Avinashilingam Institute for Home Science and Higher Education for Women
Coimbatore-641043.

Master's Degree Examination – November 2017

I- Semester

Class : IPG **Time: 3 hours**
Major : Chemistry **Max. Marks: 60**

17MCHC02 – INORGANIC CHEMISTRY I

Part A **10 x 1/2 = 5**

Choose the correct answer

1. The complex ion which has no d-electron in the central metal atom is

a. $[MnO_4]^-$ b. $[Co(NH_3)_6]^{3+}$ c. $[Fe(CN)_6]^{3-}$ d. $[Cr(H_2O)_6]^{3+}$

2. The splitting of d orbitals will be more in F^- as compared to Cl^- because

a. F^- is strong field ligand b. F^- is smaller in size c. F^- is larger in size d. F^- is weak field ligand

3. The number of microstates for P^2 configuration is

a. 10 b. 20 c. 18 d. 15

4. The lowest energy term for d^2 ion is

a. ^3F b. ^1S c. ^3P d. ^4P

5. Aluminon reagent is used for the analysis of ____

a. Nickel b. Cobalt c. Aluminium d. Zinc

6. Which of the following is used for the analysis of Ni^{2+}?

a. Alizarin b. DMG c. Magneson d. Cupron

7. Which of the following mononuclear carbonyls does not obey EAN rule?

a. $Fe(CO)_5$ b. $Ni(CO)_4$ c. $Cr(CO)_6$ d. $V(CO)_6$

8. Ferrocene has ____ structure.

a. Linear b. Sandwiched c. Bridged d. Octahedral

9. What is the coordination number of Wurtzite?

a. 4 b. 6 c. 2 d. 5

10. Which one the following impurity is responsible for n-type semiconductor?

a. Boron b. Gallium c. Arsenic d. Aluminum

Part B

5 x 4 = 20

Answer ALL questions

Each answer should not exceed 200 words or one page

11.a. Predict the number of unpaired electrons and the spin only magnetic moments at 25 °C for the following, (i) $[Fe(CN)6]^{4-}$ (ii) $[Ru(NH_3)_6]^{3+}$ (iii) $[Cr(NH_3)_6]^{2+}$

(Or)

11.b. Give the salient features of crystal field theory.

12.a. Explain the Jahn-Teller distortion in $[Cu(H_2O)_6]^{2+}$.

(Or)

12.b. Discuss Russel – Saunders states for d^2 configuration.

13.a. Give the analytical applications of rhodamine b.

(Or)

13.b. Discuss the advantages and disadvantages of organic reagents over inorganic reagents.

14.a. Discuss the structure of $Os_3(CO)_{12}$ and $Os_2(CO)_9$ complexes.

(Or)

14.b. Give an account on the synthesis and applications of organo Lithium compounds.

15.a. Discuss the structure of CsCl ionic crystals.

(Or)

15.b. Write a note on P and n type semiconductors.

Part C

5 x 7 = 35

Answer ALL questions

Each answer should not exceed 600 words or three pages

16.a. Discuss the crystal field splitting of d-orbitals in the case of octahedral complexes.

(Or)

16.b. Explain crystal field splitting in tetrahedral complexes. Give reasons for smaller value of crystal field splitting in tetrahedral than in octahedral complexes.

17.a. Discuss the Orgel diagram and absorption spectra for a d^8 ion.

(Or)

17.b. Discuss the nature of electronic transitions in octahedral high spin complexes of metal ions with d^6 configuration.

18.a. Discuss the analytical uses of Aluminon and cupferron.

(Or)

18.b. Discuss the analytical uses of alpha-benzoin, magneson and dimethyl glyoxime.

19.a. Describe bonding in metal carbonyls. How is IR spectroscopy helpful in explaining bonding in metal complexes?.

(Or)

19.b. Give a detailed account of preparation, properties, structure and uses of ferrocene.

20.a. Explain in detail about radius ratio rule and mention its effect on the shape of ionic crystals.

(Or)

20.b. Explain in detail about Band theory.

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