

**B.Sc.**

**4th Semester Examination**  
**CHEMISTRY (Honours)**

**Paper - C9T**

**(Inorganic Chemistry)**

**Full Marks : 40**

**Time : 2 Hours**

*The figures in the margin indicate full marks.  
Candidates are required to give their answers  
in their own words as far as practicable.*

**Group - A**

1. Answer any *five* questions : 5×2

(a) HF cannot be stored in glass bottle. Explain.

(b) Write two characteristic features of Ellingham diagram.

(c) What are fluorocarbons ? How are they prepared ?

*[ Turn Over ]*



- (d) Suggest a structure for a dimer of  $BeCl_2$  and explain how its formation illustrates  $BeCl_2$  acting as a Lewis acid.
- (e) Why the reactivity at borazine contrasts sharply with that of benzene ?
- (f)  $[Co(NH_3)_5NO_2]^{2+}$  may have two different colors. Comment.
- (g) What happen when  $XeO_3$  reacts with  $KI$  in presence at dil  $H_2SO_4$ ?
- (h) Draw the structure of polythionates of type  $[SnO_6]^{2-}$ . How are they prepared ?

### Group - B

Answer any *four* questions.

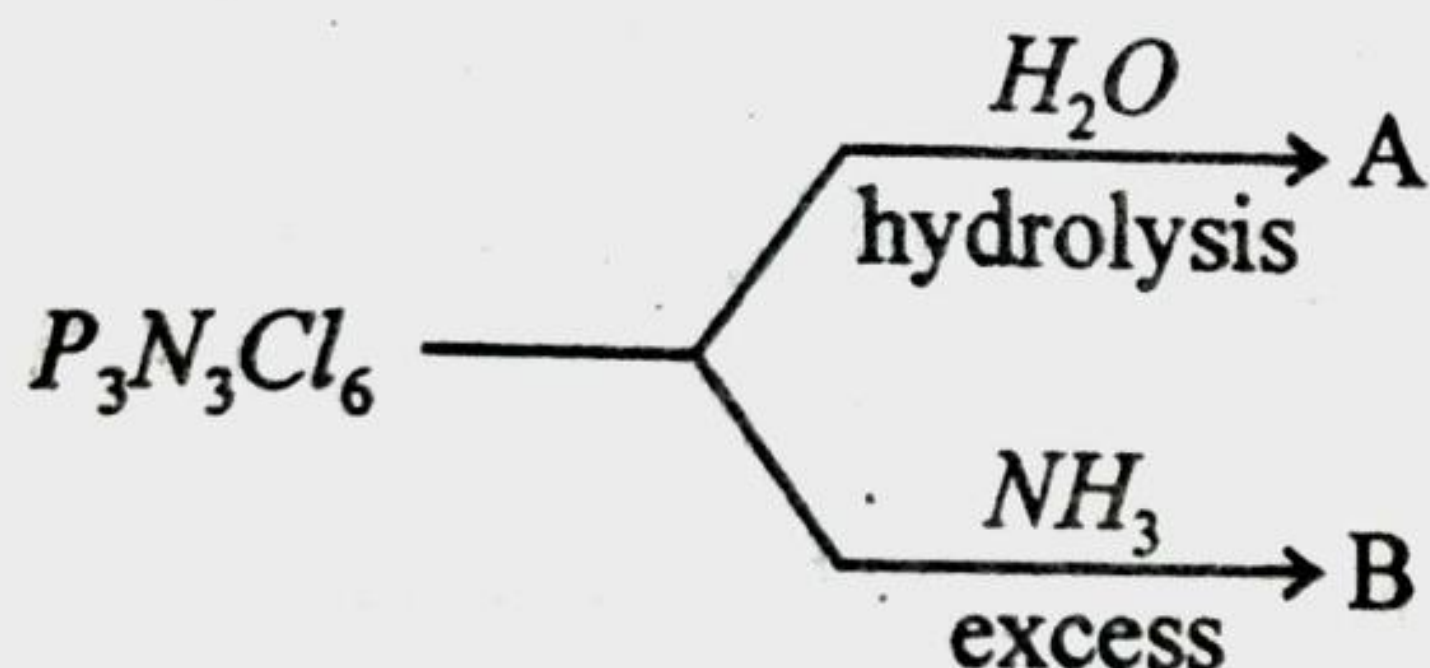
4×5

2. (a) Write notes on the structures of  $XeF_2$ ,  $XeF_4$  and  $XeF_6$ . 3
