

Roll No.

22001

M. Sc. (Chemistry) 2nd Semester
Examination – May, 2019

INORGANIC CHEMISTRY-II

Paper : CY(H)-201

Time : Three hours] [Maximum Marks : 80

Before answering the questions, candidates should ensure that they have been supplied the correct and complete question paper. No complaint in this regard, will be entertained after examination.

Note : Question No. 1 is *compulsory* and all questions carry equal marks. Attempt *five* questions in all, selecting at least *one* question from each Section.

1. **Compulsory Question :** 2+2+2+2+2+2+2=16

- (a) What are homonuclear and heteronuclear carbonyls ?
- (b) What is Nephelauxetic effect ?
- (c) Explain Synergic effect.

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- (d) What is Neil's temperature ?
- (e) What is G.S.T. for Mn^{2+} ion ?
- (f) Predict structure of $[Ru_5N(CO)_4]$ using skeletal and non- skeletal electrons.
- (g) Differentiate between atomic orbital and molecular orbital.
- (h) Define T.I.P.

SECTION – A

- 2. (a) Draw and explain M.O. diagram for the octahedral complex $[Cr(H_2O)_6]^{3+}$. 8
- (b) Discuss all the factors influencing the stability of coordination compounds. 8
- 3. (a) Discuss Crystal Field Theory. 8
- (b) Discuss effect of π -overlapping on the magnitude of splitting energy, considering only π -overlapping with d_{xy} orbitals of metal used. 8

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SECTION – B

- 4. (a) Discuss electronic spectra for molecular compounds of I_2 .
- (b) Discuss Orgel diagrams for d^2 and d^4 metal ions for octahedral complexes. Also predict possible transitions.
- 5. (a) Discuss and draw the T-S diagram for d^3 system.
- (b) Explain LMCT transitions in tetrahedral complexes taking suitable examples.
- (c) Explain Jahn Teller distortion with suitable examples.

SECTION – C

- 6. (a) Explain Guoy's method for determination of magnetic susceptibility.
- (b) What are L.N.C.C ? Also discuss structure and bonding in following :
 $(\mu-CO)_2(CpRh)_3CO$ and $\eta^4-(C_4H_4)_2Fe_2(CO)_3$

- 7. (a) What is magnetic moment ? Also discuss orbital contribution to magnetic moment of substances for high spin and low spin complexes. 8
- (b) Draw and discuss structure of $B_{10}H_{14}$ and meta- $C_2B_2H_{12}$. 8

SECTION – D

- (a) Explain bonding in carbonyl complexes. 6
- (b) Discuss the structure of sodium nitroprusside. 5
- (c) Write short note on tertiary phosphine as ligand. 5
- (a) Describe linear and bent Nitrosyl Ligand with suitable examples. 8
- (b) Why dinitrogen is weaker ligand in comparison to carbonyl ligands ? Explain by M.O. diagrams of each. 8