

Reg. No. :

Name :

Fifth Semester B.Sc. Degree Examination, December 2023

First Degree Programme under CBCSS

Chemistry

Core Course VI

CH 1542 : INORGANIC CHEMISTRY — III

(2017 – 2019 Admission)

Time : 3 Hours

Max. Marks : 80

PART – A

Answer **all** questions. Each question carries 1 mark.

1. Calculate the spin only magnetic moment of Mn^{3+} .
2. Why Cu^+ and Zn^{2+} ions are not coloured?
3. Calculate the CFSE of the complex $[\text{CoF}_6]^{3-}$.
4. Explain the term *chelate effect*.
5. What are *homoleptic carbonyls*?
6. The *hapticity* of ethylene in forming π -complexes is _____
7. Name a *metalloporphyrin*. What is the metal present in it?

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8. How is copper obtained from copper matte?
9. Give an example of an *iron-sulphur* protein.
10. What is meant by *ore dressing*?

(10 × 1 = 10 Marks)

PART – B

Answer **any eight** questions. Each question carries **2** marks.

11. Ce^{3+} is a good reducing agent. why?
12. Complete and balance the following equation.
13. Name the following using IUPAC norms:
 - (a) $[\text{Co}(\text{en})_3]^{3+}$
 - (b) $\text{K}[\text{Ag}(\text{CN})_2]$.
14. Explain the term *coordination isomerism* by taking suitable examples.
15. Give an example each with structure for a *bridged* and a *non-bridged* polynuclear carbonyl.
16. What is *Ziese's salt*? Give a diagrammatic structure of it.
17. What mechanism transports Na^+ ions out of the cell in exchange of K^+ ions?
18. What are *rubredoxins*? Give a structural representation.
19. How does the XRD instrument operate?
20. What is the use of *atomic absorption spectroscopy*?
21. What are the uses of *alnicoalloys*?
22. What is an *intramedullary rod*?

(8 × 2 = 16 Marks)

PART – C

Answer **any six** questions. Each question carries **4** marks.

23. How do *lanthanides* and *actinides* differ with respect to
 - (a) Oxidation state, and
 - (b) Complex formation? Explain.
24. Discuss the *alloy* formation characteristics of transition metals.
25. Distinguish between the terms *labile complex* and *inert complex*.
26. Discuss the application of complexes in quantitative analysis.
27. Explain the mechanism and synthetic applications of *Ziegler-Natta catalysis*.
28. How will you achieve the synthesis of *bromoferrocene* from *ferrocene*?
29. Briefly discuss the role of *haemoglobin* in the transport of O_2 and CO_2 .
30. Write a note on *laws of spectrophotometry*.
31. What are the principle and applications of *Scanning Electron Microscopy (SEM)*?

(6 × 4 = 24 Marks)

PART – D

Answer **any two** questions. Each question carries **15** marks.

32.
 - (a) Explain the details of bonding synergetic effect operative in metal carbonyls.
 - (b) Explain the biochemical functions of calcium.
33.
 - (a) Discuss the consequences of *lanthanide contraction*.
 - (b) Write a note on the *magnetic properties* and *reducing properties* of transition elements.
34. Discuss the formation of the following complex ions on the basis of VBT:
 - (a) $[NiCl_4]^{2-}$; (b) $[Fe(F)_6]^{3-}$ (c) $[Co(CN)_6]^{3-}$
35. Write a note on the different thermal methods Viz. TG, DIA and DSC of analysis.

(2 × 15 = 30 Marks)