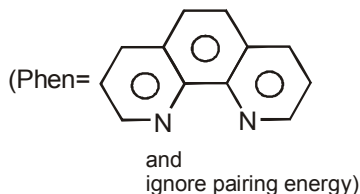


CHEMISTRY
JEE-MAIN (April-Attempt) 12
April (Shift-1) Paper

SECTION - A

1. The complex ion that will lose its crystal field stabilization energy upon oxidation of its metal to +3 state is :

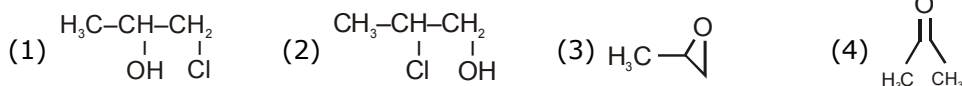


- (1) $[\text{Zn}(\text{phen})_3]^{2+}$ (2) $[\text{Fe}(\text{phen})_3]^{2+}$ (3) $[\text{Ni}(\text{phen})_3]^{2+}$ (4) $[\text{Co}(\text{phen})_3]^{2+}$

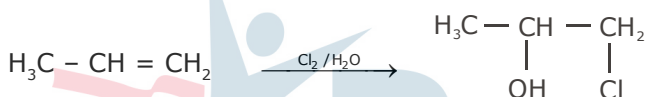
Sol. 2

This is the test of Fe^{2+} ion

2. The major product of the following addition reaction is $\text{H}_3\text{C}-\text{CH}=\text{CH}_2 \xrightarrow{\text{Cl}_2/\text{H}_2\text{O}}$



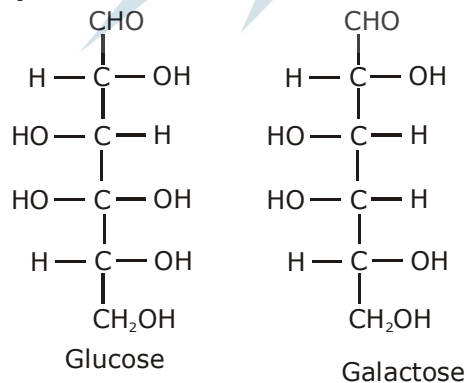
Sol. 1



3. Glucose and Galactose are having identical configuration in all the positions except position.

- (1) C - 5 (2) C - 2 (3) C - 3 (4) C - 4

Sol. 4



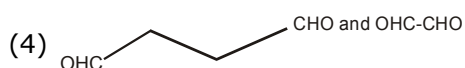
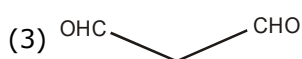
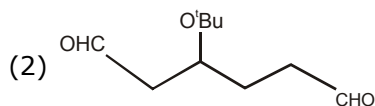
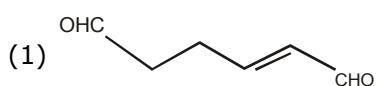
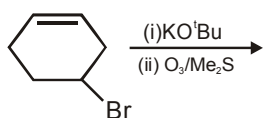
4. The basic structural unit of feldspar, zeolites, mica, and asbestos is :

- (1) SiO_2 (2) $\begin{array}{c} \text{R} \\ | \\ -(\text{Si}-\text{O})_n- \\ | \\ \text{R} \end{array}$ (R = Me)
- (3) $(\text{SiO}_4)^{4-}$ (4) $(\text{SiO}_3)^{2-}$

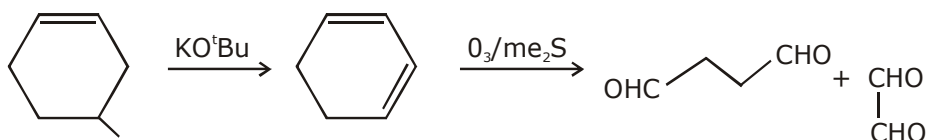
Sol. 3

Conceptual

5. The major product (s) obtained in the following reaction is/are :



Sol. 4



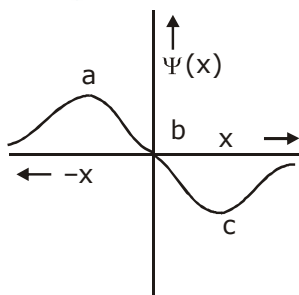
6. Peptization is a :

- (1) Process of converting a colloidal solution into precipitate
- (2) Process of converting precipitate into colloidal solution
- (3) Process of converting soluble particles to form colloidal solution
- (4) Process of bringing colloidal molecule into solution

