

SUBJECT : INORGANIC CHEMISTRY – II

Day : Saturday
Date : 13/04/2019

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

S-2019-1166

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 books.
- 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) Give the valence bond representation of the following complex ions.
 - i) $[\text{Zn}(\text{NH}_3)_6]^{+2}$
 - ii) $[\text{Co}(\text{CN})_6]^{-3}$
- b) Write and explain in brief the assumptions made by CFT to explain the bonding in metal complexes.
- c) Draw the MO energy level diagram for $[\text{Ni}(\text{NH}_3)_6]^{+2}$ and comment upon the magnetic properties of the complex.
- d) Explain the Mond's method for the manufacture of pure Nickel metal from its ores.
- e) What is spectrochemical series of the ligands? Explain it with suitable example.

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

- i) Explain with reasons – The complex ion $[\text{Fe}(\text{CN})_4]^{-4}$ is diamagnetic while $[\text{Fe}(\text{CN})_6]^{-3}$ complex ion is paramagnetic.
 - ii) Draw crystal field splitting diagram for the following:
 - 1) Octahedral ligand field
 - 2) Tetrahedral ligand field
 - iii) Write a note on – Merits and demerits of valence bond theory.
- b) Solve **ANY ONE** of the following: (05)

- i) Calculate the CFSE in Dq for Cr^{+3} ion in a strong octahedral ligand field.
- ii) Find out the number of unpaired electrons in the following complex ions
 - i) $[\text{Co}(\text{CN})_6]^{-3}$
 - ii) $[\text{Fe}(\text{CN})_6]^{-2}$

P.T.O.

SECTION – II

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

- a) Explain biological role of Calcium and Magnesium.
- b) Define 'Nuclear Fuels'. Explain Nuclear fussion fuels with suitable examples.
- c) What are metallo enzymes? Explain following zinc metalloenzymes in brief.
i) Carboxy peptidase ii) Alkaline phosphatase
- d) Draw the structures of following carbonyl compounds.
i) $\text{Ni}(\text{CO})_4$ ii) $\text{Fe}_2(\text{CO})_9$ iii) $\text{Co}_4(\text{CO})_{12}$
- e) What are different applications of Lanthanides?

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

- a) Discuss the mechanism of Waker's process of conversion of alkenes to aldehydes.
- b) What are functions of haemoglobin and myoglobin?
- c) Describe the Ion-exchange method for separation of lanthanides.
- d) Explain structure, properties and preparation method of 'Ferrocene'.
- e) Write a note on 'Photosynthesis'.

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