S – 1670

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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

(2020 Admission onwards)

Time : 3 Hours Max. Marks : 80

SECTION – A

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

1. In atomic absorption spectroscopy, the elements present in a sample are converted to gaseous atoms by a process called _____.

2. Identify the type of structural isomerism in this pair of complex:- $[Co(NH_3)_5Br]SO_4$ and $[Co(NH_3)_5SO_4]Br$.

3. Give an example for an organometallic compound containing both σ and π characteristics.

4. Give an example of an acidic flux.

5. Color of lanthanide ions is mainly due to _____ transitions.

6. The oxidation state of iron in haemoglobin is _____.

7. What are pseudo-transition elements?

8. What is wrought iron?

9. Give an example for an ambidentate ligand.

10. The most common oxidation state of actinides is _____.

(10 × 1 = 10 Marks)

SECTION – B

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

11. What is meant by leaching in metallurgy?

12. Explain any two biochemical processes of iron.

13. Explain the term chelate effect.

14. What is 18-electron rule?

15. State Beer-Lambert's law.

16. Transition metal ions form a large number of complex compounds. Explain.

17. What is meant by the term pyrometallurgy?

18. Sc^{3+} ion is colorless. Why?

19. What is meant by a labile complex?

20. The chemistry of all lanthanides is quite identical. Why?

21. What is meant by thermogravimetry?

22. Calculate the effective atomic number of $[Pt(NH_3)_6]^{4+}$.

(8 × 2 = 16 Marks)

SECTION – C

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

23. What is meant by differential thermal analysis (DTA)? What are the factors affecting DTA?

24. Explain light and dark reactions of photosynthesis.

25. Discuss the importance of the beach sands of Kerala.

26. What is Van Arkel method? Explain its application in the purification of titanium.

27. Explain Jahn-Teller effect.

28. Write a note on σ bonded organometallic compounds.

29. Explain the consequences of lanthanide contraction.

30. Discuss the principle and process of flame emission spectrometry.

31. Explain why transition metals are hard and brittle while alkaline and alkaline earth metals are soft.

(6 × 4 = 24 Marks)

SECTION – D

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

32. (a) Write a note on hydrometallurgy. **5+5+5**
    (b) Explain sodium-potassium pump.
    (c) Discuss the biochemical functions of magnesium.

33. (a) Discuss the bonding in metal carbonyls. **5+5+5**
    (b) What is Ziese's salt? Discuss the bonding involved in it.
    (c) Explain the cause of lanthanide contraction.

34. Discuss the crystal field splitting in octahedral complexes.

35. (a) What are the factors affecting the stability of complex ions? **5+5+5**
    (b) Discuss the magnetic properties of actinides.
    (c) What is meant by geometrical isomerism in complexes? Give one example.

(2 × 15 = 30 Marks)
