

❖ Problems

- Q 1. Define term symbols and also find out the ground state term for V^{3+} ion.
- Q 2. Calculate the total number of microstates for p^2 and d^7 -configurations.
- Q 3. Draw and discuss the pigeon-hole diagram for d^2 -configuration and also comment on the energy correlation of all the free ion terms.
- Q 4. How many singlet microstates do exist for a metal ion with an electronic configuration of $3d^1, 4f^4$?
- Q 5. Discuss the microstate distribution in 7F_2 term symbol.
- Q 6. Explain the energy correlation and spin-orbit coupling in Cr^{3+} and Cu^{2+} .
- Q 7. What are Orgel diagrams? How do they differ from Tanabe-Sugano diagrams?
- Q 8. Draw and discuss the generalized Orgel diagram for d^2, d^3, d^7 and d^8 electronic configurations.
- Q 9. How can you find out the high-spin low spin nature of a metal complex using the Tanabe-Sugano diagram for d^n -systems? Explain in detail using a suitable example.
- Q 10. What do you understand from the trigonal distortion of octahedral complexes? How does it affect the various d -orbital energy levels in low-spin Co^{3+} complexes?
- Q 11. Write a short note on the structural evidence from the electronic spectrum of transition metal complexes.
- Q 12. Define the Jahn-Teller theorem. Discuss its effect in the coordination chemistry.
- Q 13. How does the Jahn-Teller distortion affect the electronic spectrum of transition metal complexes?
- Q 14. Distinguish between static and dynamic Jahn-Teller distortion.
- Q 15. Write a short note on the spectrochemical series.
- Q 16. What is 'the nephelauxetic' effect and what is the empirical formula to calculate the Racah parameter for different metal ions in complexation?
- Q 17. What is ligand to metal charge transfer? Draw and discuss in tetrahedral complexes using MnO_4^- .
- Q 18. What is Prussian blue? Discuss the cause of its characteristic blue color.
- Q 19. What are the molecular addition compounds? Discuss the spectra of iodine in carbon tetrachloride.
- Q 20. Give any five applications of the enthalpy of adduct formation.

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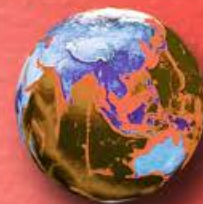
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MANDEEP DALAL



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