CBSE QUESTION PAPER 2016

Time: 3 Hrs **MM: 70**

GENERAL INSTRUCTIONS:

1. *Question number 1 – 5 carry one mark each.*
2. *Question number 6 to 10 carry two marks each.*
3. *Question number 11 to 22 carry three marks each.*
4. *Question number 23 is value based question and carry four marks.*
5. *Question number 24 to 26 carry five marks each.*

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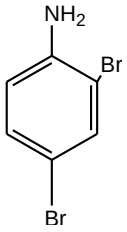
1. Write the IUPAC name of the given compound:



2. What types of magnetism is shown by a substance if its domains are arranged in equal number and in opposite directions?
3. On heating Zn granules with conc. HNO_3, a brown gas is evolved which undergoes dimerization on cooling. Identify the gas.
4. What is the reason for the stability of colloidal sols?
5. Out of $CH_2=CH-CH_2Cl$ and $CH_3-CH_2-CH_2Cl$, which is more reactive towards S_N1 reaction?
6. When pyrolusite ore MnO_2 is fused with KOH in presence of air, a green coloured compound (A) is obtained which undergoes disproportionation reaction in acidic medium to give a purple coloured compound (B):
   (i) Write the formulae of the compounds (A) and (B).
   (ii) What happens when compound (B) is heated?
7. When a coordination compound $PdCl_2.4NH_3$ is mixed with $AgNO_3$, 2 moles of $AgCl$ are precipitated per mole of the compound. Write:
   (i) Structural formula of the complex
   (ii) IUPAC name of the complex
8. For the given cells:
   Lead storage cell, Mercury cell, Fuel cell and Dry cell
   Answer the following:
   (i) Which cell is used in hearing aids?
   (ii) Which cell was used in Apollo space programme?
   (iii) Which cell is used in automobiles are inverters?
   (iv) Which cell does not have long life?
9. Write the chemical equations involved in the following reactions:
   (i) Clemmensen reduction
   (ii) Hell-Volhard Zelinsky reaction

OR

How do you convert
   (i) Toluene to benzaldehyde

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(ii) Ethanoyl chloride to ethanal

10. For a reaction : $2NH_3(g) \xrightarrow{Pt} N_2(g) + 3H_2(g)$.

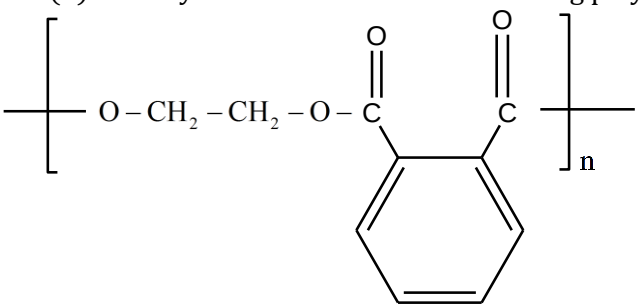
Rate = k

(i) Write the order the molecularity of this reaction.

(ii) Write the unit of k.

11. (i) What is the role of t-butyl peroxide in the polymerization of ethene?

(ii) Identify the monomers in the following polymer:



(iii) Arrange the following polymers in the increasing order of their intermolecular forces:

PVC, Nylon-6, Buna-N

OR

Write the mechanism of free radical polymerization of ethene.

12. The rate constant for the first order decomposition of H_2O_2 is given by the following equation:

$$\log k = 14.2 - \frac{1.0 \times 10^4 K}{T}$$

Calculate E_a for this reaction and rate constant k if its half – life period be 200 minutes. (Given: R = 8.314 JK^{-1} mol^{-1})

13. Give reason for the following:

(a) Aldehydes (R-CHO) are more reactive than ketones (R-CO-R) towards nucleophilic addition reaction.

(b) Benzaldehyde does not undergo aldol condensation reaction.

(c) Benzoic acid does not give Friedal-Crafts reaction.

14. (i) Out of silica gel and anhydrous $CaCl_2$, which will adsorb the water vapours?

(ii) Out of H_2SO_4 and H_3PO_4, which one is more effective in causing coagulation of positively charged sol? Give reason.

(iii) Out of sulphur sol and proteins, which one forms macromolecular colloids?

15. Give reasons:

(i) Mn shows the highest oxidation state +7 with oxygen but with fluorine it shows the highest oxidation state of +4.

(ii) Zn is soft whereas Cr is hard.

(iii) Eu^{2+} is a good reducing agent.

16. What happens when:

(i) 2, 4, 6 – trinitrochlorobenzene is treated with warm water.

(ii) 2-chlorobutane is treated with alcoholic KOH.

(iii) Ethyl chloride is treated with Na metal in presence of dry ether.

Write the equation involved in the above reactions.

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17. Complete the following reactions:

(i) $C_6H_5-COO^-NH_4^+ \xrightarrow{\Delta} A \xrightarrow{Br_2/KOH} B \xrightarrow{CH_3COCl/pyridine} C$

(ii) $C_6H_5N_2{}^+BF_4^- \xrightarrow[\Delta]{NaNO_2/Cu} A \xrightarrow{Sn/HCl} B \xrightarrow{CHCl_3+alc.\ KOH} C$

18. (i) Write the name of two monosaccharides obtained on hydrolysis of maltose sugar.
(ii) Name the vitamin whose deficiency causes convulsions.
(iii) Write one example each for Fibrous protein and Globular protein.

