

LOYOLA COLLEGE (AUTONOMOUS), CHENNAI – 600 034



B.Sc. DEGREE EXAMINATION – CHEMISTRY

SIXTH SEMESTER – APRIL 2018

CH 6607– COORDINATION CHEMISTRY

Date: 10-05-2018

Dept. No.

Max. : 100 Marks

Time: 01:00-04:00

PART – A

Answer ALL the questions:

(10x2=20 Marks)

1. Octahedral field splitting energy, Δ_o , is always higher than tetrahedral field splitting energy, Δ_t . Why?
2. Many compounds of transition elements are colored. Explain.
3. What are the factors affecting the rate of substitution reactions in metal complexes?
4. In electron transfer reaction, the transfer of electron from $[Fe(CN)_6]^{4-}$ to $[Fe(CN)_6]^{3-}$ is rapid. Why?
5. What is trans effect?
6. How is trans diamminedichloroplatinum(II) obtained from trans tetrammineplatinum(II) by trans effect?
7. What are metal carbonyls? Give two examples.
8. Write the structures, and magnetic nature of $[V(CO)_6]$.
9. What is nitrogen fixation? What enzyme is useful for this process?
10. What is 18 electron rule in metal complexes? Give an example.

PART – B

Answer any EIGHT questions:

(8x5=40 Marks)

11. State and explain Jahn-Teller theorem
12. Differentiate between high spin and low spin complexes. Explain with examples.
13. Discuss the variation of radii of M^{3+} ions of first row transition metals using CF theory.
14. Explain photo substitution and photo isomerisation.
15. What are inert and labile metal complexes? Give any two examples.
16. Write the dissociative mechanism in ligand substitution reaction with examples.

17. Explain the cis effect with two examples.
18. Write the preparation of Schiff bases by template synthesis.
19. What is Ziegler – Natta catalyst? How is it formed?
20. Discuss the role of metal complexes as catalyst for hydroformylation of olefins.
21. Discuss the nature of M-C bonding in metal carbonyls.
22. a. What is catalase? Write its function.
b. What are metallo-enzymes? Give example.

PART – C

Answer any FOUR questions:

(4x10=40 Marks)

23. Draw the energy level diagram of $[Co(F_6)]^{3-}$ Explain with the help of molecular orbital theory.
24. a. What are the postulates of crystal Field theory?
b. Explain the splitting of d orbitals of metal in octahedral complexes.
25. Explain the outer and inner sphere mechanism of electron transfer reaction of complexes.
26. Discuss the different theories proposed for explaining the trans effect.
27. a. What is Wilkinson's catalyst? What is the role of the metal in this catalyst? **(4)**
b. Write the mechanism of hydrogenation of olefins using Wilkinson's catalyst. **(6)**
28. a. What is the significance of contrast agent in MRI? Give two examples.
b. Write the structure of carboxypeptidase – A. What is its biological importance?
