



**WEST BENGAL STATE UNIVERSITY**  
B.Sc. Honours 4th Semester Examination, 2020

**CEMACOR09T-CHEMISTRY (CC9)**

Time Allotted: 2 Hours

Full Marks: 40

*The figures in the margin indicate full marks.  
Candidates should answer in their own words and adhere to the word limit as practicable.  
All symbols are of usual significance.*

**Answer any three questions taking one from each unit**

**Unit-I**

1. (a) Describe the principle of refining of nickel by Mond's process. 4
- (b) Copper can be extracted by hydrometallurgy but not zinc. Explain. 3
- (c) Which metals are produced and refined by van Arkel de Boer process? Give a brief description of the method used. 1+2
  
2. (a) Outline the principle of refining of metal by zone refining. 4
- (b) Which metals are generally extracted by electrolytic reduction and why? 2
- (c) Which metals are generally extracted together by Parting process? 1
- (d) What is the role of graphite rod in the electrometallurgy of aluminium? 3

**Unit-II**

3. (a) What product is expected when Xe reacts with  $\text{PtF}_6$  in vapour state? 2
- (b) Why the chemistry of Li is anomalous in comparison to sodium and potassium? 3
- (c) Why is  $\text{B}_3\text{N}_3\text{H}_6$  called 'inorganic benzene'? State the hybridization of B and N in the compound. State one difference between this compound and benzene regarding chemical behaviour. 2+2+1
- (d) Discuss the structure of  $\text{S}_4\text{N}_4$ . How the compound is prepared? 2+1
- (e) Why is  $\text{AlCl}_3$  covalent but  $\text{AlF}_3$  ionic? 2
- (f) Compare the properties of elements N, P, As, Sb, Bi in respect of their (i) hydrides and (ii) halides. 5
  
4. (a) What are interhalogens? Classify different binary interhalogens and give examples of each type. Comment on their hydrolysis products and structures. 6

- (b) Compare the catenation properties of C, Si and Ge with explanation. 3
- (c) 'Freons deplete the ozone layer of upper atmosphere' — Explain with equations. 4
- (d) 'The acidity of aqueous solution of boric acid increases in presence of glycerol' — Explain. 3
- (e) Discuss the structure and bonding of the following compounds: 2+2
- (i)  $\text{XeO}_3$       (ii)  $\text{XeF}_2$

### Unit-III

5. (a) Give IUPAC names of: 2
- (i)  $\text{Na}_4(\text{Fe}(\text{CN})_5\text{NOS})$
- (ii)  $[\text{PtCl}(\text{NH}_2\text{CH}_3)_2(\text{NH}_3)]\text{Cl}$
- (b) Draw the structures of the possible isomers of  $[\text{Pt}(\text{NO}_2)(\text{py})(\text{NH}_3)(\text{NH}_2\text{OH})\text{NO}_2]$ . 3
- (c) What is ambidentate ligand? Give examples. 3
- (d) Give evidence to show that  $[\text{Co}(\text{NH}_3)_5\text{Cl}]\text{SO}_4$  and  $[\text{Co}(\text{NH}_3)_5\text{SO}_4]\text{Cl}$  exist as ionization isomers. 2
6. (a) Give examples of each of the following types of ligand with name and formula: 2
- (i) bridging ligand
- (ii) bidentate ligand.
- (b) Write the IUPAC names of: 2
- (i)  $[\text{Pt}(\text{py})_4][\text{PtCl}_4]$
- (ii)  $[\text{CoN}_3(\text{NH}_3)_5]\text{SO}_4$
- (c) What do you mean by chelate effect? Explain why it is called an entropy effect. 2+2
- (d) Show the structure of  $\text{Cu}(\text{SO}_4) \cdot 5\text{H}_2\text{O}$ . 1
- (e) Give one example of 'Electronic Isomerism'. 1

*N.B. : Students have to complete submission of their Answer Scripts through E-mail / Whatsapp to their own respective colleges on the same day / date of examination within 1 hour after end of exam. University / College authorities will not be held responsible for wrong submission (at in proper address). Students are strongly advised not to submit multiple copies of the same answer script.*

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