Sol. 2

Conceptual

7. The electrons are more likely to be found :



- (1) In the region a and b
- (3) in the region a and c

- (2) Only in the region a
- (4) only in the region c

Sol. 3

8. The correct set of species responsible for the photochemical smog is :

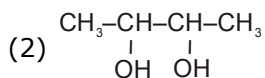
- (1) CO_2 , NO_2 , SO_2 and hydrocarbons
- (2) N_2 , NO_2 , and hydrocarbons
- (3) NO , NO_2 , O_3 , and hydrocarbons
- (4) N_2 , O_2 , O_3 , and hydrocarbons

Sol. 3

photochemical smog is caused by oxides of nitrogen and ozone and hydrocarbons

9. But-2-ene on reaction with alkaline KMnO_4 at elevated temperature followed by acidification will give :

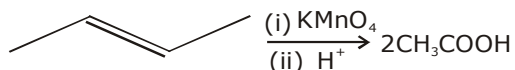
(1) one molecule of CH_3CHO and one molecule of CH_3COOH



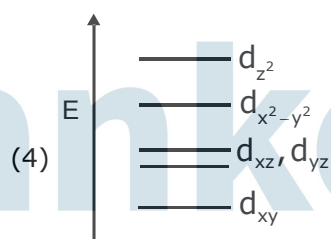
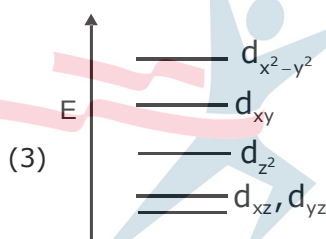
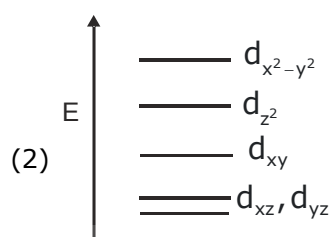
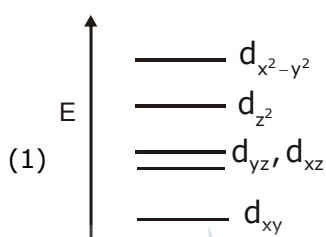
(3) 2 molecules of CH_3CHO

(4) 2 molecules of CH_3COOH

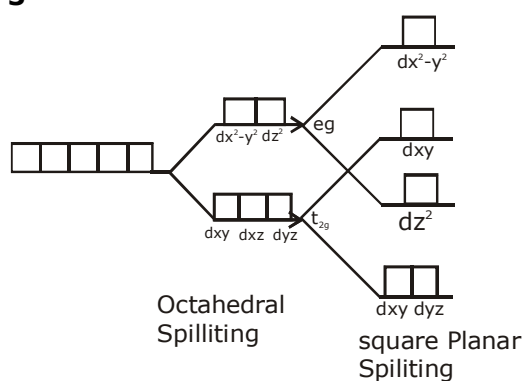
Sol. 4



10. Complete removal of both the axial ligands (along the z-axis) from an octahedral complex leads to which of the following splitting patterns ? (relative orbital energies not on scale).

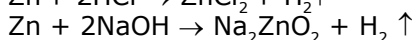
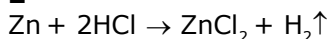


Sol. 3

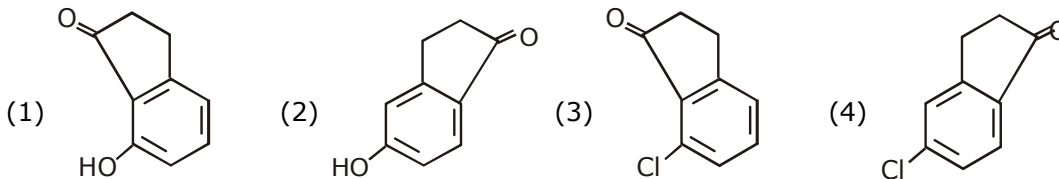
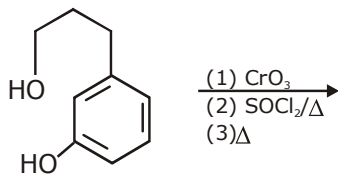


11. The metal that gives hydrogen gas upon treatment with both acid as well as base is:
- (1) magnesium (2) zinc (3) iron (4) mercury

