



বিদ্যাসাগর বিশ্ববিদ্যালয়  
**VIDYASAGAR UNIVERSITY**  
**Question Paper**

**B.Sc. Honours Examinations 2022**

(Under CBCS Pattern)

**Semester - IV**

**Subject: CHEMISTRY**

**Paper : C 9-T**

**Inorganic Chemistry - III**

**Full Marks : 40**

**Time : 2 Hours**

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

*The figures in the margin indicate full marks.*

**Group - A**

Answer any **four** questions :

5×4=20

1. (a) What experiment led Bartlett towards the synthesis of the compounds of inert gases ?
- (b)  $\text{SF}_6$  is inert whereas  $\text{TeF}_6$  is highly reactive — Explain. 3+2
2. (a) Write down the IUPAC names of the following complexes —
  - (i)  $\text{K}_3[\text{Fe}(\text{CN})_5\text{Cl}]$
  - (ii)  $[\text{Co}(\text{NH}_3)_6][\text{CdCl}_5]$
- (b) Why  $\text{CO}_2$  is a gaseous monomer whereas  $\text{SiO}_2$  is a polymeric solid ?
- (c) Give the structure of Caro's acid. 2+2+1

3. (a) Indicate the oxidation number of P atoms in  $H_4P_2O_6$  and  $H_4P_2O_7$ .
- (b) What is Chelate effect ?  $[Co(en)_3]^{3+}$  is more stable than  $[Co(NH_3)_6]^{3+}$  — Explain. 2+(1+2)
4. Write down the principle of vapour phase refining. How Ni and Zr can be purified in this method ? 2+3
5. (a) Classify the following ligands as  $\sigma$ -donor,  $\pi$ -donor or  $\pi$ -acceptor.  
 $F^-$ , CO and  $NH_3$
- (b) How many isomers are possible for  $[Cr(en)_2(NCS)Cl]^+$  ? Give reasons for your answer. 3+2
6. (a) Give balanced equations for the reactions that occur when  $S_2O_3^{2-}$  reacts with  $Cl_2$  and  $I_2$  in aqueous solution.
- (b) What is inorganic graphite and why is it so called ? 2+(1+2)

**Group - B**

Answer any *two* questions : 10×2=20

1. (a) Anhydrous HF can not be obtained from the reaction of  $CaF_2$  and Conc. $H_2SO_4$  — Explain.
- (b) Predict the geometry of  $XeF_3^+$  with the help of VSEPR rule.
- (c)  $(CH_3)_3N$  and  $(SiH_3)_3N$  have similar formulae but have different structures — Explain.
- (d) Why is borazine much more reactive than benzene ?
- (e) Iodine is more soluble in presence of  $I^-$  ions — Explain.
- (f) Give the structure of cyclic trimetasilicate ion. 2+1+2+2+2+1
2. (a) Write the product and predict the geometry of the product formed —  
 $XeF_4 + NaF \rightarrow ?$
- (b) What do you know about Ellingham diagram ? Illustrate with example.

- (c) Draw the structure of  $[\text{Mg}(\text{EDTA})]^{2-}$ .
- (d) Give balanced ionic equation for the hydrolysis of  $\text{ICl}_3$  in aqueous sodium hydroxide.
- (e) Molar conductances at a dilution of 1024 litres of  $\text{PtCl}_4 \cdot 2\text{NH}_3$ ,  $\text{PtCl}_4 \cdot 3\text{NH}_3$  and  $\text{PtCl}_4 \cdot 6\text{NH}_3$  are 7, 97 and 520  $\text{Ohm}^{-1}\text{cm}^2$  respectively. Rationalise these data in the light of Werner's theory. 2+3+1+2+2
3. (a) Compare the chemistry of tri halides of N and P with respect to their hydrolytic behaviour.
- (b) Write a short note on Silicates.
- (c) What do you mean by linkage isomerism ? Give your answer with example.
- (d) Why is carbon used for reduction of  $\text{ZnO}$  ? 2+3+(2+1)+2
4. (a) What do you mean by hydrometallurgy ?
- (b) What happens when  $\text{AgNO}_3$  is added to  $\text{Na}_2\text{S}_2\text{O}_3$  ?
- (c) How does  $\text{XeF}_4$  and  $\text{XeF}_6$  react with water ? Give chemical equation.
- (d) Describe the structure and bonding of diborane.
- (e) Write the structure of the product formed —
- $(\text{CH}_3)_3\text{SiCl} \xrightarrow{\text{hydrolysis}} \quad \quad \quad 1+2+3+3+1$
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