## FIRST PRE- BOARD EXAMINATION 2020-2021

**Class: XII** **Time: 3hrs**
**Subject: Chemistry** **Mark: 70**

**Question: 1**

**I. Fill in the blanks by choosing the appropriate word / words from those given in the blankets : 4 x 1 = 4**

**[ $Sp^3d$, $Sp^3d^2$, HCl, low, $A^2sp^3$, Uracil, Adenine, $Sp^3$, high , HBr, Trigonal bipyramidal ,T – shaped, anhydrous ZnCl2 , cytosine.]**

1. $SF_4$ molecule involves ------- hybridization and is -------- in shape.
2. Outer orbital complexes involve ------- hybridization and are ------ spin complexes
3. Lucas reagent is a mixture of conc ------ and --------.
4. The pyrimidine bases present in an RNA molecule are -------- and ---------.

**II. Multiple choice question 4 x 1 = 4**

1. In the reaction $C_6H_5CHO + (CH_3CO)_2O \xrightarrow{CH_3COONa}$ (A) product A is.
   a] Acetaldehyde b] Cinnamic acid c] phenol d ] Benzoin
2. Among the following the most basic compound is .
   a] Benzylamine b] Aniline c] Acetamide d ] P- nitro aniline
3. The percentage of unoccupied spaces in bcc is
   a] 26 b] 32 c] 52 d] 68
4. The vapour pressure of a liquid ------- with increase in temperature .
   a] decrease b] increase c] constant d] none of these

**III. Match the following 4 x 1 = 4**

| | |
|---|---|
| 1. Raoult's law | -- $\Pi = CRT$ |
| 2. Henry's law | -- $p = Pa^{o} x_A + p^{o}_B x_B$ |
| 3. Elevation in boiling point | -- $p = kw \cdot x$ |
| 4. Osmostic pressure | -- $\Delta Tb = k_b \cdot m$ |

**IV. Answer the following questions 4 x 2 = 8**

1. How will you obtain the following ?
   a] Anisole from phenol
   b] Benzene from benzene diazonium chloride
2. Explain why ?
   a] Fluorine has lower electron affinity than chlorine .
   b] Ozone acts as a powerful oxidizing agent .
3. For a non - ideal solution explain why ?
   a] $\Delta V_{mixing} \neq o$ b] $\Delta H_{mixing} \neq 0$
4. How does a crystal having metal excess defect maintain its electrical neutrality ?

**QUESTION: 2 (2)**

Account for the following

1. N – N single bond is weaker than P - P bond .
2. $PCl_5$ exist but $NCl_5$ does not .

**{or}**

Write the balanced chemical equations for the following .

1. Reaction of chlorine with hot and concentrated NaOH
2. Reaction in copper with dilute Nitric acid.

**QUESTION: 3** **(2)**

If 'a' is the edge length of a body centred cubic structure and r is the radius of the atom than how are these two related .

1. How many atoms are present per unit cell in a bcc ?

**QUESTION : 4** **(2)**

State the geometry and magnetic property of tetra carbonyl nickel ( 0) according to the VB theory ?

1. What type of structural isomers are $[pt(OH)_2(NH_3)_4]SO_4$ and $[pt\,SO_4(NH_3)_4](OH)_2$?

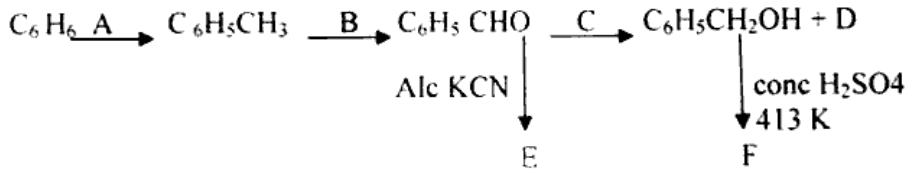
**QUESTION : 5** **(2)**

Write equations for the following reactions and name the reactions .

1. Formaldehyde is treated with 50% caustic soda solution .
2. Benzene diazenium chloride is treated with copper and hydrochloric acid .

**QUESTION: 6** **(2)**

Identify the compounds A,B,C,D, E and F




**QUESTION : 7** **(2)**

Give balanced equations for the following .

1. Aniline and benzoyl chloride .
2. Diethyl ether and hydroiodic acid [cold]

**[or]**

1. Phenol and benzene diazonium chloride
2. Formaldehyde and ammonia .

**QUESTION : 8** **(2)**

The vapour pressure of pure benzene at a certain temperature is 640mm Hg . When a non – volatile and non - electrolyte solid weighing 2 . 175 g is added to 39g of benzene the vapour pressure of the solution 600mm hg . what is the molecular mass of the solid substance ?

