



UNIVERSITY OF THE PUNJAB

Fifth Semester – 2019

Examination: B.S. 4 Years Program

Roll No. in Fig.

Roll No. in Words.

PAPER: Inorganic Chemistry
Course Code: CHEM-303 Part-I (Compulsory)

MAX. TIME: 15 Min.

MAX. MARKS: 10

Signature of Supdt.:

Attempt this Paper on this Question Sheet only.

Please encircle the correct option. 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. (1x10=10)

- i) What is the oxidation number of platinum in the coordination compound, $\text{Pt}(\text{NH}_3)_2\text{Cl}_2$?
a) +1 b) -1 c) 0 d) +2
- ii) The energy gap between conduction and valence band is termed as;
a) Potential energy band b) Kinetic energy band c) Forbidden Zone d) None of these
- iii) Which theory explains ionic bonding between metal ion and ligand in metal complexes?
a) VBT b) MOT c) CFT d) None of the above
- iv) The Crystal Field Stabilization Energy (CFSE) for the $[\text{Fe}(\text{H}_2\text{O})_6]^{3+}$ complex;
a) $2.0 \Delta_0$ b) $1.2 \Delta_0$ c) $2.4 \Delta_0$ d) $0.0 \Delta_0$
- v) The IUPAC name of $\text{K}_3[\text{Fe}(\text{CN})_6]$ is
a) Potassium hexacyano ferrate (II) b) Potassium hexacyano ferrate (III)
c) Potassium hexacyano ferrate (IV) d) None of these
- vi) Which one of the following ligands form a chelate:
a) Acetate b) Oxalate c) Cyanide d) Ammonia
- vii) In complex formation, the central metal atom/ion acts as;
a) Lewis Base b) Lewis Acid c) Bronsted Acid d) Bronsted Base
- viii) Which d-orbital is used in dsp^2 hybridization resulting square planar geometry?
a) d_{xy} b) $d_{x^2-y^2}$ c) d_z^2 d) d_{xz}
- ix) The Magic number of iron in $[\text{Fe}(\text{CO})_4]^{-2}$ is;
a) 6 b) 7 c) 8 d) 9
- x) The strength of a ligand can be determined by:
a) Spectrochemical series b) Electrochemical series



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MAX. TIME: 2 Hrs. 45 Min.

MAX. MARKS: 50

ATTEMPT THIS (SUBJECTIVE) ON THE SEPARATE ANSWER SHEET PROVIDED

Q.2. Questions with Short Answers.

(2 x 10 = 20)

- i) Describe Metallic Bond on the basis of Band theory?
- ii) What is the effect of impurities on conductivity of the metal?
- iii) Draw the M.O diagram of $\text{Cr}(\text{CO})_6$
- iv) Give postulates of Werner's theory.
- v) Define Magic Number giving suitable examples.
- vi) Draw the structure of $[\text{CoF}_6]^{3-}$ on the basis of MOT.
- vii) Write a short note on Semi-Conductors?
- viii) What are Outer orbital complexes? Give an example?
- ix) Discuss any three methods for the preparation of $\text{Fe}(\text{CO})_5$.
- x) What are the limitations of CFT?

Q.3. Questions with Brief Answers.

(5 x 6 = 30)

- i) Discuss the structures of following on the basis of VBT.
a) $[\text{Fe}(\text{CN})_6]^{4-}$ b) $[\text{Fe}(\text{H}_2\text{O})_6]^{2+}$
- ii) Write a short note on Spectrochemical series.
- iii) Explain briefly Binding Energy in metals.
- iv) Describe the preparation and structure of $\text{Ni}(\text{CO})_4$.
- v) Predict the shape of the following molecules / ions on the basis of VSEPR model.
a) XeF_4 b) NH_4^+ c) IF_7
- vi) Describe the bonding in metal carbonyls on the basis of IR.