19. (i) Name the method of refining Zirconium.
(ii) In the extraction of Al, impure Al_2O_3 is dissolved in conc. NaOH to form sodium aluminate and leaving impurities behind. What is the name of this process?
(iii) What is the function of limestone in the extraction of iron from its oxides?

20. (a) For the complex $[CoF_6]^{3-}$, write the hybridization, magnetic character and spin of the complex. (At number: Co = 27)

(b) Draw one of the geometrical isomers of the complex $[Co(en)_2Cl_2]^+$ which is optically active.

21. Calculate E^0_{cell} for the following reaction at 298K;

$2Cr(s) + 3Fe^{2+}(0.01M) \rightarrow 2Cr^{3+}(0.01M) + 3Fe(s)$

Given : $E_{cell} = 0.261\ V$

22. An element crystallizes in a f.c.c. lattice with cell edge of 400 pm. The density of the element is 7g cm^{-3}. How many atoms are present in 280 g of the element?

23. Due to hectic and busy schedule, Mr. Awasthi made his life full of tensions and anxiety. He started taking sleeping pills to overcome the depressions without consulting the doctor. Mr. Roy, a close friend of Mr. Awasthi, advised him to stop taking sleeping pills and suggested to change his lifestyle by doing Yoga, meditation and some physical exercise, Mr. Awasthi followed his friends' advice and after few days he started feeling better.
After reading the above passage, answer the following:
(i) What are the values (at least two) displayed by Mr. Roy?
(ii) Why it is not advisable to take sleeping pills without consulting doctor?
(iii) What are tanquilizers? Give two examples.

24. (a) Calculate the boiling point of solution when 2 g of Na_2SO_4 $(M = 142\,g\,mol^{-1})$ was dissolved in 50 g of water, assuming Na_2SO_4 undergoes complete ionization.
(K_b for water = 0.52 K kg mol^{-1})

(b) Define the following terms:
(i) Colligative properties (ii) Ideal solution

OR

(a) When 2.56 of sulphur was dissolved in 100 g of CS_2, the freezing point lowered by 0.383 K. Calculate the formula of sulphur (S_x).
(K_f for $CS_2 = 3.83$ K kg mol^{-1} Atomic mass of Sulphur = 32 g mol^{-1})

(b) Blood cells are isotonic with 0.9% sodium chloride solution. What happens if we place blood cells in a solution containing?
(i) 1.2% sodium chloride solution
(ii) 0.4% sodium chloride solution

25. (a) Account for the following:

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(i) H_2Te is more acidic than H_2S.

(ii) PC_5 is more covalent than PC_3.

(iii) Boiling points of interhalogens are little higher as compare to pure halogens.

(b) Draw the structures of:

(i) $HClO_4$ (ii) $XeOF_4$

OR

(i) Arrange the following in the increasing order of their reducing character:
H_3PO_3, H_3PO_4, H_3PO_2

(ii) Out of He and Xe, which one can easily form compound and why?

(iii) Write the conditions to maximize the yield of ammonia in Haber's process.

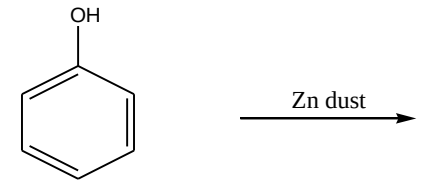
(iv) Write two uses of Chlorine gas.

(v) How can you detect the presence of SO_2 gas.

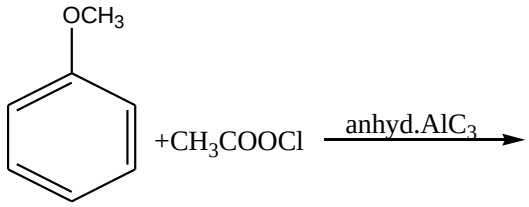
26. (a) Writhe the products(s) in each of the following reactions:

(i) $CH_2=CH-CH_2OH \xrightarrow{PCC}$

(ii)



(iii)



(b) Write the mechanism of the following reaction :

$$2CH_3CH_2OH \xrightarrow{Conc.H_2SO_4/413K} CH_3CH_2-O-CH_2CH_3$$

OR

(a) Write equation of the following reactions:

(i) Bromine in CS_2 with phenol

(ii) Treating phenol with chloroform in the presence of aq. NaOH

(iii) Anisole reacts with HI

(b) Distinguish between:

(i) Ethanol and Diethyl ether

(ii) Propanol and t-butyl alcohol

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SOLUTION

1. 2, 4, - Dibromoaniline
2. Anti - ferromagnetism
3. NO_2 (Nitric oxide)
4. $CH_2 = CH - CH_2Cl$ is more reactive towards SN_1 reaction because it will form more stable intermediate carbocation than $CH_3CH_2CH_2Cl$
5. When we add a lyophilic colloid to a lyophobic sol, it slow down coagulation process and makes it stable colloidal system
6. (i) green coloured compound $A = k_2MnO_4\,(\text{Potassium Magnate})$

   $B = kMnO_4\,(\text{Potassium permagnate})$

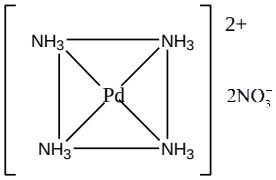
   $2MnO_2 + 4kOH + O_2 \rightarrow 2K_2MnO_4 + 2H_2O$

