

LOYOLA COLLEGE (AUTONOMOUS), CHENNAI – 600 034



B.Sc. DEGREE EXAMINATION – CHEMISTRY

SIXTH SEMESTER – APRIL 2018

CH 6613– COORDINATION CHEMISTRY

Date: 19-04-2018
Time: 09:00-12:00

Dept. No.

Max. : 100 Marks

PART A

ANSWER ALL QUESTIONS

10x 2 = 20 Marks

1. Mention the primary and secondary valency in $[\text{Co}(\text{NH}_3)_6] \text{Cl}_3$
2. Mention the coordination number and oxidation state of the central metal atom in $[\text{Fe}(\text{CO})_5]$ and $[\text{Pt}(\text{Cl})_4]^{2-}$
3. What is meant by atom transfer reaction? Provide a suitable example.
4. What is chelate therapy?
5. Mention the advantages of Ziegler-Natta Catalyst.
6. Draw the structure of $\text{Mn}_2(\text{CO})_{10}$ and calculate the EAN.
7. Arrange the following ligands in their increasing order of trans effect. Cl , H_2O , NH_3 and Br
8. What is a Schiff base? Give an example.
9. Mention the metal ion present in the following enzymes i) carboxy peptidase ii) rubredoxins .
10. Draw the structure of cisplatin and write its IUPAC name.

PART B

ANSWER ANY EIGHT QUESTIONS

8 x 5 = 40 Marks

11. Classify the following as chelating or non-chelating ligands . i) Acetylacetonato ion ii) oxalate ion
iii) oxine iv) EDTA v) ammine.
12. Calculate the CFSE of the following ions i) Co^{3+} (Low spin and High Spin) ii) Mn^{2+} (Low spin and High Spin)
13. List out the postulates and drawbacks of VBT.
14. Explain the concept of associative and dissociative mechanism of substitution of $\text{Co}(\text{III})$ octahedral complex.
15. Explain the concept of photosensitisation with reference to a Donor-Acceptor molecule .
16. What is Kurnakov test? Mention its application for any $\text{Pt}(\text{II})$ complex of square planar geometry.

17. What is Wilkinson Catalyst and explain the advantages of Wilkinson catalyst over other catalyst.
18. Draw the structures of i) $\text{Co}_2(\text{CO})_8$ ii) $\text{Fe}_3(\text{CO})_{12}$ iii) $\text{Ni}(\text{CO})_4$.
19. a) Mention the criteria of metals used for diagnosis and chemotherapy.
b) Suggest four metals used for the detection of cancer.
20. Discuss the structure of myoglobin and its significance.
21. Distinguish cis effect from Trans effect with an example.
22. Explain the bonding in ferrocene and indicate the metal orbitals and ligands orbitals involved in bonding with a neat sketch

PART C

ANSWER ANY FOUR QUESTIONS

4 x 10 = 40 Marks

23. What is Jahn-Teller distortion? Sketch the d orbital spilling diagram to explain the Jahn-Teller distortion of d^{1-10} , high and low spin, octahedral complexes.
24. a) Explain the structural isomerism in coordination complexes with suitable examples.
b) Explain the concept of optical isomerism in octahedral complex of type MA_4B_2 and $\text{MA}_2\text{B}_2\text{C}_2$, where M is the central metal atom, A,B and C are neutral monodentate ligands (6)
25. What are the factors influencing the rate of substitution in square planar complexes
26. a) How will you prepare stereo regulated polypropylene by Zeigler-Natta catalyst and explain the mechanism.
b) Why does carbon monoxide ligand occupy higher position in the spectrochemical series even though it is a neutral ligand? (7+3)
27. Explain the concept of electron transfer in octahedral complexes by inner sphere and outer sphere mechanism using suitable example.
28. a) Explain the importance of MRI in biological applications for mankind (6)
b) Mention the active site in carboxy peptidase? Mention the role and function of the carboxy peptidase. (4)
