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Reg. No. : .....

Name : .....

Fifth Semester B.Sc. Degree Examination, December 2021

First Degree Programme Under CBCSS

Chemistry

Core Course

CH 1542 : INORGANIC CHEMISTRY – III

(2014 & 2016 Admission)

Time : 3 Hours Max. Marks : 80

SECTION – A

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

1. Ti^{3+} ion exhibits purple colour. Give reason.
2. Transition metals and their compounds have good catalytic properties. Given one compound used as catalyst.
3. Mention any two applications of coordination compounds in quantitative analysis.
4. Calculate the EAN of manganese atom in $Mn_2(CO)_{10}$.
5. Calculate CFSE for a low spin octahedral complex having d^6 electronic configuration.
6. Give two examples for ionic organometallic compounds.
7. Mention any two applications of silicon rubber.

P.T.O.

8. What are Silicides? Give any one example.

9. Mention two uses of carbides in industry.

10. What is Inorganic Benzene?

(10 × 1 = 10 Marks)

SECTION – B

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

11. Why this is difficult to oxidize Mn (II) to Mn (III)?

12. $[Fe(CN)_6]^{4-}$ and $[Fe(H_2O)_6]^{2+}$ are of different colors in dilute solutions. Why?

13. Which of the following complex ion is LS and which is HS?

    (a) $[CoF_6]^{3-}$

    (b) $[Rh(NH_3)_6]^{3+}$ Explain.

14. What is Chelate effect?

15. What are HNCC and LNCC? Give one example for each.

16. Give any four similarities of pseudo halogens and halogens.

17. What are sigma bonded organometallic compounds? Give one example.

18. Name two oxides of Phosphorous. Draw the structures of these.

19. What are inner and outer orbital complexes as per VBT? Illustrate with suitable examples.

20. Give the geometry and the structure of the compound IF_5.

21. Draw the structures of XeF_6 and XeO_3.

22. Explain the structure of B_4H_{10}.

(8 × 2 = 16 Marks)

SECTION – C

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

23. What is lanthanide contraction? Mention its consequences.

24. Explain the preparation, properties and uses of $K_2Cr_2O_7$.

25. Illustrate structural isomerism in co-ordination compounds with suitable example.

26. Discuss on factors affecting stability of complexes.

27. Write a short note on the biochemistry of Magnesium and calcium.

28. What is Zeise's salt? Explain the bonding in it.

29. Write a short note on cooperativity and Bohr Effect in oxygen transport.

30. Discuss briefly the biological function and toxicity of the following elements :

    (a) Cu

    (b) Zn

    (c) Cr

    (d) Hg

31. Discuss on different types of silicates.

(6 × 4 = 24 Marks)

SECTION – D

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

32. Explain crystal field theory. How does it differ from the valence bond theory? How does this theory account for the fact that $[CoF_6]^{3-}$ is paramagnetic but $[Co(NH_3)_6]^{3+}$ is diamagnetic though both are octahedral.

33. Explain the characteristics of d-block elements in detail.

34. Briefly explain the preparation, structure and bonding in ferrocene.

35. (a) Discuss briefly on Phosphorous based polymers.

(b) Write a short note on zeolites.

(2 × 15 = 30 Marks)