   (ii) When compound B is heated it will form

   $3k_2MnO_4 + H_2O \rightarrow 2K_2MnO_4 + Mno_2 + 4koH$

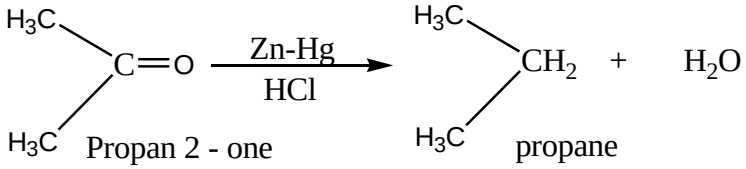
   Potassium
   Per magnate
7. (i) **Structural formula of complex.**

   It has square planar structure and central metal atom is d dsP^2



   (ii) **IUPAC name of the complex:**

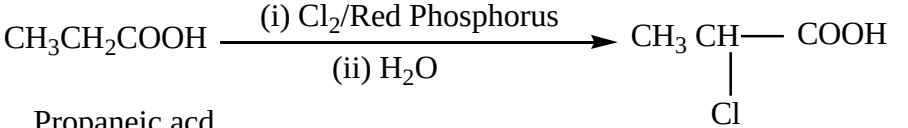
   Name = Tetraamine Paladium (II) Nitrate
8. (i) Mercury cell (ii) Fuel cell (iii) Lead storage cell (iv) Dry cell
9. Clemmensen Reduction



Propan 2 - one

propane

(ii) HVZ **(Hell Volhard Zelinsky Reaction)**



Propaneic acd

2 - Chloro Propanoic acid

OR

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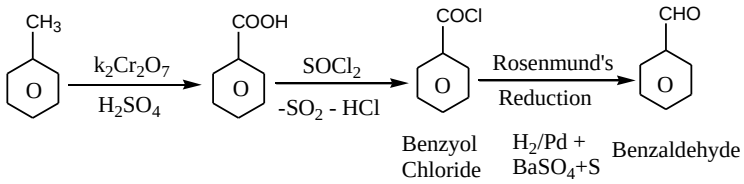
(i) Toulene to Benzaldehyde



(ii) Ethanoyl Chloride to ethanal

$$\underset{\text{Ethanoyl Chloride}}{CH_3COCl} + H_2/Pd/BaSO_4 \rightarrow \underset{\text{Ethanal}}{CH_3CHO} + HCL$$

10. $2NH_3(g) \xrightarrow{Pt} N_2(g) + 3H_2(g)$

(i) Order of the reaction = zero order because in the above reaction after a certain increase of pressure, the rate of reaction becomes independent of concentration of NH_3

Molecularity of the reaction = 2

(ii) Unit of $k = \frac{\text{concentration}}{\text{time}} = \frac{M}{S}$

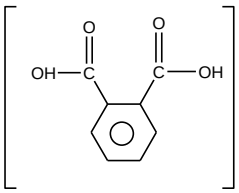
11. Rate of t – Butyl peroxide in the polymerization of ethene is used as a free radical generating initiator or simply as a catalyst during the polymerization of ethene

(ii) The monomers in the given reaction are

Ethylene glycol

$n(OH - CH_2 - CH_2 - OH)$ and

Phthalic acid



(iii) Buna N < PVC < Nylon 6

Because the increasing order of intermolecular forces of attraction follows the order

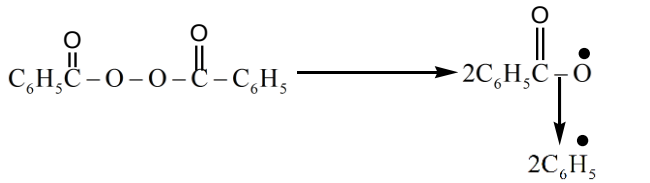
Elastomer < Plastic < fibre

Or

Mechanism of free Radical Polymerization of Ethene

The made of free radical Polymerisation consists of steps

(1)**Chain initiation step:**



$C_6H_5^{\bullet} + CH_2 = CH_2 \rightarrow C_6H_5CH_2 - {}^{\bullet}CH_2$

(2) **Chain Propagating Step:**

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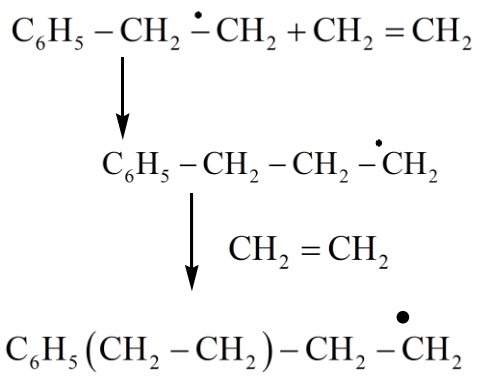
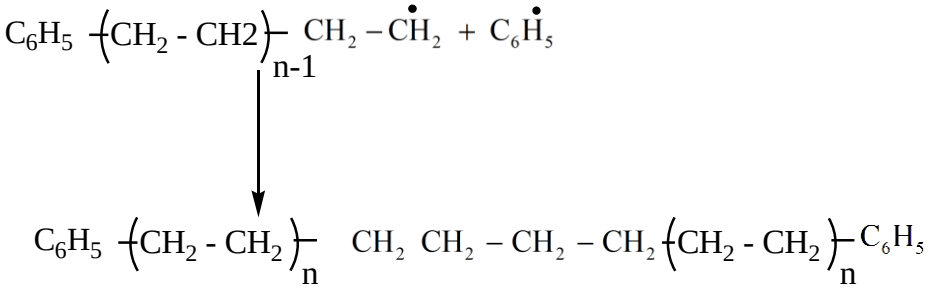


(3) **Chain Terminating Step:**



12. log k= $14.2 - 1.0\times10^4 \times 10^4 \, k/T$

On comparing Arrhenius equation

$k = A.\, e^{-Ea/RT}$ with given value of k.

