**2023**

**Chemistry**

**B.Sc. III Semester End Examination - 2023**

**PAPER - CC-6T**

*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 any five questions :** **5×2=10**

(i) Why is group-16 elements called as chalcogens?

(ii) $FeSO_4$ solution mixed with $(NH_4)_2SO_4$ solution in 1:1 molar ratio gives the test $Fe^{2+}$ ion but $CuSO_4$ solution mixed with ag.$NH_3$ 1:4 molar ratio does not gives the test of $Cu^{2+}$ ion. Explain.

(iii) $XeF_6$ can not be stored in glan ($SiO_2$) vessels – Why?

(iv) Write one similarity and two dissimilarity among organic polymer and inorganic polymer.

(v) $CCl_4$ does not get hydrolysed but $SiCl_4$ does – Why?

(vi) $TlCl_3$ behaves as an oxidising agent– Why?

(vii) What is pi-acid and pi-chelating ligand? Explain the example.

(viii) KCN is extremely toxic in nature, but $K_4[Fe(CN)_6]$ is non-toxic – explain.

## Group - B

2. Answer any four question : 4×5=20

(i) What is Chelate effect. Give reason.

(ii) Draw all the geometrical and optical isomers of $[Co(en)_2Cl_2]^+$ ion. $(2\frac{1}{2}+2\frac{1}{2})=5$

3. (i) Write the IUPAC name of the brown ring complex.

(ii) What is inorganic rubber? How it is prepaid?

(iii) What is meant by calcination and roasting? 1+2+2

4. (i) What is inorganic diamond?

(ii) Draw the MO diagram of $XeF_2$ molecule. Mention HOMO & LUMO. 2+3

5. (i) What are interhalogen compounds? Why ICl more reactive than $I_2$?





(ii) A polydentate ligand may also act as a flexidentate ligand. Explain with an example. 3+2

6. (i) $(CH_3)_3$ is more basic than $(SiH_3)_3N$ – Why?

(ii) The BP of $NH_3$ is higher than that of $PH_3$ but lower than $BiH_3$–Why? $2\frac{1}{2}+2\frac{1}{2}$

7. (i) Write balanced chemical equation for the reaction of $Cl_2$ with hot and conc. NaOH solution. Mention type of reaction.

(ii) Perchloric acid is a stronger acid than chlorous acid– Why?

(iii) The S-S bond legnth in dithionite $(S_2O_4^{2-})$ is longer and weaker– explain. $(1\frac{1}{2}+1\frac{1}{2}+2)=5$

## Group - C

**Answer any one question.** **1×10=10**

8. (i) Draw the MO diagram of 3c-2e bond in $B_2H_6$.

(ii) Discuss the structure and bonding of hexa-chlorotriphosphazene. $(NPCl_2)_3$.

(iii) Rubber corks or pipes can not be used in an experiment involving Ozone– Why?

(iv) Concentrate nitric acid kept in a laboratory bottle looks yellowish – Why?

(v) Why silicones are more stable, inert and have water repelling properties? (2+2+2+2+2)

9. (i) How many geometrical & optical isomers possible and mention them of the given types of complex. $[Ma_3b_3]$. a, b are two different monodentate ligand.

(ii) How does hypo remove unreacted AgBr from photographic film?

(iii) Mention one physical and one chemical experiment by which you can distinguish cis and trans isomer of a metal complex.

(iv) Draw the structure of carbon suboxide mentioning all formal charge of atoms in the suboxide ($C_3O_2$).

(v) Inorganic benzene is more reactive than benzene– Explain. (2+2+2+2+2)