

**❖ Problems**

- Q 1. Give at least seven limitations of crystal field theory.
- Q 2. Why does the crystal field theory fail to provide any rational explanation for the nephelauxetic effect?
- Q 3. Discuss the “superexchange phenomenon” as an evidence for the presence of covalent-character in metal-ligand bonds.
- Q 4. Write down the main postulates of molecular orbital theory for metal complexes.
- Q 5. Explain the metal-ligand  $\sigma$ -bonding for octahedral complexes in the molecular orbital framework.
- Q 6. Draw and discuss the molecular orbital energy level diagram involving  $\sigma$ -bonding for tetrahedral complexes.
- Q 7. How does the  $\pi$ -bonding affect the magnitude of crystal field splitting in octahedral complexes when ligand  $\pi$ -orbitals are empty and are high in energy?
- Q 8. Explain the metal-ligand  $\pi$ -bonding for octahedral complexes in the molecular orbital framework.
- Q 9. Draw and discuss the molecular orbital energy level diagram involving  $\pi$ -bonding for tetrahedral complexes.
- Q 10. Draw the molecular orbital energy level diagram for  $\pi$ -bonding for square-planar complexes. Also, explain ligand to metal charge transfer in brief.

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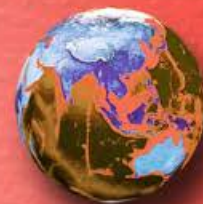
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**Volume I**

**MANDEEP DALAL**



*First Edition*

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ISBN: 978-81-938720-0-0



9 788193 872000

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