K22P 1375

Reg. No. : .....

Name : .....

III Semester M.Sc. Degree (CBSS – Reg./Sup./Imp.) Examination, October 2022
(2019 Admission Onwards)
CHEMISTRY
CHE3C.08 : Inorganic Chemistry – II

Time : 3 Hours Max. Marks : 60

SECTION – A

Answer **all** questions in **one** word or **one** sentence. **Each** question carries **one** mark.

1. What spectroscopic method(s) would one utilize in order to observe Jahn-Teller distortions in a paramagnetic molecule ?
2. What is nephelauxetic series ?
3. What is the ground state term for free ion d^2 and d^8 configuration ?
4. What is molar magnetic susceptibility ?
5. What are labile and inert complexes ?
6. Explain why Pt^{2+} form stable complexes with Cl^-.
7. Give any two examples for fluxional molecules.
8. Draw the structure of Re_3Cl_9. **(8×1=8)**

SECTION – B

Answer **any eight** questions. Answer may be **two** or **three** sentences. **Each** question carries **two** marks.

9. Explain on the magnetic nature of $[Pd(NH_3)_6]^{2+}$.
10. Which is colored, $[Ti(H_2O)_6]^{3+}$ or $[Sc(H_2O)_6]^{3+}$? Explain.

11. How does crystal field splitting affect the ionic radii of metal ions of first transition series ?

12. Explain Russell-Saunders coupling.

13. State and explain Curie-Weiss law.

14. What are labile and inert complexes ?

15. The absorption bands observed in electronic spectra of complexes is not sharp. Explain.

16. Explain why Pt^{2+} form stable complexes with Cl^{-}.

17. Explain why square planar complexes are more labile than octahedral complexes during ligand substitution reactions.

18. Discuss on the hapticity of cyclopentadienyl ligand.

19. What are LNCC and HNCC ?

20. The alkynyl compounds of transition metals are more stable than alkyl or aryl compounds. Explain. **(8×2=16)**

SECTION – C

Short paragraph questions. Answer **any four** questions. **Each** question carries **three** marks.

21. Explain Jahn-Teller defect. What spectroscopic method would one utilize in order to observe Jahn-Teller distortions in a diamagnetic molecule ?

22. Discuss the d-orbital splitting in square planar complexes according to CFT.

23. Explain Gouy method for the determination of magnetic susceptibility of complexes.

24. Explain $S_N1(CB)$ mechanism for base hydrolysis of complexes.

25. How binary formation constant are determined by spectrophotometric method ?

26. Discuss the mechanism of metal catalysed hydroformylation reaction. **(4×3=12)**

SECTION – D

Essay type questions. Answer **four** questions. **Each** question carries **six** marks.

27. A) Describe the molecular orbital diagram of hexafluoro cobalt (III) ion.

OR

B) Discuss in detail the assumptions and drawbacks of valence bond theory of complexes.

28. A) Explain orgel diagrams.

OR

B) Explain in detail the selection rules for electronic absorption in complexes.

29. A) Explain how binary formation constants are determined by pH meter.

OR

B) Discuss on the factors affecting the stability of complexes.

30. A) Discuss the structure and bonding in ferrocene.

OR

B) Discuss on metal clusters. **(4×6=24)**