

M. SC. (Analytical Chemistry) / M. SC. (Organic Chemistry) / M. SC.
(Inorganic Chemistry) Sem-II (Choice Based Credit & Grade System) :

WINTER - 2018

SUBJECT: INORGANIC CHEMISTRY – II

Day: : Wednesday
Date: 10/10/2018

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

W-2018-0984

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 diagrams **WHEREVER** necessary.
- 5) Use of non – programmable **CALCULATOR** is allowed

SECTION – I

Q.1 Attempt any **THREE** of the following: **(15)**

- a) Define ore. Write the names of important ores of Iron metal. Explain in brief the Blast furnace method for preparation of pig iron from its ore.
- b) Draw and explain in brief the shapes of 'd' orbital.
- c) Write the assumption of Molecular orbital theory.
- d) Explain in brief i) The inner sphere mechanism and ii) Outer sphere mechanism
- e) Discuss the V.B. presentation of the following complex ions.
i) $[\text{Cr}(\text{NH}_4)_6]^{+3}$ ii) $[\text{NiCl}_4]^{-2}$

Q.2 A) Attempt any **TWO** of the following: **(10)**

- a) What do you mean by variable oxidation states. Explain the variable oxidation states w.r.t. the 1st series of elements of 'd' block.
- b) Write the distribution of d^3 , d^6 and d^8 electrons of a metal ion in strong and weak ligand fields in octahedral complex.
- c) Write note on 'Spectrochemical series of Ligands'.

B) Solve any **ONE** of the following: **(05)**

- a) Calculate CFSE in D_q units for Fe^{+3} ion in octahedral and tetrahedral complexes.
- b) Calculate the number of unpaired electrons and their magnetic moments in B.M. in the following systems
 d^5 and d^7 systems in strong and weak ligand field splittings

SECTION - II

Q.3 Attempt any **THREE** of the following: **(15)**

- a) Describe Ion exchange method for the separation of Lanthanides.
- b) Explain biological importance of Iron.
- c) Explain following types of methods for the preparation of transition metal carbonyls.
i) Direct reaction ii) Reductive carbonylation
- d) What are nuclear fuels? Explain fusion and fission nuclear fuels.
- e) How sodium and potassium are important in different biological processes?

P.T.O.

Q.4 Attempt any **THREE** of the following:

(15)

- a) Discuss the following metalloenzymes of copper
 - i) super oxide dismutase
 - ii) Cytochrome C Oxidase
- b) Draw the structure of following
 - i) $V(CO)_6$ ii) $Fe_2(CO)_9$ iii) $Co_4(CO)_{12}$
- c) What are transuranic elements? Describe any one method for preparation of transuranic elements
- d) Explain the process of 'Photosynthesis'.
- e) Describe the catalytic cycle involved in Wacker's process.

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