K23P 1375

Reg. No. : .....

Name : .....

III Semester M.Sc. Degree (CBSS – Reg./Supple./Imp.) Examination, October 2023
(2020 Admission Onwards)
CHEMISTRY
CHE3C08 : 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. **(8×1=8)**

1. Give an example of a compound which will exhibit Jahn-Teller distortion.
2. Tetrahedral complexes are high spin. Why ?
3. What is the ground state term for p^2 configuration ?
4. What is Neel's temperature ?
5. Define chelate effect.
6. Why square planar complexes are considered as generally labile ?
7. What is Zeise's salt ? Draw its structure.
8. Give two examples of organometallic compounds of beryllium.

SECTION – B

Answer **any eight** questions. Answer may be **two** or **three** sentences. **Each** question carries **two** marks. **(8×2=16)**

9. Pt^{4+} ion forms octahedral whereas Pt^{2+} ion forms square planar complexes. Explain.
10. Draw the crystal field splitting diagram for $[CoCl_4]^{2-}$ and calculate CFSE.

P.T.O.

11. Write the electronic configuration of $[Fe(CN)_6]^{4-}$ on the basis of CFT and predict whether the complex is paramagnetic or diamagnetic.

12. Draw the Orgel diagram of transition metal complex with d^2 configuration.

13. $CdCO_3$ is colourless while CdS is yellow. Why ?

14. What do you mean by spin orbit coupling in transition metal complexes ?

15. What is trans effect ? Explain using examples.

16. Write notes on anation reactions with suitable examples.

17. Explain briefly substitution reactions in square planar complexes. What are the factors influencing the substitution reactions in square planar complexes ?

18. What are metallocenes ? Draw the structure of two metallocenes.

19. What do you mean by migratory insertion reactions ? Explain with suitable examples.

20. Write notes on metal alkyne complexes. Give two examples.

SECTION – C

Answer **any four** questions. Short paragraph questions. **Each** question carries **three** marks. **(4×3=12)**

21. Explain tetragonal distortion or Jahn-Teller distortion using suitable examples.

22. What is nephelauxetic effect ? What is the significance of Racah parameter ?

23. How magnetic measurements are used for the structural determination of transition metal complexes ? Explain using suitable examples.

24. Explain thermodynamic and kinetic stability of transition metal complexes using suitable examples.

25. What is oxidative addition reaction ? What are the characteristics of oxidative addition reactions ? Discuss using examples.

26. Explain Monsantoacetic acid process.

SECTION – D

Answer **any four** questions. Essay type questions. **Each** question carries **six** marks. **(4×6=24)**

27. A) Explain the MO energy level diagram for octahedral, tetrahedral and square planar complexes.

OR

B) Explain CFT. Write notes on the crystal field splitting in octahedral complexes. What are the factors affecting the magnitude of Δ ?

28. A) Discuss briefly Gouy method for the determination of magnetic susceptibility of complexes.

OR

B) What are Tanabe Sugano diagrams ? Draw the Tanabe Sugano diagram of d^2 octahedral complexes ? Discuss the applications of Tanabe Sugano diagrams.

29. A) Explain briefly the determination of formation constants by pH metric and spectrometric methods.

OR

B) Write notes on the redox reactions and photochemical reactions of coordination compounds.

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

OR

B) Explain the mechanism of hydroformylation reaction.

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