(i) $\frac{Ea}{2.303R} = 1.0\times10^4$

$E_a = 1.0\times10^4 \times 2.303 \times 8.3145 \, J/mol\ k$

$E_a = 10^4 \times 19.1471 \, J/\ mol$

$E_a = 191.47.1.42 \ J/mol$

$E_a = 191 kJ/mol$

(ii) for first order Reaction

$k = \frac{0.693}{t_{1/2}}$

$k = \frac{.693}{200\times60000} = \frac{57.75}{100000}$

$k = .0005775$

$k = 5.77\times10^{-4}/sec$

13. (a) Aldehydes are more reactive than ketones towards nucleophilic addition reactions due to the following reasons:

(i) Aldehydes are less sterically hindered than ketones

(ii) Due to inductive effect – since carbonyl group of ketones have 2 alkyl group and it will increase electron density on carboxyl group making it less electrophilic. Therefore nucleophile fail to attack on ketone's carboxyl group. But this is not in the case of Aldehyde. That's why they are more reactive

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(b) Benzaldehyde do not undergo aldol condensation because it lacks α – hydrogen within its structure. This α – hydrogen is the hydrogen attached to the carbon in carbonyl group.

(c) Benzoic acid does not undergo Friedal craft reaction because Friedal craft reaction involves the attack by an electrophile to the substituted benzene ring, but - COOH group in Benzoic acid is electron with drawing group and it increase the e^- density in $-COOH$ group due to resonance making it unsuitable for Friedal craft catalyst to attack on it and thus makes Benzene ring deactivated

14. (i) Anhydrous calcium chloride will adsorb water vapour but silicagel will not.

(ii) H_3PO_4 is more effective in causing coagulation of positively charged sol because according to Hardy Schultze rule greater the valency of flocculating ion greater is its power to cause precipitation and in H_3PO_4 PO_4^{-3} ion has -3 charge while in H_2SO_4 SO_4^{-2} has -2 charge. So H_3PO_4 more effective.

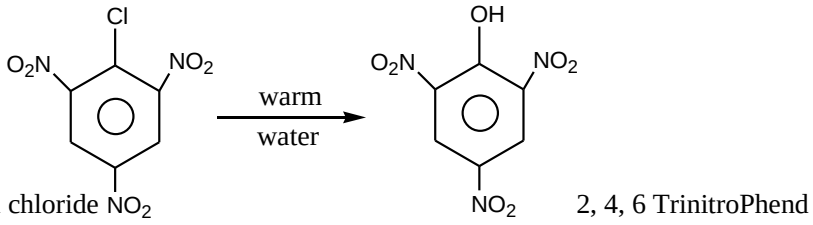
(iii) Proteins will form macromolecular colloids become proteins have large colloidal dimension molecules than sulphur sols.

15. Mn shows highest oxidation state +7 with oxygen but with fluorine it can show highest oxidation state upto +4 because oxygen can form multiple bonds with metal atom but fluorine cannot that's why Mn_2O_7 is formed with oxygen and MnF_4 is formed when Mn reacts with fluorine.

(ii) Zinc is soft while chromium is hard because according to HSAB (Hard and Soft Acids, Base Theory the species which is small and high charge state and are weakly polarizable are generally hard and chromium has small size and high charge state of +3 that's why it is hard while zinc has large size, low charge state (+2) and strongly polarizable that's why it is soft.

(iii) Eu^{+2} (Europium) is a good reducing agent because in + 2 state Eu has an electronic configuration $4f^7$ (because half filled f-shell gives more stability) and it oxidises in air by losing 2 electrons from it valence shell and act as a reducing agent.

16. (i) When 2, 4, 6 Trinitrochlorobenzene is heated with warm water



Picryl chloride NO_2 2, 4, 6 TrinitroPhend

(ii) When 2 chlorobutane is heated with alcoholic kOH then

$$CH_3CH_2\underset{\underset{Cl}{|}}{C}HCH \xrightarrow{\text{alc kOH}} CH_3 - CH = CH - CH_3$$

But - 2 - ene

(iii) When ethyl chloride is treated with Na metal is presence of dry ether Butane will form

$$2C_2H_5Cl + Na \xrightarrow[\text{ether}]{\text{dry}} NaCl + \underset{\text{Butane}}{C_4H_{10}}$$

17. (i)

