

## M.Sc. (Sem.-IV) Examination

507

## Chemistry (Inorganic)

April-2017

Time : 3 Hours]

[Max. Marks : 70

- Q.1. (a) Write a short note on applications of FT-IR referring few examples ? [7]  
OR  
(a) Explain the IR Spectra of thiocyanate ion and its coordination in a metal complex? [7]  
(b) Write a short note on Hyperfine Splitting ? [7]  
OR  
(b) Why it is harder to observe the ESR spectra of 2<sup>nd</sup> and 3<sup>rd</sup> row transition series elements? Compare it with first row transitions series. [7]
- Q.2. (a) Write a short note on FT-NMR. [7]  
OR  
(a) Explain Deuterium coupling and Nitrogen coupling. [7]  
(b) Explain the Mossbauer spectra of Fe[Fe(CN)<sub>6</sub>]. [7]  
OR  
(b) Write a short note on principle and applications of Mossbauer spectroscopy. [7]
- Q.3. (a) Write a note on Classification of Organometallic Compounds. [7]  
OR  
(a) Discuss in detail transition metal-butadiene compounds. [7]  
(b) Discuss in detail transition metal-alkene compounds. [7]  
OR  
(b) Write a note on Isomerisation. [7]

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Q.4. (a) Write a note on cyclopentadienyl compounds of Lanthanides. [7]

OR

(a) Discuss the spectral and magnetic properties of lanthanides. [7]

(b) Write a note on organometallic chemistry of the Actinides. [7]

OR

(b) Discuss the techniques for the separation of lanthanides. [7]

Q.5. Answer the following.

(One mark each)

- (i) What is force constant in IR spectroscopy.
  - (ii) What is the energy range ( in KeV) of emitted  $\gamma$  ray in M.B.Spectroscopy.
  - (iii) What is oxidation state of iron in sodium nitroprusside ion?
  - (iv) What kind of nuclei will only exhibit NMR phenomenon?
  - (v) Why the operating frequency of  $^{13}\text{C}$  is less than  $^1\text{H}$ .
  - (vi) What is precessional frequency?
  - (vii) Relate precessional frequency with applied magnetic field.
  - (viii) Write the name and structure Wilkinson's catalyst.
  - (ix) Write the dismutation reaction of alkene.
  - (x) Write the conformation of ferrocene.
  - (xi) Write the characteristics of homogeneous catalysis.
  - (xii) What is Lanthanide contraction?
  - (xiii) Define transuranic elements.
  - (xiv) Give the names of ores of Uranium.
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