UNIVERSITY OF THE PUNJAB

B.S. 4 Years Program : Fifth Semester – 2020

Paper: Inorganic Chemistry

Course Code: CHEM-303 **Part – I (Compulsory)** **Time: 15Min. Marks: 10**

Roll No. in Fig. .....

Roll No. in Words. .....

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Signature of Supdt.:

Attempt this Paper on this Question Sheet only.
Division of marks is given in front of each question.
This Paper will be collected back after expiry of time limit mentioned above.

Q.1. Encircle the right answer cutting and overwriting is not allowed. (10x1=10)

i) The metal carbon bond becomes _____ with increased back donation of electrons from metal to carbon.

a) Weak **b)** Strong **c)** Small **d)** Smallest

ii) The CFSE for tetrahedral complexes (Δ_t) is lesser than CFSE for octahedral complexes (Δ_o); the relationship is_____.

a) $\Delta_t = 4/9\Delta_o$ **b)** $\Delta_o = 4/9\Delta_t$

c) $\Delta_t = 9/4\Delta_o$ **d)** None of them

iii) According to VSEPR theory, the geometry of I_3^- is;

a) Trigonal Planar **b)** Tetrahedral **c)** Pyramidal **d)** Linear

iv) According to CFT, how many unpaired electron are present in complex $[Fe(CN)_6]^{3-}$?

a) 1 **b)** 2 **c)** 3 **d)** 4

v) The structure of IF_7 is:

a) Octahedral **b)** Pentagonal bipyramidal

c) Square Pyramidal **d)** Trigonal Prismatic

vi) Which metal complex ion expected to show John-Teller distortion:

a) $[Cr(H_2O)_6]^{+3}$ **b)** $[Cr(NH_3)_6]^{+3}$

c) $[Cr(CN)6]^{-3}$ **d)** $[Cr(bPh)_3]^{+2}$

vii) The Magic number of Fe in $[Fe(CO)_4]^{-2}$ is;.

a) 6 **b)** 7 **c)** 8 **d)** 9

viii) CFESE for a high spin d4 complex is:

a) $\Delta = -0.6$ **b)** $\Delta = -1.8$

c) $\Delta = -1.6$ **d)** $\Delta = -1.2$

ix) The type of hybridization in $[Mn(CN)_6]^{-4}$ is:

a) sp^3 **b)** d^2sp^3 **c)** dsp^3 **d)** sp^3d

x) In case of pure insulator covalent band is:

a) Full band **b)** Empty band

c) Semi filled **d)** Similar to conduction band

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Roll No. ……

Paper: Inorganic Chemistry Course Code: CHEM-303Part – II **Time: 2 Hrs. 45 Min. Marks: 50**

ATTEMPT THIS (SUBJECTIVE) ON THE SEPARATE ANSWER SHEET PROVIDED

Q.2. Give short answers of the following: **(10x2=20)**

i) How the metal carbonyl acts as a Lewis acid?

ii) What are inner orbital complexes? Give an example?

iii) Discuss the structure of $Fe_{2(}CO)_9$.

iv) Sodium is a good conductor of electricity while Silicon is a semi-conductor. why?

v) What are N(E) curve?

vi) Draw the structure of $[Fe(CN)_6]^{-3}$ on the basis of VBT.

vii) What are strong and weak field ligands?

viii) What is EAN rule?

ix) Draw M.O diagram of $Cr(CO)_6$.

x) How does temperature affect the conductivity in semiconductors?

Q.3. Give brief answers of the followings. **(6x5=30)**

i) Describe applications of metal complexes in analytical chemistry.

ii) Discuss the chemistry of $[Fe(CO)_5]$.

iii) Compare the conductivity of univalent, bivalent and trivalent metal?

iv) Explain the effect of temperature and impurities on conductivity

v) Discuss Metallic bond on the basis of Band theory.

vi) Discuss the structures of the following with the help of VSEP

a) $PbCl_2$ b) NH_3 c) ICl_2^-