

Reg. No

Name

18P205

MSc DEGREE END SEMESTER EXAMINATION- APRIL 2018
SEMESTER 2 : CHEMISTRY / PHARMACEUTICAL CHEMISTRY
COURSE : 16P2CHET05 / 16P2CPHT05 ; INORGANIC CHEMISTRY – II

(Common for Regular - 2017 & Supplementary - 2016 admission)

Time : Three Hours

Max. Marks: 75

Section A

Answer any 10 (2 marks each)

1. $[\text{RuCl}_6]^{2-}$ is low spin complex, though Cl^- is lower in the spectrochemical series. Why?
2. Fluoride complexes of which alkaline earth metal cation is more stable? Why?
3. Which of the complex has smaller value of β , $[\text{NiF}_6]^{4-}$ or $[\text{NiBr}_4]^{2-}$? Explain the reason.
4. KMnO_4 is having intense violet colour, while MnSO_4 is faintly coloured. Explain the reason.
5. Ferromagnetism is not seen in fifth and sixth period d-block metals. Why?
6. The complex $[\text{Hg}(\text{CN})_4]^{2-}$ is labile as well as thermodynamically stable, why?
7. Substitution reaction in square planar complexes are stereo retentive, why?
8. The electron transfer reaction between $[\text{Ru}(\text{NH}_3)_6]^{2+}$ / $[\text{Ru}(\text{NH}_3)_6]^{3+}$ redox pair is much more faster than the electron transfer between $[\text{Co}(\text{NH}_3)_6]^{2+}$ / $[\text{Co}(\text{NH}_3)_6]^{3+}$ redox pair, why?
9. Explain linkage isomerism with an example.
10. What is ORD?
11. What is circular dichroism?
12. The spectra of actinides are not as sharp as lanthanides. Why?
13. What is the advantage of using $\text{Eu}(\text{fod})_3$ in NMR spectroscopy?

(2 x 10 = 20)

Section B

Answer any 5 (5 marks each)

14. Discuss the effect of Jahn – Teller distortion on the electronic spectra of Metal complexes with suitable example.
15. Differentiate ferromagnetism and antiferromagnetism.

16. Explain the fluorescence and phosphorescence in ruby.
17. Discuss the factors in which spin cross over in a complex depends.
18. What are the factors affecting the rate of water exchange reaction. Explain the different classes of complexes on the basis of rate of water exchange reactions.
19. Differentiate between labile and inert complexes. Explain, why $[\text{Cr}(\text{H}_2\text{O})_6]^{2+}$ is labile whereas $[\text{Cr}(\text{CN})_6]^{3-}$ is inert?
20. Give an account on Prussian blue and related structures.
21. Discuss the resolution method of chiral metal complexes with a suitable example.

(5 x 5 = 25)

Section C

Answer any 2 (15 marks each)

22. Discuss briefly the CF theory of octahedral complexes. Illustrate With suitable examples how this theory is useful in explaining the spectral and magnetic properties of complexes? What are the shortcomings of this theory?
23. a) Explain Jahn- Teller distortion with suitable example. How it affects the electronic transition of $[\text{Ti}(\text{H}_2\text{O})_6]^{3+}$? b) Discuss the MO treatment for tetrahedral complexes with sigma bonding alone and draw the molecularorbital energy level diagram. Show the ligand field splitting parameter Δ_t .
24. Explain the mechanism of electron transfer reaction. Explain, how Marcus theory is used for studying the rate of self-exchange reaction?
25. (a) What is trans effect? Discuss the different theories proposed for explaining the trans effect.
(b) Using trans effect series as a guide, outline the synthesis of geometrical isomers of $[\text{Pt}(\text{Cl})(\text{Br})(\text{Py})(\text{C}_2\text{H}_4)]$ starting from $[\text{Pt}(\text{Cl})_4]^{2-}$ and other ligands.

(15 x 2 = 30)