

FIRST PRE- BOARD EXAMINATION 2020-2021

Class: XII  
Subject: Chemistry

Time: 3hrs  
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  $ZnCl_2$  , cytosine.]

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

II. Multiple choice question

4 x 1 = 4

- 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
- Among the following the most basic compound is .  
a] Benzylamine b] Aniline c] Acetamide d] P- nitro aniline
- The percentage of unoccupied spaces in bcc is  
a] 26 b] 32 c] 52 d] 68
- 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               | -- II = CRT                    |
| 2. Henry's law                | -- $p = p_A^0 x_A + p_B^0 x_B$ |
| 3. Elevation in boiling point | -- $p = kw \cdot x$            |
| 4. Osmotic pressure           | -- $\Delta T_b = k_b \cdot m$  |

IV. Answer the following questions

4 x 2 = 8

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

QUESTION: 2

(2)

Account for the following

- N - N single bond is weaker than P - P bond .
- $PCl_5$  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  $[PtSO_4(NH_3)_4(OH)_2]$ ?

QUESTION : 5

(2)

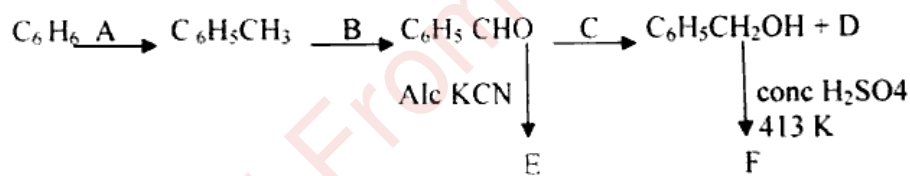
Write equations for the following reactions and name the reactions .

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.  $[\text{Co}(\text{NH}_3)_6] \text{Cl}_3$
2.  $\text{K} [\text{PtCl}_3(\text{NH}_3)]$
3. Draw the geometrical isomers of the compound  $[\text{Co}(\text{NH}_3)_2\text{Cl}_2]$
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 .

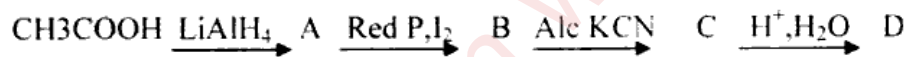
**QUESTION :11****(3)**

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

**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  $\text{PH}_3$  possess a smaller bond angle than that for  $\text{NH}_3$

**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 (  $K_f = 5.12 \text{ K Kg} / \text{mol}$  )
- (ii) What will be the vapour pressure of a solution containing 5 moles of sucrose (  $\text{C}_{12} \text{H}_{22} \text{O}_{11}$  ) 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)**

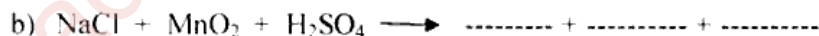
- i) An element with density 10g/cm forms a cubic unit cell with edge length of  $3 \times 10^{-8}$  cm. what is the nature of cubic unit cell if the atomic mass of the element is 81 g/mol.
- ii) a) what type of crystal defect is produced when cadmium chloride is added to silver chloride  
b) what type of crystal defect is produced when crystal of FeO

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

1.  $\{ \text{CO}(\text{NH}_3)_5 \text{Br} \} \text{SO}_4$  and  $\{ \text{Co}(\text{NH}_3)_5 \text{SO}_4 \} \text{Br}$ ? Give a chemical test to distinguish between the two isomers .
2. For the coordination complex ion  $\{ \text{CoF}_6 \}^{3-}$ 
  - 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 .



2. For the molecule  $\text{IF}_5$

- 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  $\text{HgSO}_4 / \text{H}_2\text{SO}_4$  yields a compound (B) on oxidation molecular formula  $\text{C}_3\text{H}_6\text{O}$ . (B) on oxidation with acidified potassium dichromate gives compound (C) and (D). compound (C) when treated with  $\text{SOCl}_2$  GIVES compound (E). (E) when reacts with ethanol gives a sweet smelling liquid (F). Identity the compounds A,B,C,D,E, and F.

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