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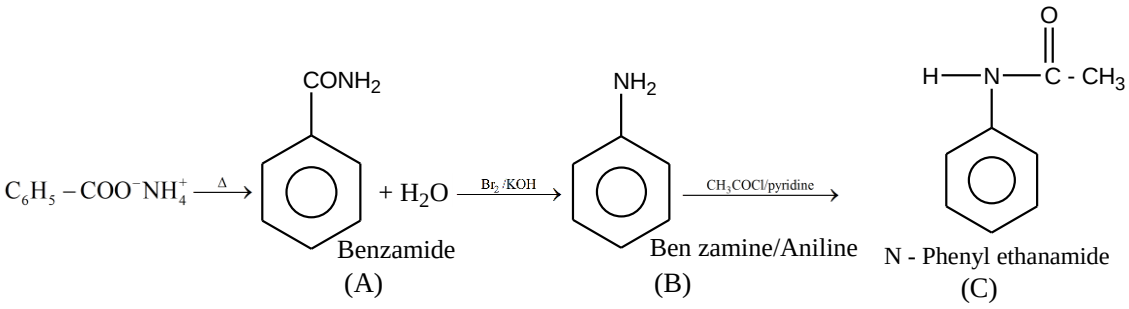
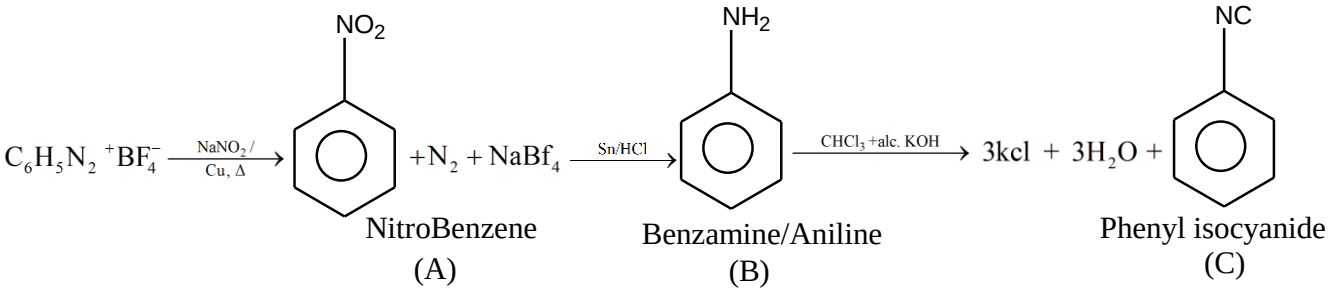


(ii)



18. (i) On hydrolysis of maltose sugar we obtain 2 molecules of D+ glucose $(C_6H_{12}O_6)$

(ii) Vitamins B_1 deficiency caused convulsions

(iii) Fibrous Protein – Collagen

Globular Protein – Albumin

19. (i) Zirconium is refined by Van arkel method

(ii) Electrolysis is the method in which impure Al_2O_3 is dissolved in concentrated NaOH to form sodium aluminate and leaving impurities behind

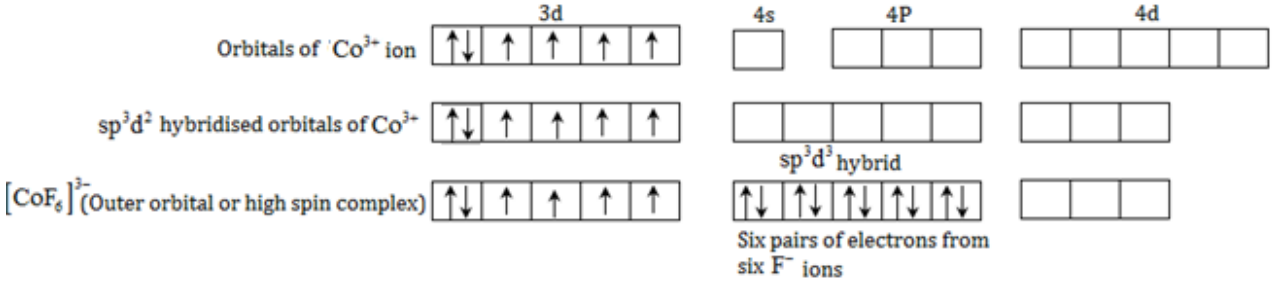
(iii) Limestone is used as a flux which is used to remove impurities (such as silica SiO_2) in the ore to form slag which melts and collects above the iron at the bottom of the furnace, if the impurities, not removed, it would clog the furnace.

20. (a) For the complex $[\cdot CoF_6]^{3-}$ Hexafluoro cobaltate(III) ion . In this complex the outer electronic configuration of cobalt in excited state is $3d^6$. Since F^- ion provides a weak ligand field. So one 4s, three 4p and two 4d orbitals hybridise to yield six SP^3d^2 hybrid orbitals pointing towards six ends of octahedron. Six F^- ion donate a pair of e^- to each of these vacant orbitals to have octahedral geometry. So the presence of unpaired e^- in 3d orbital makes it paramagnetic

Hybridisation = sP^3d^2

Magnetic character = paramagnetic

Spin of complex = high spin complex



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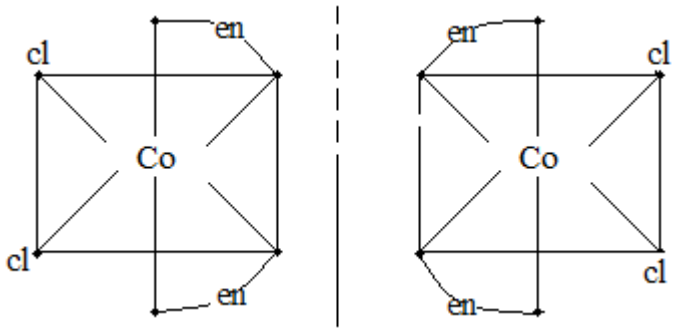
(b) One geometrical isomer of $\left(Co(en)_2Cl_2\right)^-$ which is optically active



