

**M.Sc.Examination, 2018**  
**Semester-III**  
**Chemistry(Elective)**  
**Course: CH-917**  
**Optional ( Inorganic Chemistry)**

**Time: Three Hours**

**Full Marks: 40**

Questions are of value as indicated in the margin.  
Answer *any four* questions.

1. a) Discuss about role of  $^1\text{H}$ NMR spectroscopy for the identification of M-H bond in an organometallic complex. 4  
b) How can you distinguish **pure 2,2'-bipyridine ligand** and its metal-chelate complex? 3  
c) Explain the importance of NMR spectroscopy in the determination of facial and meridional isomer of metal- organic complex. 3
  2. a) Show the fluxional nature of azo-dye through NMR spectroscopy. 4  
b) Give  $^{19}\text{F}$  NMR pattern of a fluorine based interhalogen compound. 2  
c) Briefly illustrate the chemical shift in NMR spectroscopy. 4
  3. a) What are the involved criteria for the MLCT, LMCT, MMCT and IPCT in photochemical processes? Give proper example. 1.5x4  
b) Show the proposed mechanistic scheme for photoisomerization of  $[\text{Ru}^{\text{III}}\text{X}_2\text{L}_4]$  complex. 4
  4. a) Write about the involved pathways for a **photosensitized reaction**. 4  
b) Why and how does photosynthesis become damaging? Show the important roles of  **$\beta$ -carotene and tocopherols** in this regard. 3+3
  5. a) Compare **photo generated catalysis** and **catalysed photolysis**. 3  
b) Show the mechanistic scheme for the photo catalytic transformation of **1-pentene** to **trans-2-pentene**. 3  
c) Write about the redox behaviour of photo excited  $[\text{Ru}(\text{bipy})_3]^{2+}$ . 3  
d) What is **Flash Photolysis**? 1
  6. a) Write down the **Basic principle of Polarography**. 4  
b) Write down the advantages of dropping mercury electrode over other conventional electrodes. 2  
c) Briefly discuss the methodology involved in **amperometric titration**. 4
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