MASTER OF SCIENCE (CHEMISTRY) (CBCS - 2018 COURSE)
M.Sc. (Chemistry) Sem-II :SUMMER- 2022
SUBJECT : INORGANIC CHEMISTRY - II

Day : Thursday
Date : 14-07-2022

S-20145-2022

Time : 03:00 PM-06:00 PM
Max. Marks : 60

N.B.:

1) All questions are **COMPULSORY.**
2) Answer to both the sections should be written in **SEPARATE** answer books.
3) Figures to the right indicate **FULL** marks.
4) Draw neat and labelled diagrams **WHEREVER** necessary.
5) Use of non-programmable **CALCULATOR** is allowed.

SECTION-I

Q.1 Answer **ANY THREE** of the following: **(15)**

a) Draw the shapes of 'd' orbitals and explain these shapes in detail.

b) Write the assumption of crystal filed theory and give its two important merits.

c) Define and explain the terms 'high spin' and 'low spin' complexes with suitable examples.

d) Draw M.O. Energy level diagram for an octahedral complex without π bonding

e) Write a note on- 'Spetrochemical series of ligands'.

Q.2 A) Answer **ANY TWO** of the following: **(10)**

a) Explain with reasons- $\left[Ni(CN)_4\right]^{-2}$ has square planar geometry while $\left[NiCl_4\right]^{-2}$ has tetrahedral geometry.

b) Write the limitations of valence bond theory.

c) Explain the Van Arkel's method used for the purification of Impure Titanium metal to obtain extra- pure titanium metal.

B) Solve **ANY ONE** of the following: **(05)**

a) Calculate the magnetic moment in B.M. in the following complex ions.

i) $\left[Co(CN)_6\right]^{-3}$ ii) $\left[Zn(NH_3)_4\right]^{+2}$

b) Give the VB representation of $\left[Cu(NH_3)_4\right]^{+2}$ metal ion.

P.T.O.

SECTION-II

Q.3 Answer **ANY THREE** of the following: **(15)**

a) Explain the role of Sodium and Potassium in biological system.

b) Explain structure and properties of 'Ferrocene'.

c) Describe biological importance of Iron.

d) Write the importance of metalloenzymes. Also explain any one zinc-metalloenzyme.

e) Write a note on: Nuclear fuels.

Q.4 Answer **ANY THREE** of the following: **(15)**

a) Discuss any two methods for synthesis of transition metal carbonyls.

b) Describe catalytic cycle involved in Hydroformulation.

c) Why separation of lanthanides is difficult? Explain ion-exchange method for their separation.

d) How copper is important in biological process? Explain following copper metalloenzymes:-

i) Super oxide Dismutase ii) Cytochrome C oxidase

e) Write a note on:- Nitrogen fixation.

* * * * *