21. $2\,Cr_{(x)} + 3Fe^{+2}(.01M) \rightarrow 2\,Cr^{+3}(0.1M) + 3Fe_{(s)}$

In this cell reaction $n = 6$

(n = number of e^- oxidized or reduced)

$$E_{cell} = E^o_{cell} + \frac{.0591}{6} \cdot \log \frac{\left[Cr^{+3}\right]}{\left[Fe^{+2}\right]}$$

$E_{cell} = .261V$

Put this value in the above equation

$$.261 = E^o_{cell} + \frac{.0591}{6}\frac{[.01]}{[.01]}$$

$$.261 - \frac{.0591}{6} = E^o_{cell}$$

$$.261 - .00986 = E^o_{cell}$$

$$.2511\ V = E^o_{cell}$$

22. As it is face lattice

So No. of atoms per unit cell(z) = 4

Edge length (a) = 400 Pm = 400×10^{-10}cm

Density(d) = 7 g/cm³

Mass = 280 g

No. of atoms = ?

Volume of cell $V = a^3 = \left(400 \times 10^{-10}\right)^3 = 64 \times 10^{-24} cm^3$

Volume of 280g of element = $\frac{m}{d} = \frac{280}{7} = 40\,cm^3$

No. of unit in $40\,cm^3 = \frac{\text{volume of 280g of element}}{\text{volume of unit cell}}$

$$= \frac{40}{64 \times 10^{-24}} = \frac{400 \times 10^{25}}{64} = 6.25 \times 10^{23} \text{ unit cell}$$

In FCC each unit cell contain 4 atoms Hence total no. of atoms in 6.25×10^{23} units cells are $= 4 \times 6.25 \times 10^{23} = 25 \times 10^{23}$ atoms

23. (i) Two values showed by Mr. Roy are

(a) Social value as he is concerned about his friend's health

(b) Educational value as he is having knowledge about the side effect of sleeping pills

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(ii) It is not advisable to take sleeping pills without consulting doctor because these drugs interfere with the message transfer mechanism from nerve to receptor.
(iii) Tranquilizers are the substances which are used for the treatment of stress and mental diseases. These effect the central nervous system and induce sleep to patient

24. (a) Boiling Point of Solution = ?

$k_b = .52\,kg/mole$

$W_B = 2g$

$W_A = 50\,g$

$M_B = 142$ g/mole

$$\text{Molality} = \frac{W_B \times 1000}{M_B \times W_A}$$

$$m = \frac{2 \times 1000}{142 \times 50} = \frac{20}{71}$$

$m = .281$ mol/kg

$\Delta T_b = k_b \times m$

$= .281 \times .52$

$= .14.6$ k

Boiling Point of solution = Boiling point of pure solvent + elevation in Boiling point

$= 373 + .146$

$= 373.146\,k$

(b) (i) **Colligative Properties:** Colligative properties are defined as properties of dilute solutions of non volatile solutes whose value depend upon the concentration of number of moles of solute particles in the solution but not on the individual identity of the solute Various colligative properties are

(i) Relative lowering of vapour pressure
(ii) Elevation of boiling point
(iii) Depression of freezing point
(iv) Osmotic pressure

(ii) **Ideal solution:**

An ideal solution may be defined as the solution which obey's Roults law over the entire range of concentration and temperature. The conditions for an ideal solution are:

It should obey Roult's law i.e-

(i) $P_A = P_A^{\circ} x_A$

$P_B = P_{B^{\circ}}\, x_A$

(ii) $\Delta H_{mixing} = 0$ (Enthalpy change)

(iii) $\Delta V_{mixing} = 0$ (Volume change)

OR

(a). Calculation of molar mass of sulphur (S_n)

$$M_B = \frac{k_f \times w_B \times 1000}{w_A \times \Delta T_f}$$

$k_b = 3.83$ k kg/mol

$w_B = 2.56g$

$w_A = 100g$

$\Delta T_f = .383$

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$$M_B = \frac{3.83 \times 2.56 \times 100}{100 \times .383} = \frac{9804.8}{100 \times 383}$$

$M_B = 256$

Now molar mass of sulphur from formula

$S_x = x \times 32\,g/mol$

$x \times 32 = 256$

$x = \frac{256}{32} = 8$

Formula of sulphur = S_8

(b) If we place Blood cells in a solution containing

(i) 1.2% NaCl solution i.e hypertonic solution since its osmotic pressure high and water will move out of the cell causing the cell to shrink due to plasmolysis

(ii) On the other hand if we place Blood cells in 0.4% sodium chloride solution i.e hypotonic solutions with respect to human Blood, then its osmotic pressure is low and water will move into the cell causing it to swell and finally burst.

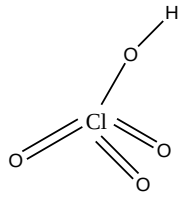
25. (a) (i) H_2Te is more acidic then H_2S because H_2Te easily looses its bounded Hydrogen atoms and H_2S does not loose it. Since Te has large size than 'S' so Hydrogen is removed easily.

(ii) PCl_5 is more covalent than PCl_3 because as we more down in a group tendency to form +5 oxidation state compound increases than +3. Hence polarizability of PCl_5 is more and hence greater is the covalent character.