- (b) Outline the principle of zone refining. 2
3. (a) State basic concepts of Werner's coordination theory and mention its limitations. 3



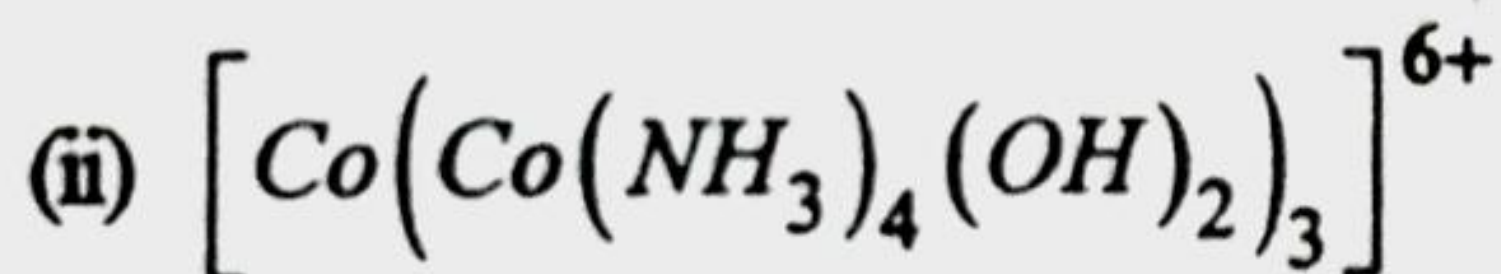
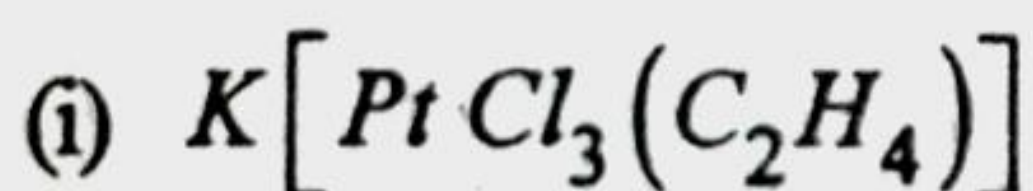
( 3 )

(b) Give the product *A* and *B*



2

4. (a) Write IUPAC nomenclature of



2

(b) Describe how  $\text{BH}_3$  can behave as both an electron acceptor and an electron donor in the adduct  $\text{OC.BH}_3$ .

2

(c) Explain why  $\text{PCl}_3$  and  $\text{SbCl}_3$  behave differently in water.

1

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

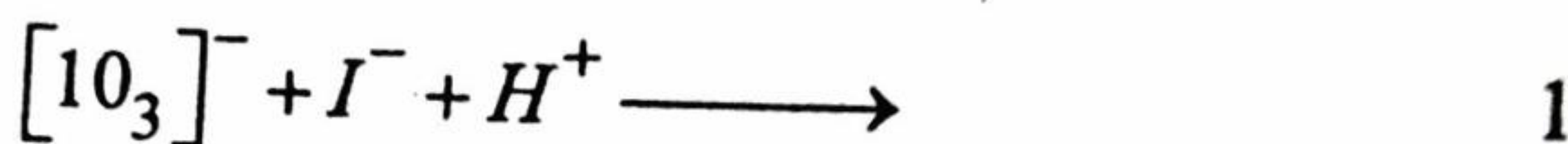
2

[ Turn Over ]



(b) Suggest why the  $NSi_3$  skeleton in  $N(SiMe_3)_3$  is planar. 2

(c) Complete the following equation



6. (a) Both  $NO$  and  $NO_2$  are odd electron molecules but only  $NO_2$  dimerizes readily. Explain. 2

(b) Give a short account on the structure and bonding of  $B_2H_6$ . 3

7. (a) What are siloxanes ? 1

(b) Show stepwise hydrolysis product of  $P_4O_{10}$ . 2

(c) Describe a suitable synthesis of Xenon trioxide. 2

### Group - C

Answer any *one* question.

