STELLA MARIS COLLEGE (AUTONOMOUS) CHENNAI 600 086
(For candidates admitted from the academic year 2015-16)

SUBJECT CODE: 15CH/MC/IC64

B.Sc. DEGREE EXAMINATION, APRIL 2018
BRANCH IV - CHEMISTRY
SIXTH SEMESTER

COURSE : MAJOR-CORE
PAPER : INORGANIC CHEMISTRY - III
TIME : 3 HOURS **MAX. MARKS : 100**

SECTION – A

ANSWER ALL THE QUESTIONS. **(30x1=30)**

I. CHOOSE THE CORRECT ANSWER:

1. d-block elements in the periodic table can be referred as
   (a) Transition elements (b) Alkali elements
   (c) Alkali earth elements (d) Actinides
2. Central metal ion present in Hemoglobin is
   (a) Copper (b) Iron (c) Zinc (d) Sodium
3. The Coordination number for Fe^{2+} ion is
   (a) 2 (b) 4 (c) 6 (d) 0
4. The charge of Cobalt ion in the complex $[Co(NH_3)_6]Cl_3$ is
   (a) 3+ (b) 4+ (c) 5+ (d) 6+
5. Total hardness of water can be determined by using standard solution of
   (a) DMG (b) EDTA (c) NaOH (d) HCl
6. The shape of $[Cr(NH_3)_4Cl_2]^+$ is
   (a) Linear (b) Trigonal (c) Octahedral (d) Squar planar
7. Which of the following is a radio active metal
   (a) Pu (b) Fe (c) Zn (d) Hg
8. _____ metal can be extacted from monazite ore
   (a) Tungsten (b) Thorium (c) Tin (d) Titanium
9. Fe + CO
   The product formed in the above reaction is
   (a) $Fe(CO)_3$ (b) $Fe(CO)_4$ (c) $Fe(CO)_5$ (d) $Fe(CO)_6$
10. Cyclopentadiene ligand is present in ----------
    (a) Myoglobin (b) Alizarin (c) Cupferon (d) Ferrocene

II. FILL IN THE BLANKS:

11. $2MnO_4^- + 16H^+ + 5C_2O_4^{2-} \rightarrow 2Mn^{2+} + 8H_2O +$ ----------.
12. Zinc metal ion play vital role for proper functioning of --------.
13. Nomenclature of $K_3[Fe(CN)_6]$ coordination complex is ----------.
14. $[Co(NH_3)_5Br]SO_4$ and $[Co(NH_3)_5 SO_4]Br$ Complexes are the example for ---------- isomerism.
15. Ni^{2+} metal ion can be quantitatively precipitated by using ------- solution.
16. Ferroin is a --------- indicator.
17. --------- Chromotography can be used for separation of lanthanides.

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18. U^{235} is ------ active metal.
19. $Ni(CO)_4 + H_2SO_4 \rightarrow NiSO_4$ + ---------- + ----------.
20. The shape of $Ni(CO)_4$ is ----------.

III. MATCH THE FOLLOWING:

21. CrO_3/ H_3O^+	-	Bidentate ligand
22. Ethylene diamine	-	Pitch blende
23. Crystal field splitting	-	Oxidising reagent
24. Uranium	-	Highly basic compound
25. Buyl lithium	-	Low and high spin complex

IV. ANSWER IN ONE OR TWO SENTENCES:

26. Why Ti^{2+} is purple in colour but Ti^{4+} is colourless?
27. Write an example for polydentate ligand.
28. What is the respective central metal ion oxidation state, co-ordination number and the over all charge on the complex $NH_4[Cr(NH_3)_2(NCS)_4]$?
29. Write the general electronic configuration for lanthanides.
30. Does $Fe_2(CO)_9$ contain Fe-Fe bond? Write the structure.

SECTION – B

ANSWER ANY FIVE QUESTIONS: (5x6 = 30)

31. Write in detail about general electronic configuration, magnetic and chemical properties of transition metals.
32. What are the different types of ligands in a coordination complex? Write an example for each one.
33. Write a note on linkage, ionisation, and hydrate isomerism that exhibited by coordination complex.
34. What is spectrochemical series for ligands? How it can be used to predict whether the given complex is low or high spin?
35. Write the applications of the following compounds in quantitative analysis.
    (i) Dimethyl glyoxime (ii) Ferroin (iii) EDTA
36. Explain about lanthanide contraction and its consequences.
37. Write the preparation and structure of Ferrocene.

SECTION – C

ANSWER ANY TWO QUESTIONS: (2x20 = 40)

38. (a) Write a note on the biological role of Fe and Zn metals. (10)
    (b) Explain about the geometrical and optical isomerism exhibited by six coordinate complexes. (10)
39. State and explain about
    (a) Sidgwick effective atomic number rule. (10)
    (b) Crystal field theory of coordination complex. (10)
40. (a) Explain about the extraction of thorium from monazite and uranium from pitchblende. (10)
    (b) Write the preparation, any two chemical properties and structure of Ni and Fe carbonyls. (10)

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