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Name.....

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Reg. No.....

**THIRD SEMESTER M.Sc. DEGREE EXAMINATION, DECEMBER 2014**

(CSS)

Chemistry

**CH 3C 08—INORGANIC CHEMISTRY—II**

Time : Three Hours

Maximum : 36 Weightage

**Part A**

Answer all questions.

Each question carries 1 weightage.

1. How do Orgel diagrams differ from Tanabe-Sugano diagrams ?
2. Arrive at the ground terms for  $Mn^{2+}$  and  $Cr^{3+}$  ions.
3. How does antiferromagnetic property vary with temperature ? Explain.
4. What do you mean by temperature independent paramagnetism ?
5. Explain anation reaction with a suitable example.
6. What is *cis*-effect ? Explain.
7. Explain photoaquation reaction with an example.
8. What is Marcus equation ? Explain the terms involved.
9. How chemical shift is measured in NMR spectroscopy ?
10. How ESR spectroscopy can be used to distinguish between Cu(I) and Cu(II) in complexes ? Explain.
11. What is transmetallation reaction ? How this reaction is useful in the synthesis of organometallic compounds ?
12. How is Ziese's salt prepared ? Write down its structure.
13. Identify the co-ordination sites in  $\alpha$ -alanine ?
14. Differentiate between metalloenzymes and metal activated enzymes.

(14 × 1 = 14 weightage)

**Part B**

Answer any seven questions.

Each question carries 2 weightage.

15. How charge transfer spectra are produced ? How do charge transfer transitions differ from d-d transitions ?
16. Explain the reasons for deviation of magnetic moment values from spin-only values, 3d metal complexes.

Turn over



17. What is trans effect ? Discuss the theories of trans effect.
18. Write a note on the photochemical reaction of chromium complexes.
19. How infrared spectroscopy can be used to identify terminal and bridging carbonyl groups in metal carbonyls ?
20. Write a note on metal carbene complexes.
21. State and explain 18-electron rule as applied to organometallic compound.
22. How metal acetylene complexes are synthesised ? Give an account of their structure.
23. Discuss the special characteristics of vitamin B<sub>12</sub> which differentiate it from other vitamins.
24. Discuss the factors that affect the stability of metal complexes. (7 × 2 = 14 weightage)

### Part C

*Answer any two questions.  
Each question carries 4 weightage.*

25. How ferrocene is synthesised ? Give an account of its structure bonding and reactivity.
26. Explain A, D and I mechanisms of substitution reactions in octahedral transition metal complex bringing out the factors affecting the reactions.
27. Outline the principle involved in Mossbauer spectroscopy. How is it useful in the study of metal complexes ?
28. Discuss the general structural features of iron-sulphur protein and their role in biological systems. (2 × 4 = 8 weightage)