer]

Ans. 667



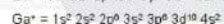
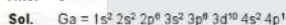
Glucose

No. of mole of glucose require for production of 10,000 KJ heat is = $\frac{10,000}{2700}$ mole.

$$\text{Total mass of glucose} = \frac{10,000}{2700} \times 180 = 666.67 \text{ gram}$$

16. The value of ℓ (azimuthal quantum number) for valence shell electron of Ga^+ ion is _____

Ans. 0



Azimuthal Quantum number (ℓ) for valence shell electron is 0.

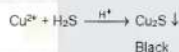
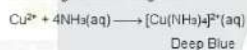
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$$= 13.6 \left[\frac{5}{9} \right] = 7.55 \text{ eV}$$

18. Anion of a compound 'X' gives brown ring test and cation gives deep blue coloration with NH_4OH and also gives precipitate with HCl & H_2S , then compound 'X' is

- (1) $\text{Cu}(\text{NO}_3)_2$ (2) $\text{Pb}(\text{NO}_3)_2$ (3) $\text{Pb}(\text{NO}_2)_2$ (4) $\text{Zn}(\text{NO}_3)_2$

Sol. Nitrates give brown ring test.



19. What is the value of second excitation energy of Li^{2+}

- (1) 108.8 eV (2) 81.8 eV (3) 13.6 eV (4) 95.2 eV

Ans. (1)



Sol.

$$[\Delta E_{n_1 \rightarrow n_2}] = 13.6 \times 2^2 \left[\frac{1}{n_1^2} - \frac{1}{n_2^2} \right]$$

$$= 13.6 \times (3)^2 \left[\frac{1}{1} - \frac{1}{9} \right]$$

$$= 13.6 \times 8 \left[\frac{8}{9} \right]$$

$$= 13.6 \times 8 = 108.8 \text{ eV}$$

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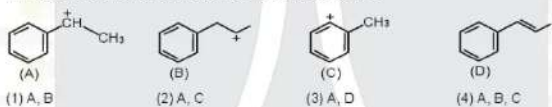
20. $P + \text{CHCl}_3 \xrightarrow{\text{KOH}} Q$
 Poisonous P₁ product
- Identify compound P and Q respectively
- (1) Primary amine, secondary amine (2) Primary amine, Primary amine
 (3) Primary amine, Isonitrile (4) Secondary amine, Isonitrile

Ans. (3)

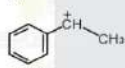
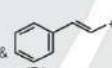
Sol. Only 1^o amines give carbylamines reaction



21. In which of the following carbocation are resonance stabilised



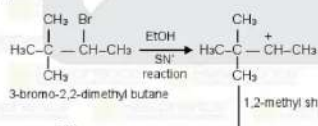
Ans. (3)

Sol.  &  are resonance stabilised carbocations.

22. When ethanol is reacts with 3-Bromo-2,2-dimethyl butane then product formed is :

- (1) 2, 2-Dimethyl-3-ethoxybutane (2) 2-Ethoxy-2,3-dimethyl butane
 (3) 2-Ethoxy-2-methyl pentane (4) 3-Ethoxy-2,2-Dimethyl butane

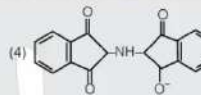
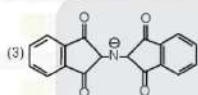
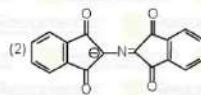
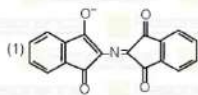
Ans. (2)



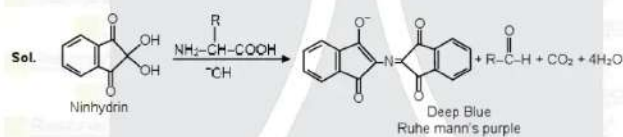
Sol.

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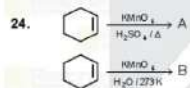
23. Ninhydrin + $\text{NH}_2\text{-CH-COOH}$ \rightarrow Product is ?
 α -amino acid



Ans. (1)



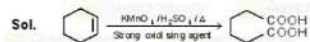
Ninhydrin is useful for identification of α -amino acid which react with ninhydrin and give deep blue colour.



A, B are respectively.

- (1) both diol
- (2) both dicarboxylic acid
- (3) A is dicarboxylic acid and B is diol
- (4) A is diol and B is dicarboxylic acid

Ans. (3)



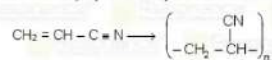
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25. Orlon is a :

- (1) Polyamide (2) Polyester (3) Polyacrylonitrile (4) Polycarbonate

Ans. (3)

Sol. Orlon is a polymer of acrylonitrile also known as PAN



Acrylonitrile PAN or orlon.

26. Which of the following is better for green chemistry in day to day life (Domestic Purpose)

- (1) $\text{Cl}_2\text{C} = \text{CCl}_2$ as dry cleaning agent liquid (2) Liquid CO_2 for cloth cleaning
(3) Cl_2 gas as a bleaching agent of paper (4) CCl_4 as dry cleaning agent

Ans. (2)

Sol. $\text{CCl}_2 = \text{CCl}_2$ was earlier used as solvent for dry cleaning agent but it is carcinogen. So liquid CO_2 is used. Replacement of halogenated solvent by liquid CO_2 will result in less harm to ground water.

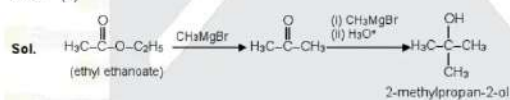
27. Which of the following incorrect :

- (1) Amylose is branched (2) Starch is made up of α -glucose
(3) Glycogen is also called animal starch (4) β -glycosidic linkage for cellulose

Ans. (1)

28. How many mole of CH_3MgBr are required to convert ethylethanoate to 2-methylpropan-2-ol :

Ans. (2)



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