

AQ-901

M.Sc. Part-I (Semester -II) (CBCS Scheme)

Examination

INORGANIC CHEMISTRY

Paper-V

(Coordination Chemistry)

Time—Three Hours]

[Maximum Marks—80

N.B. :— (1) ALL questions are compulsory and carry equal marks.

(2) Use of scientific calculator is allowed.

1. (a) Draw and explain energy level molecular orbital diagram for tetrahedral complex showing σ and π bonding. 5
- (b) What are charge transfer spectra ? Explain its various types with suitable example. 5
- (c) Why does the t_{2g} set of orbitals in metal ions remain non-bonding in octahedral complexes of σ -donors ? Explain. 6

OR

- (p) What is inner sphere electron transfer reaction ?
Explain its mechanism. 5
- (q) What is Tunnelling effect ? Explain it with suitable
example. 5
- (r) Give a detail account on Marcus-Hush Theory. 6
5. (a) What are metal-carbonyls ? Discuss the structure
and bonding in $\text{Fe}_2(\text{CO})_9$. 5
- (b) How do vibrational spectra help to understand
bonding in metal carbonyls ? Explain. 5
- (c) Explain the formation of linear and bent O-N-M
bond in metal nitrosyls with help of hybridisation of
N-atom of nitrosyl group. 6

OR

- (p) Discuss structure and bonding in dinitrogen metal
complexes. 5
- (q) What is Wilkinson's Catalyst ? Explain its role in
homogeneous hydrogenation of alkenes. 5
- (r) Discuss the strength of back π -bonding in $\text{Ni}(\text{CO})_4$,
 $[\text{Fe}(\text{CO})_4]^{2-}$ and $[\text{Co}(\text{CO})_4]^-$ metal carbonyls on the
basis of IR spectra. 6