



K21P 0188

Reg. No. : .....

Name : .....

IV Semester M.Sc. Degree (C.B.S.S. – Reg./Suppl. (Including Mercy  
Chance)/Imp.) Examination, April 2021  
(2014 Admission Onwards)

CHEMISTRY

CHE 4C.11 : Inorganic Chemistry – III

Time : 3 Hours

Max. Marks : 60

## SECTION – A

Answer **all** questions in **one** word or **one** sentence. **Each** question carries **one** mark.

1. Give any one applications of neutron diffraction analysis.
2. Is  $\text{Mn}(\text{CO})_5\text{NO}$  is paramagnetic or diamagnetic ?
3. Cerite contains \_\_\_\_\_ lanthanoids.
4. The common oxidation state of lanthanides is \_\_\_\_\_
5. In biological system, the metal ions involved in electron transport are \_\_\_\_\_
6. Carboxypeptidase contains \_\_\_\_\_ metal ion.
7. Explain any one methods for the preparation of  $\text{Ni}(\text{CO})_4$ .
8. Calculate the EAN of hexamminecobalt(III) ion. (8×1=8)

## SECTION – B

Answer **any eight** questions in **two** or **three** sentences. **Each** question carries **two** marks.

9. Explain Koopman's theorem.
10. What is the working principle behind CHN analyser ?

P.T.O.



11. Give three applications of X-ray absorption spectroscopy.
12. Give three differences between Raman and IR spectroscopy.
13. Why lanthanides are coloured ?
14. Explain actinide contraction.
15. What is Lande splitting factor ?
16.  $Ce^{3+}$  is colourless. Why ?
17. Explain the medical relevance of  $Li^+$  and  $Au(I)$ .
18. What is biomineralisation ?
19. What is chelation therapy ?
20. What is transcription ?
21. What is Hapticity ?
22. Write any two methods for the preparation of  $Cr(CO)_6$ .
23. How are the terminal and bridging carbonyls characterised ?
24. Explain Mössbauer effect. **(8×2=16)**

## SECTION – C

Short paragraph question. Answer **any four**. Each question carries **3** marks.

25. Explain the basic principles of NMR spectroscopy.
26. What are the similarities between lanthanoids and actinoids ?
27. Give a brief description of Mössbauer spectroscopy.
28. Explain hydrogen cycle.
29. Explain the structure of  $Fe_2(CO)_9$ .
30. Explain any two methods for the extraction of actinides.
31. Explain the principle of voltammetry.
32. What are the types of imaging agents used in medicinal field ? **(4×3=12)**



## SECTION – D

Essay type question. Answer **any four**. Each question carries **6** marks.

33. Explain the major differences between TGA and DTA.
34. Explain amperometric techniques.
35. Explain polarography.
36. Explain Ellingham diagram.
37. Explain different techniques used for the extraction of Lanthanides from monazite mineral.
38. Explain Lattimer-frost diagrams.
39. Explain the mechanism of oxygen transport.
40. Discuss the role of metal ions in biological systems.
41. Describe Nitrogen cycle.
42. What are dinitrogen complexes ? Explain end-on and side-on bridging.
43. Discuss the structure of  $CO_2(CO)_8$  in solution and solid phase.
44. Explain the structure and bonding of  $Fe(CO)_5$ ,  $Fe_2(CO)_9$  and  $Fe_3(CO)_{12}$ . **(4×6=24)**