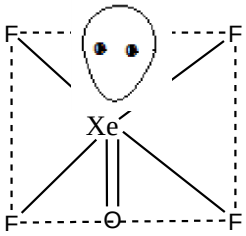
(iii) Boiling points of interhalogens are little higher as compared to pure halogen because of large electronegativity difference between two halogen atoms.

(b) Structures of $HClO_4$ and $XeOF_4$

$HClO_4$



$XeOf_4$



OR

(i) The increasing order of their reducing character is

$H_3PO_4 < H_3PO_3 < H_3PO_2$

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Since in H_3PO_4 there is no $P-H$ bond so it is least reducing in nature. In H_3PO_3 there is 1 $P-H$ bond and in H_3PO_2 there are 2 $P-H$ Bond so it is more reducing in nature.

(ii) Out of He and Xe , xenon can easily from compounds because as we more down the group compound forming capacity increases and Xe is at the Bottom of the series and also Xe has outer shell e^- less tightly bound to the nucleus due to which charge density is away from the nucleus.

(iii) In haber's process yield of Ammonia can be maximized in following ways

(a) N_2 and H_2 gases should be in pure nature to increase the yield of ammonia
(b) A catalyst should be used to increase the rate of a reaction ex - Al_2O_3 can be used.
(c) High pressure on the reaction at equilibrium favours the shift of equilibrium to the right because the forward reaction proceed with a decrease in number of moles.
(d) Low temperature will shift the equilibrium to right because reaction is exothermic and it will yield greater amount of Ammonia. It is in accordance with Le – chatelier's Principle

(iv) **Uses of Chlorine gas**

(a) In the purification of water
(b) As an oxidising agent and in the manufacture of Bleaching powder

(v) Detection of SO_2 gas

SO_2 (sulphur dioxide) is a pungent smelling gas and it can be detected by passing through acidified Potassium dichromate solution which turns green due the reaction of $Cr_2O_7^{-2}$ to Cr^{+3} ions from orange

$$SO_2 + 2H_2O \rightarrow SO_4^{2-} + 4H^+ 2e^- \quad \times 3$$

$$Cr_2O_7^{-2} + 14H^+ + 6e^- \rightarrow 2Cr^{+3} + 7H_2O$$

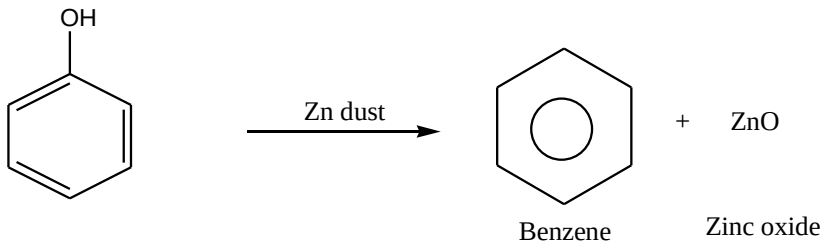
$$Cr_2O_7^{2-} + 3SO_2 + 2H^+ \rightarrow 2\ Cr^{+3} + 3SO_4^{2-} + H_2O$$

Orange green

26. (a) (i) $CH_2 = CH - CH_2OH \xrightarrow{PCC} CH_2 = CH - CHO$

Prop-2-en, 1 – al

(ii)



(iii)

(b) **Mechanism**

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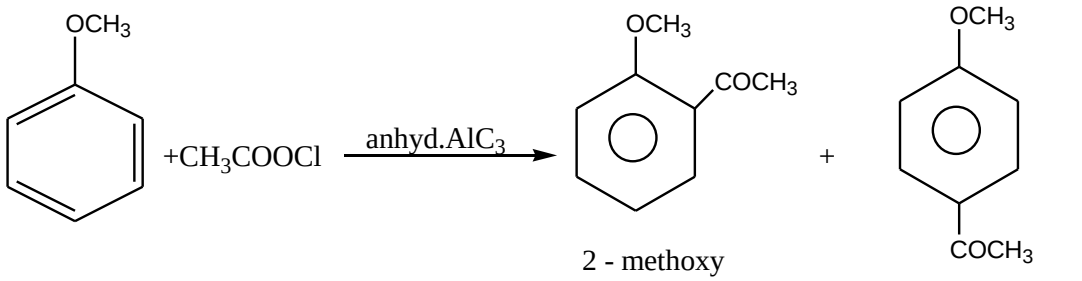
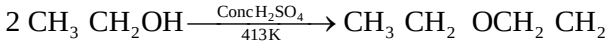


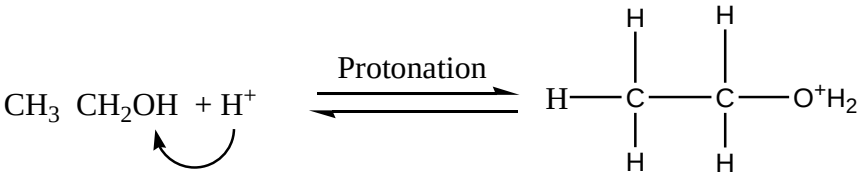
2 - methoxy acetophenone (minor)

4 methoxy acetophenone (major)

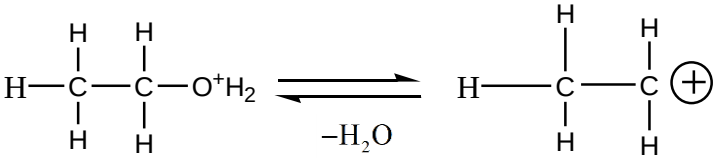


This reaction involves the cleavage of $[R-O-H]$ Bond. The mechanism of the following reaction can be explained below:

