2021

Chemistry

[Third Semester]

Paper - CC6T

Full Marks : 40

Time : 2 hours

The figures in the right-hand margin indicate marks.

Candidates are required to give their answers in their own words as far as practicable.

Illustrate the answers wherever necessary.

Group - A

1. Answer <u>any five</u> questions : 5×2

(a) Compare the acidity of boron trihalides.

(b) What happens when XeO_3 reacts with Kl in presence of dil. H_2SO_4?

(c) 'Li' has highest ionisation potential value but lowest aqueous standard reduction potential value among the alkali metals–Why?

(d) Basic character increases in the order
$Be(OH)_2 < Mg(OH)_2 < Ca(OH_2$ – Why?

(e) $(SiH_3)_3N$ and $(CH_3)_3N$ react with HCl to give different products – Why?

(f) $[Co(NH_3)_5\ NO_2]^{2+}$ may have two different colours. Comment.

(g) Why HF cannot be stored in class bottle. Explain.

(h) Discuss diagonal relatioinship between lithium & magnesium.

Group - B

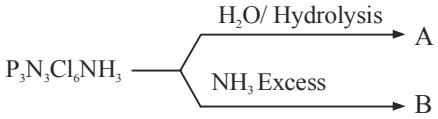
Answer <u>any four</u> questions. **4×5=20**

2. (a) Compare the colour of halogens using Molecular Orbital theory with proper explanation.

   (b) Why I_2 is violet in a non-co-ordinating solvent but brown in a co-ordinating solvent. $2\frac{1}{2}+2\frac{1}{2}=5$

3. (a) Write short note on "Chelate effect".

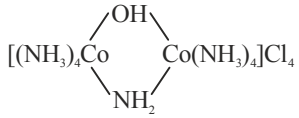
(b) Give the product A and B.



(c) What is ferrosilicon? 2+2+1=5

4. (a) Write IUPAC nomenclature of

(i) $[Ni(NH_3)_6][Co(NO_2)_6]$

(ii) 

(b) Describe how BH_3 can behave both an electron acceptor and an electron donor in the adduct $OC.BH_3$.

(c) Explain why PCl_3 and $SbCl_3$ hebave differently in water. 2+2+1=5

5. (a) $B(OH)_3$ behave as a weak acid but strength increases in presence of 1,2-diols. Explain. 2

(b) What happens when ammonium molybdate is added to a phosphate salt in presence of conc. HNO_3 is hot condition? 2

(c) Complete the following equation.

$[IO_3]^- + I^- + H^+ \longrightarrow$

6. (a) Both NO and NO_2 are odd electron molecule but only NO_2 dimerizes readily. Explain.

(b) Give a short account on the structure and bonding of B_2H_6. $2\frac{1}{2}+2\frac{1}{2}$

7. (a) Diamond is extremely high melting but is a non-conductor. Graphite is covalent but is a good conduction. Both are allotropes.–Correlate the contrary.

(b) If 'CO' can act as a good ligand for low oxidation states of metals, why CO_2 can not?

(c) Differentiate the hydrolysis behaviour of $SiCl_4$ & CCl_4. (2+2+1)

Group -C

Answer any one question. **1×10=10**

8. (a) Write explanatory note on :- van Arkel-de Boer process and Mond's process.

(b) Which of the complexes are chiral?

(i) $[Cr(EDTA)]^-$
(ii) $[Ru(en)_3]^{2+}$
(iii) $[Pt(dien)Cl]^+$

(c) Write down the comparison between organic polymer and inorganic polymer.

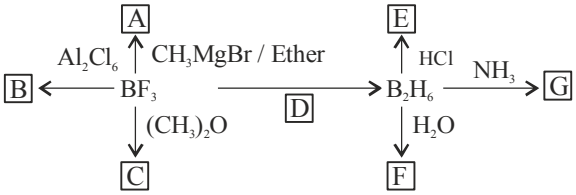
(d) Compare the ionic mobility of monopositive alkali metal ions in hydrated from and related it with their conducting power.

(e) Give the application of noble gases. 3+2+2+2+1=10

9. (a) Write note on pseudohalide.

(b) What is Clathrate?

(c) Complete the reaction by putting the substances assigning A, B, C, D, E, F, G.



(d) 'I_3^- is linear, but I_3^+ is bent'–Explain.

(e) How will you identify Cd^{2+} ion in presence of Cu^{2+}? Answer with proper explanation.

2+1+3+2+2=10