

❖ Problems

- Q 1. Give the principal routes to synthesize metal carbonyl complexes.
- Q 2. Discuss the nature of bonding for transition metal complexes in the framework of the molecular orbital theory.
- Q 3. Draw and discuss the structure of $\text{Fe}_3(\text{CO})_{12}$ and $\text{Ir}_4(\text{CO})_{16}$.
- Q 4. Write a short note on the structure of osmium-carbonyl complexes with special emphasis on $\text{Os}_4(\text{CO})_{14}$, $\text{Os}_4(\text{CO})_{15}$ and $\text{Os}_4(\text{CO})_{16}$.
- Q 5. How many metal-metal bonds and terminal carbonyls are present in $\text{Rh}_6(\text{CO})_{16}$?
- Q 6. How would you distinguish between square-pyramidal and trigonal bipyramidal geometries of $\text{Fe}(\text{CO})_5$ using their vibration spectra?
- Q 7. Discuss the effect of backbonding on the carbonyl stretching frequency in hexacarbonyl complexes of the first transition series.
- Q 8. How would you calculate the reaction rate for metal carbonyls using infrared spectroscopy?
- Q 9. Discuss the points of difference between linear and bent mode of bonding for nitrosyl ligand.
- Q 10. Explain the structure and bonding of metal-dioxygen complexes in detail.
- Q 11. How does the end-on bonding mode differ from side-on bonding mode in dinitrogen complexes of transition metals?
- Q 12. Give important reactions of coordinated ligands with reference to N_2 , O_2 and NO complexes.
- Q 13. Why is tertiary phosphine so important in organometallic chemistry?
- Q 14. What kind of orbitals do the tertiary phosphine use for backbonding? Explain in detail.
- Q 15. Define the ligand cone angle and the Tolman electronic parameter.

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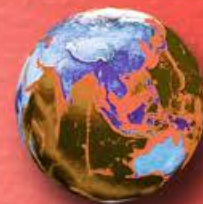
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Volume I

MANDEEP DALAL



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ISBN: 978-81-938720-0-0



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