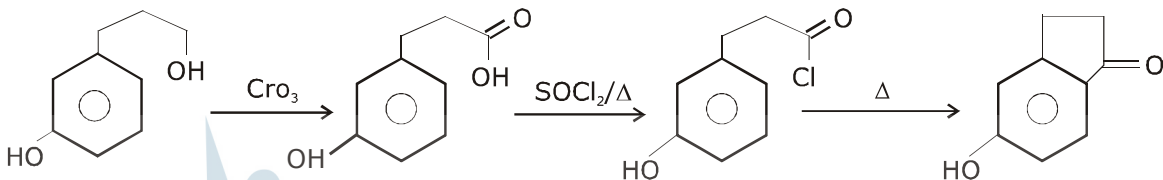
Sol. 2



12. The major product of the following reaction is:



Sol. 2



13. An organic compound 'A' is oxidized with Na_2O_2 followed by boiling with HNO_3 . The resultant solution is then treated with ammonium molybdate to yield a yellow precipitate. Based on above observation, the element present in the given compound is:
 (1) Fluorine (2) Phosphorus (3) Sulphur (4) Nitrogen

Sol. 3

This is the test of element phosphorus.

14. What is the molar solubility of $\text{Al}(\text{OH})_3$ in 0.2 M NaOH solution? Given that, solubility product of $\text{Al}(\text{OH})_3 = 2.4 \times 10^{-24}$:
 (1) 3×10^{-19} (2) 12×10^{-21} (3) 12×10^{-23} (4) 3×10^{-22}

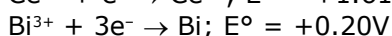
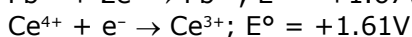
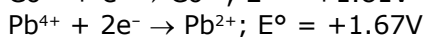
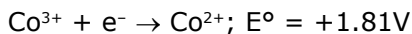
Sol. 4

$$K_{sp} = [\text{Al}^{3+}] [\text{OH}^-]^3$$

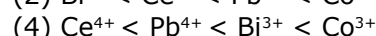
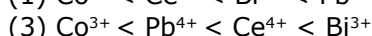
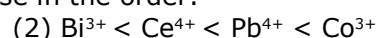
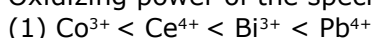
$$2.4 \times 10^{-24} = [\text{Al}^{3+}] (0.2)^3$$

$$\frac{2.4 \times 10^{-24}}{8 \times 10^{-3}} = [\text{Al}^{3+}] = 3 \times 10^{-22}$$

15. Given:



Oxidizing power of the species will increase in the order:



Sol. 2

16. The group number, number of valence electrons and valency of an element with atomic number 15, respectively, are:

- (1) 15, 6 and 2 (2) 16, 5 and 2 (3) 15, 5 and 3 (4) 16, 6 and 3

Sol. 3

Group no = 15 no of valance of electron = 5
valency of element = 3

17. The correct sequence of thermal stability of the following carbonates is:

- (1) $\text{MgCO}_3 < \text{SrCO}_3 < \text{CaCO}_3 < \text{BaCO}_3$ (2) $\text{BaCO}_3 < \text{SrCO}_3 < \text{CaCO}_3 < \text{MgCO}_3$
(3) $\text{MgCO}_3 < \text{CaCO}_3 < \text{SrCO}_3 < \text{BaCO}_3$ (4) $\text{BaCO}_3 < \text{CaCO}_3 < \text{SrCO}_3 < \text{MgCO}_3$

Sol. 3

Thermal stability of carbonate
 $\text{MgCO}_3 < \text{CaCO}_3 < \text{SrCO}_3 < \text{BaCO}_3$

18. In the following reaction; $x\text{A} \rightarrow y\text{B}$

$$\log_{10} \left[-\frac{d[\text{A}]}{dt} \right] = \log_{10} \left[\frac{d[\text{B}]}{dt} \right] + 0.3010$$

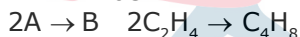
'A' and 'B' respectively can be:

- (1) N_2O_4 and NO_2 (2) C_2H_2 and C_6H_6
(3) n-Butane and Iso-butane (4) C_2H_4 and C_4H_8

Sol. 4

$$\text{Log} \left(-\frac{d\text{A}}{dt} \right) = \text{log} \left[2 \times \frac{d\text{B}}{dt} \right] = \frac{-d\text{A}}{dt} = \frac{2d\text{B}}{dt}$$

R_x^n will be



19. The mole fraction of a solvent in aqueous solution of a solute is 0.2. The molality (in mol kg^{-1}) of the aqueous solution is:

