

AE-756

M. Sc. (Previous)
Term End Examination, 2016-17

CHEMISTRY

Paper - I

Inorganic Chemistry

Time : Three Hours] [Maximum Marks : 100
[Minimum Pass Marks : 36

Note : Attempt any **five** questions. All questions carry equal marks.

1. (a) Write the rules of VSEPR theory with suitable examples. What are the limitations of VSEPR theory?
(b) Explain the Walsh diagram of H_2O molecule and its importance.
2. (a) Discuss the various factors affecting the stability of metal complexes.
(b) Write the chelate effect in metal complexes and its thermodynamic origin.

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3. (a) What is 'trans effect'? Discuss the theories of this effect.
- (b) Explain the SN^1 and SN^2 mechanisms for octahedral complexes.
4. Write notes on (any **two**) :
- (a) Inert and labile complexes
- (b) Electron transfer reaction
- (c) Kinetics of octahedral substitution
5. (a) Explain the σ (sigma) bonding in octahedral complexes with suitable examples.
- (b) Write the effect of π (pi) bonding on value of crystal field stabilisation energy (Δ_0).
6. (a) Explain the use of vibrational spectra for bonding and structural elucidation of metal carbonyls.
- (b) Describe the preparation and properties of metal nitrosyl complexes
7. Write notes on (any **two**) :
- (a) Dioxygen complexes
- (b) Tertiary phosphine as ligand
- (c) Dinitrogen complexes

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8. (a) Discuss and draw the Orgel diagram for d^1 and d^8 complexes.
- (b) Write notes on :
- (i) Charge transfer spectra
- (ii) Anomalous magnetic moments
9. (a) What are metal-clusters? Discuss the structure and bonding in carboranes.
- (b) What is Keggin ion? Discuss isopoly and heteropoly acids and salt in detail.
10. Write notes on (any **two**) :
- (a) Crown ether complexes
- (b) Symmetry elements and operations
- (c) C_2 , C_{2v} , C_{2v} and T_d point group