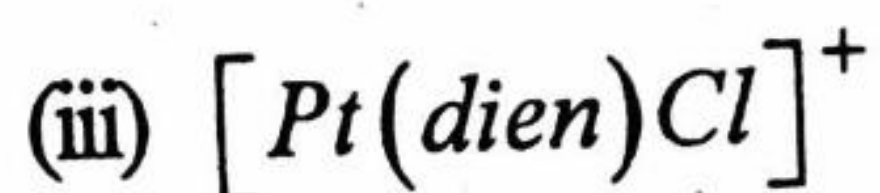
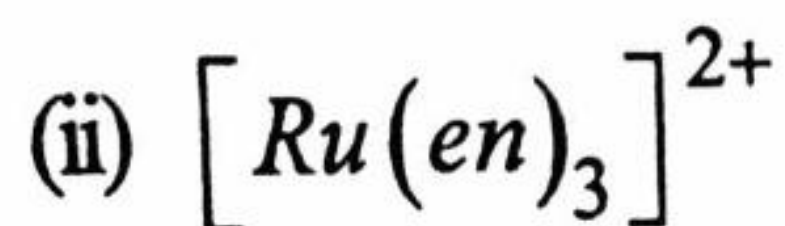
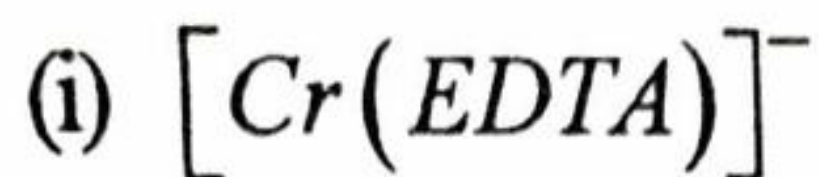
1×10

8. (a) Copper can be extracted by hydrometallurgy but not zinc. Explain. 2



( 5 )

(b) Which of the complexes



are chiral ?

3

(c) Explain the different colours of halogen molecules.

2

(d) Discuss the structure of  $S_2O_3^{2-}$ .

2

(e) Give the application of noble gases.

1

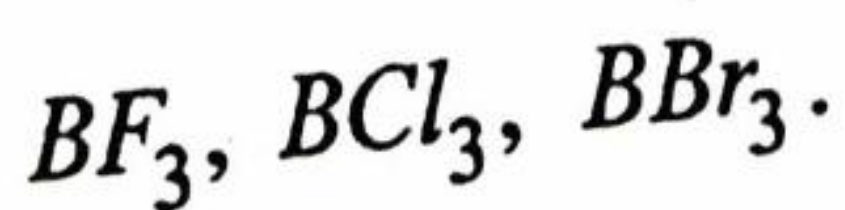
9. (a) Write note on pseudohalide.

2

(b) What is ferrosilicon ?

1

(c) Arrange the following in order of increasing acid strength and give reasons for your choice :



3

[ Turn Over ]

( 6 )

(d) The triiodide ion,  $I_3^-$  is linear, but  $I_3^+$  is bent.

Explain.

2

(e) The bond angles for the hydrides of the Group 15 elements are as follows :  $NH_3$ ,  $107.8^\circ$ ,

$PH_3$ ,  $93.6^\circ$ ;  $AsH_3$ ,  $91.8^\circ$ ; and  $SbH_3$ ,  $91.3^\circ$ .

Account for this trend.

2

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