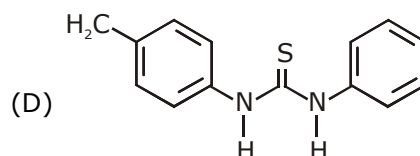
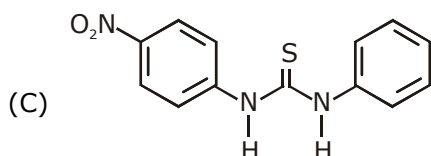
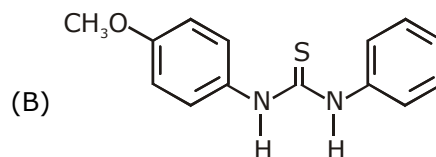
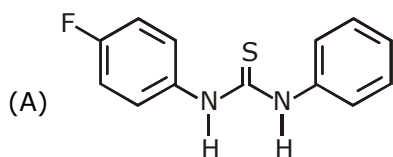
- (1) 13.88×10^{-3} (2) 13.88×10^{-1} (3) 13.88 (4) 13.88×10^{-2}

Sol. 3

$$m = \frac{X_A}{X_B} \times \frac{1000}{M_B} = \frac{0.2}{2.8} \times \frac{1000}{18}$$

$$m = 13.88$$

20. The increasing order of the pK_b of the following compound is:



- (1) (A) < (C) < (D) < (B)
(3) (B) < (D) < (A) < (C)

- (2) (C) < (A) < (D) < (B)
(4) (B) < (D) < (C) < (A)

Sol. 3

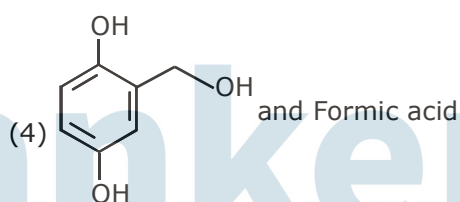
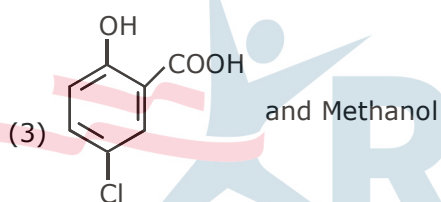
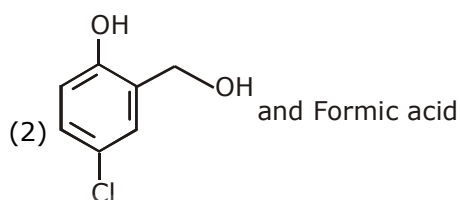
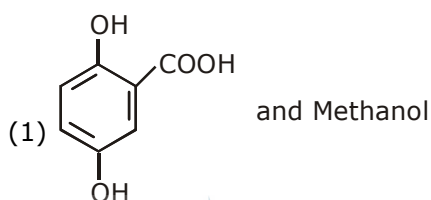
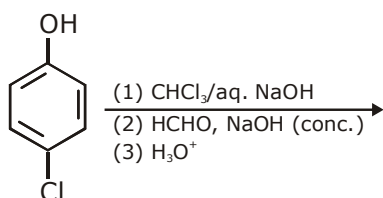
As P_{kb} increase basic strength decrease.

21. 5 moles of AB_2 weigh 125×10^{-3} kg and 10 moles of A_2B_2 weigh 300×10^{-3} kg. The molar mass of A(M_A) and molar mass of B(M_B) in kg mol^{-1} are:

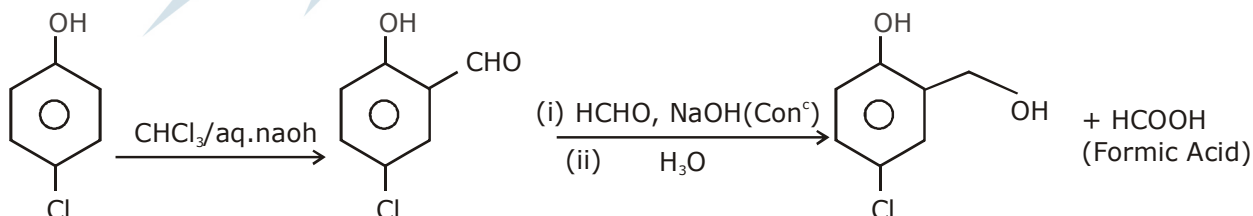
- (1) $M_A = 5 \times 10^{-3}$ and $M_B = 10 \times 10^{-3}$ (2) $M_A = 50 \times 10^{-3}$ and $M_B = 25 \times 10^{-3}$
 (3) $M_A = 25 \times 10^{-3}$ and $M_B = 50 \times 10^{-3}$ (4) $M_A = 10 \times 10^{-3}$ and $M_B = 5 \times 10^{-3}$