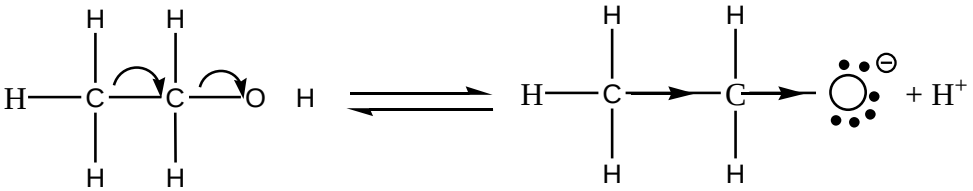
(1) Step I **Formation of carbo cation**



(ii) Step II **Loss of H_2O**

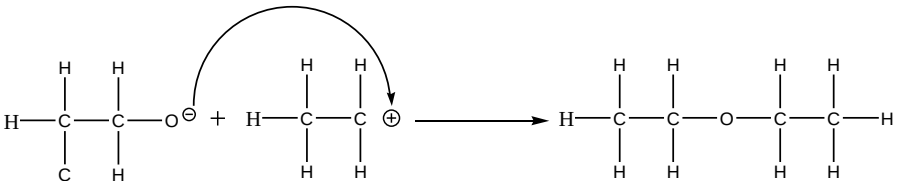


(iii) Step III **Formation of alkoxide ion** $(C_2H_5O^-)$



Since oxygen is electronegative atom and alkyl group is e^- donating, so it will increase e^- density on oxygen

(4) Step IV **Attack of Alkoxide ion on Carbocation**



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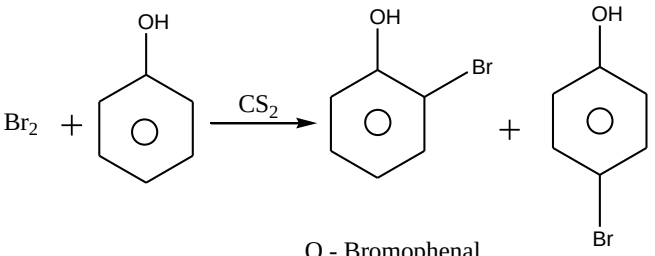
Or

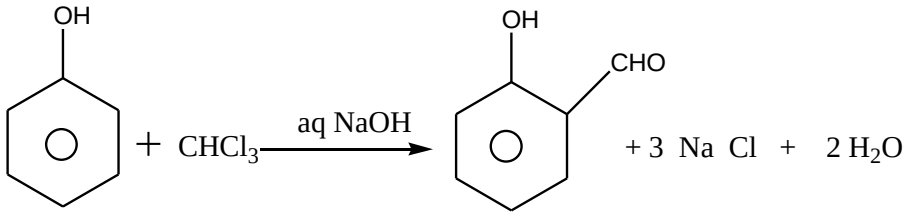
(a) (i)



O - Bromophenal (minor)

P - Bromo Phenal (major)

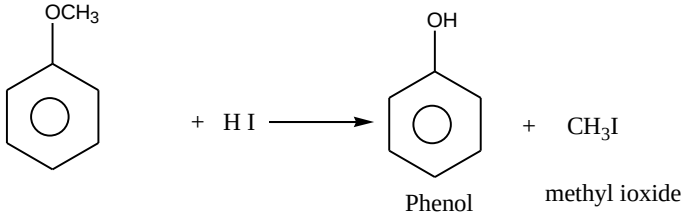
(ii)



Sali cyaldehyde
(O - hydroxy Benzaldehyde)

This is called Riemer Tiemann Reaction

(iii)



Phenol

methyl ioxide

(b) **Distinguish Between**

(i) Ethanol and Diethyl ether

Ethanol gives Hydrogen gas with sodium metal but diethyl ether does not

$$\underset{\text{Ethanol}}{C_2H_5OH} + Na \rightarrow \underset{\text{Sodium ethoxide}}{C_2H_5ONa} + \frac{1}{2}H_2$$

$$C_2H_5OC_2H_5 + Na \rightarrow \times$$

(ii) Propanal and Tert – Butyl alcohol :

They can be distinguished by reacting with Hot reduced copper

$$\underset{(\text{Propanal})}{CH_3\overset{-}{C}H_2} \quad \underset{(1^\circ\text{alcohol})}{\overset{-}{C}H_2OH} \xrightarrow[Cu/575k]{} \underset{\text{propanal}}{CH_3CH_2CHO} + H_2$$

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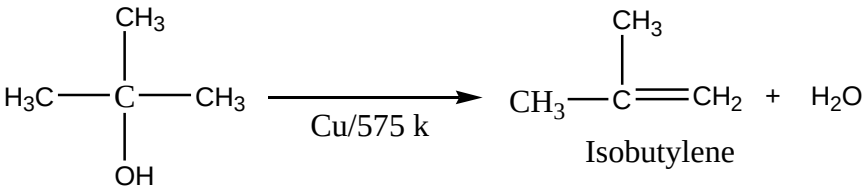

Isobutylene

(tert Butyl alcohol)

(3^o alchohol)

Propanal is dehydrogenated to Aldehyde but tertiary Butyl alcohol does not dehydrogenate due to absence of α – hydrogen. However it gets dehydrated to from an alkene.

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