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Fifth Semester B.Sc. Degree Examination, February 2021

First Degree Programme under CBCSS

Chemistry

Core Course

CH 1542 : INORGANIC CHEMISTRY – III

(2017 Admission)

Time : 3 Hours Max. Marks : 80

SECTION – A

Answer **all** questions. Answer in a word/sentence. Each question carries **1** mark.

1. Zn(II), Cd(II) and Hg(II) ions are colourless. Why?
2. What is the most common oxidation state of lanthanides?
3. Sketch the d orbital splitting in square planar complex
4. What is liquation?
5. What is calcination in metallurgy?
6. Why are transition metals mostly used in construction materials?
7. Explain the structure of Zeise's salt?
8. What are cytochromes?

P.T.O.

9. Which is the most common ore of iron?

10. What is lanthanide contraction?

(10 × 1 = 10 Marks)

SECTION – B

Answer **any eight** questions, each question carries **2** marks. (short answer questions)

11. Briefly explain the metallurgy of sodium.

12. Explain the laws of spectrophotometry.

13. The electronic spectra of the lanthanide complexes are sharper in comparison with that of the transition metal complexes. Why?

14. Discuss the structure of dibenzene chromium

15. Briefly explain Scanning Electron Microscopy (SEM).

16. What is the reason for the high spin nature of the tetrahedral complexes?

17. Write a note on the geometrical isomerism in coordination complexes.

18. State and explain 18 electron rule.

19. What are the factors affecting the stability of metal complexes?

20. What are ambidendate ligands? Explain with examples.

21. Calculate the CFSE of the complex $[Co(NH_3)_6]^{2+}$.

22. What is the function of cytochrome P450 in human body?

(8 × 2 = 16 Marks)

SECTION – C

Answer **any six** questions. Each question carries **4** marks. (short essay type)

23. Give a short note on Jahn Teller distortion and its consequence.

24. Write a note on the preparation, properties and uses of $K_2Cr_2O_7$.

25. Explain the magnetic properties and complexation behaviour of lanthanides.

26. Discuss the mechanism of oxygen transport in blood.

27. Differentiate between Atomic absorption spectroscopy and Flame emission spectroscopy.

28. Discuss the working of a sodium - potassium pump in biological system.

29. Explain the bonding in complexes using valence bond theory.

30. Briefly explain the biochemistry of magnesium and calcium.

31. Explain the purification of metals by zone refining.

(6 × 4 = 24 Marks)

SECTION – D

Answer **any two** questions. Each question carries **15** marks. (essay type)

32. (a) Explain the application of coordination complexes in qualitative and quantitative analysis. **8**

    (b) Explain the factors affecting crystal field splitting. **7**

33. (a) Write a note on AFM and TEM. **5**

    (b) Mention the applications of organometallic compounds. **5**

    (c) Explain the principle of TG with example. **5**

34. (a) Write a note on the magnetic properties and colour of metal complexes. 5

(b) Differentiate between haemoglobin and myoglobin in terms of their structure and function. 5

(c) Explain the structure of iron carbonyls. 5

35. (a) Give a note on the ligand substitution reactions in metal complexes. 5

(b) What are iron sulphur proteins? 5

(c) Discuss the classification of organomattalic compounds. 5

(2 × 15 = 30 Marks)