Sol. 1

22. The major products of the following reaction are:



Sol. 2



23. An ideal gas is allowed to expand from 1L to 10L against a constant external pressure of 1 bar. The work done in kJ is:

- (1) -0.9 (2) +10.0 (3) -2.0 (4) -9.0

Sol. 1

$$w = -p_{\text{ext}} \Delta v = -1 \text{ bar} [9 \text{ lit}] = -900\text{J} = -0.9\text{kJ}$$

24. An element has a face-centred cubic (fcc) structure with a cell edge of a. The distance between the centres of two nearest tetrahedral voids in the lattice is:

- (1) $\frac{a}{2}$ (2) $\sqrt{2}a$ (3) $\frac{3}{2}a$ (4) a

Sol. 1

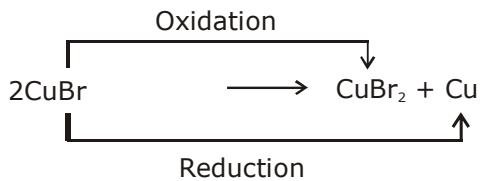
Fact

25. The idea of froth floatation method came from a person X and this method is related to the process Y of ores. X and Y, respectively are:
 (1) washer man and reduction (2) fisher woman and concentration
 (3) fisher man and reduction (4) washer woman and concentration

Sol. 4
 Conceptual

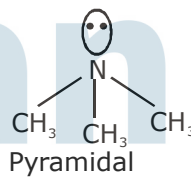
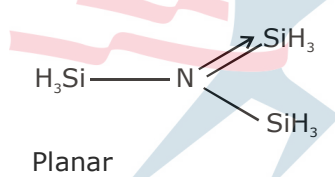
26. An example of a disproportionation reaction is:
 (1) $2\text{MnO}_4^- + 10\text{I}^- + 16\text{H}^+ \rightarrow 2\text{M}^{2+} + 5\text{I}_2 + 8\text{H}_2\text{O}$
 (2) $2\text{CuBr} \rightarrow \text{CuBr}_2 + \text{Cu}$
 (3) $2\text{NaBr} + \text{Cl}_2 \rightarrow 2\text{NaCl} + \text{Br}_2$
 (4) $2\text{KMnO}_4 \rightarrow \text{K}_2\text{MnO}_4 + \text{MnO}_2 + \text{O}_2$

Sol. 2



27. The correct statement among the following is:
 (1) $(\text{SiH}_3)_3\text{N}$ is planar and less basic than $(\text{CH}_3)_3\text{N}$
 (2) $(\text{SiH}_3)_3\text{N}$ is planar and more basic than $(\text{CH}_3)_3\text{N}$
 (3) $(\text{SiH}_3)_3\text{N}$ is pyramidal and more basic than $(\text{CH}_3)_3\text{N}$
 (4) $(\text{SiH}_3)_3\text{N}$ is pyramidal and less basic than $(\text{CH}_3)_3\text{N}$

Sol. 1



28. Which of the following is a thermosetting polymer?
 (1) Buna-N (2) Nylon 6 (3) PVC (4) Bakelite

Sol. 4
 Conceptual

29. Which of the following statements is not true about RNA?
 (1) It has always double stranded α -helix structure
 (2) It usually does not replicate
 (3) It is present in the nucleus of the cell
 (4) It controls the synthesis of protein

Sol. 1
 Conceptual

30. Enthalpy of sublimation of iodine is 24 cal g^{-1} at 200°C . If specific heat of $\text{I}_2(\text{s})$ and $\text{I}_2(\text{vap})$ are 0.055 and $0.031 \text{ cal g}^{-1}\text{K}^{-1}$ respectively, then enthalpy of sublimation of iodine at 250°C in cal g^{-1} is
 (1) 11.4 (2) 22.8 (3) 2.85 (4) 5.7

Sol. 2

$$\frac{\Delta H_{T_2} - 24}{50} = \frac{(31 - 55)}{1000} \times 254$$

$$\Delta H_{i_2} - 24 = -24 \times \frac{254}{20} = 22.8$$