

M. SC. (ANALYTICAL CHEMISTRY) / M. SC. (ORGANIC CHEMISTRY) / M. SC. (INORGANIC CHEMISTRY) SEM-II
(CHOICE BASED CREDIT & GRADE SYSTEM) : SUMMER -
2018

SUBJECT : INORGANIC CHEMISTRY – II

Day : Friday
Date : 13/04/2018

Time : 03.00 PM TO 06.00 PM
Max. Marks : 60

S-2018-0871

N.B.

- 1) All questions are **COMPULSORY**.
- 2) Figures to the right indicate **FULL** marks.
- 3) Answers to both the sections should be written in **SEPARATE** answer book.
- 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 and explain in brief the M.O. energy level diagram for $[\text{CO F}_6]^{-3}$ complex ion and write its magnetic properties.
 - b) Explain the V.B picture of the following complexes:
i) $[\text{Cr}(\text{H}_2\text{O})_6]^{+3}$ ii) $[\text{Zn}(\text{NH}_3)_4]^{+2}$
 - c) Write the distribution of d^5 and d^{10} electrons in a metal ion in weak ligand field and explain them in detail.
 - d) Explain the Van Arkel's method for purification of impure Titanium metal to obtain extra pure Titanium metal.
 - e) Write the assumptions of crystal field theory.
- Q.2** A) Answer any **TWO** of the following: (10)
- a) Define and explain in detail what do you mean by i) Inert complex ii) Labile complex.
 - b) Explain the square planer structure of $[\text{Ni}(\text{CN})_4]^{-2}$ complex ion.
 - c) Write a note on –“Variable oxidation states.”
- B) Solve any **ONE** of the following: (05)
- a) Calculate the magnetic moment in B.M. in the following complex ions
i) $[\text{VF}_6]^{-3}$ ii) $[\text{Fe}(\text{CN})_6]^{-4}$
[At. No. for V = 23, Fe = 26]
 - b) Calculate the CFSE in Δ_0 for
i) d^5 – tetrahedral weak legand field system
ii) d^8 – octahedral strong ligand field splitting

SECTION – II

- Q.3** Answer any **THREE** of the following: (15)
- a) Comment upon the oxidation states of Lanthanides and actinides.
 - b) Explain the biological role of Ca and Fe.
 - c) What are the requirements of metallic compound to function as a homogeneous catalyst?
 - d) What is Misch metal? How is it prepared? Give two properties and two uses of Mich metal.
 - e) Write a note on –“Hydroformylation”.
- Q.4** Answer any **THREE** of the following: (15)
- a) Give the structures of the following:
i) $\text{Mn}_2(\text{CO})_{10}$ ii) $\text{Co}_2(\text{CO})_8$ iii) $\text{Ni}(\text{CO})_4$
 - b) Explain the functions of Hemoglobin and myoglobin.
 - c) Write a short note on ‘Ferrocene’.
 - d) What are nuclear Fission Fuels?
 - e) Explain solvent extraction method used for purification of Lanthanides.

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