**QUESTION : 9** **(3)**

Name the following compounds according to IUPAC rules .

1. $[Co(NH_3)_6]Cl_3$
2. $K[PtCl_3(NH3)]$
3. Draw the geometrical isomers of the compound $[Co(NH_3)_2Cl_2]$
4. Write the formula of potassium trioxalatoferrate [III]

**QUESTION :10** **(3)**

How can the following conversions be brought about ?

1. Acetaldehyde to acetone
2. Methylamine to ethylamine
3. Propanol to isopropyl alcohol .

**QUESTION :11** **(3)**

Give reasons for the following :

1. phenol is acidic but ethanol is not .
2. Acetaldehyde does not give cannizaro's reaction but formaldehyde give the reaction .

**(or)**

Identify the compounds A,B,C,and D

$$CH3COOH \xrightarrow{LiAlH_4} A \xrightarrow{Red\ P,I_2} B \xrightarrow{Alc\ KCN} C \xrightarrow{H^+,H_2O} D$$

**QUESTION : 12** **(3)**

Give balanced chemical equation .

1. Ozone with lead sulphide
2. sulphur dioxide with potassium permanganate .

**QUESTION: 13** **(3)**

1. Write the reaction when glucose on oxidation with bromine water .
2. Which Xe compound has distorted octahedral shape ?

**QUESTION: 14** **(3)**

Give simple chemical tests to distinguish between the following pairs of compounds .

1. Benzaldehyde and benzoic acid .
2. propanal and propanone .

**QUESTION :15** **3 X 1 = 3**

Give reasons for the following questions .

1. Why does fluorine exhibit only -1 oxidation state in all of its compounds .
2. Why is the first Ionisation energy of oxygen is lower than that of nitrogen.
3. Why does $PH_3$ possess a smaller bond angle than that for $NH_3$

**QUESTION : 16** **5 X 1 =5**

(i) Calculate the mass of compound ( molar mass = 256 g / mol ) to be dissolved in 75 g of benzene to lower its freezing point by 0.48 K ( Kf = 5.12 K Kg / mol)

(ii) What will be the vapour pressure of a solution containing 5 moles of sucrose ( $C_{12} H_{22} O_{11}$ ) in 1 Kg of water .if the vapour pressure of pure water is 4.57 mm of Hg ? ( C= 12, H=1,O=16)

**(Or)**

i) An element with density 10g/cm forms a cubic unit cell with edge length of $3x10^{-8}$ cm. what is the nature of cubic unit cell if the atomic mass of the element is 81 g/mol.

ii) a) what type of crystal defect is produced when cadmium chloride is added to silver chloride 

b) what type of crystal defect is produced when crystal of FeO

**QUESTION :17** **5 x 1 = 5**

1. $\{ CO(NH_3)_5 Br \} SO_4$ and $\{Co(NH_3)_5 So4 \} Br$ ? Give a chemical test to distinguish between the two isomers .
2. For the coordination complex ion $\{ CoF_6 \}^{3-}$
   a) What is the oxidation number of cobalt in the complex ion ?
   b) State the type of hybridization of the complex ion ?
   c) State the magnetic behaviour of the complex ion .

**{ Or}**

1. complete and balance the following reaction .
   a) $P_4 + NaOH + H_2O \longrightarrow$ -------+ ----------
   b) $NaCl + MnO_2 + H_2SO_4 \longrightarrow$ --------- + ---------- + ----------
   c) $Cl_2 + H_2S \longrightarrow$ -------- + ----------
2. For the molecule IF5
   a) Draw the structure of the molecule.
   b) State the hybridization of the central atom.
   c) State the geometry of the molecule.

**QUESTION : 18** **5 x 1 = 5**

Write chemical equation to illustrate the following name reaction .

a) Kolbe`s electrolytic reaction .
b) Clemmensen `s reaction
c) Hoffmann bromide reaction
d) Gabriel phthamide reaction
e) Wurtz -- Fittig reaction

**(OR)**

a) An aliphatic unsaturated hydrocarbon (A) when treated with $HgSO_4$ / $H_2SO_4$ yields a compound (B) on oxidation molecular formula $C_3H_6O$. (B) on oxidation with acidified potassium dichromate gives compound (C) and (D). compound (C) when treated with $SOCl_2$ GIVES compound (E). (E) when reacts with ethanol gives a sweet smelling liquid (F). Identity the compounds A,B,C,D,E, and F.