

**M.Sc.Examination, 2018**  
**Semester-III**  
**Chemistry**  
**Course: CH-913**  
**Elective-1( Inorganic Chemistry)**

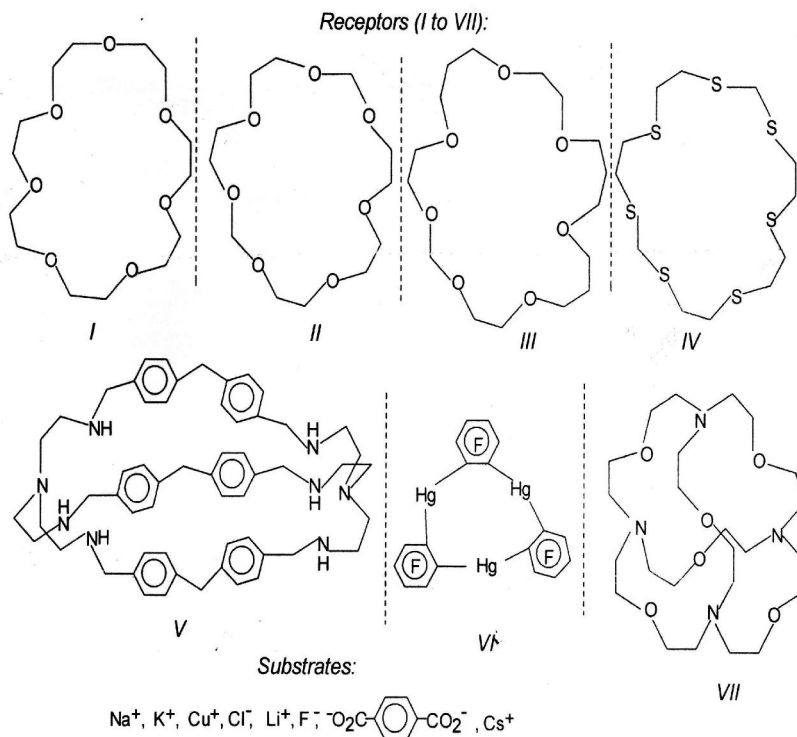
**Time: Three Hours**

**Full Marks: 40**

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

1.

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*Match with the above receptors (either direct or modifying) and substrates with justification in terms of the Recognition process to have reasonable Receptor-Substrate Complex.*

*(Hint: One or more Substrate(s) or Receptor(s) may not match).*

2. a) What are coronand, coronate, podand, podate, cryptand and cryptate? Explain the relative stabilities of podate, cryptate and coronate. 2+2+2+2
- b) How a azacrown receptor to be used as a anion receptor? 2
3. a) What are multiple crowns? Comment on their usefulness towards molecular recognition process. 1+3
- b) Define spherand with example(s). 2
- c) Give two examples of ferrocene based receptors. Comment on their usefulness towards electron transfer processes. 2+2
4. a) Compare phosphorescence and fluorescence, and show Jablonski diagram in this context. 3
- b) What is zero-point energy? Is it zero or not? Give reason. 2.5
- c) Show the mode of photo-excitation in term of MO diagram in a molecule having carbonyl group. 3
- d) Comment on the stability of the singlet and triplet states of any molecule. 1.5

**P.T.O.**

( 2 )

5. a) Write about the utility of  $[\text{Ru}(\text{bipy})_3]^{2+}$  in artificial photosynthesis. 4  
b) Compare MLCT and LMCT in the light of photochemistry. 3  
c) What are the reasons behind high quantum yield? Give examples. 3
6. a) What is photo-magnetization? Give example. 2  
b) What are the roles of quencher in photochemical processes? 2  
c) What are the roles of sacrificial donor and acceptor in photo-chemical reactions? – Give examples. 3  
d) What is pre-dissociation? Show the potential energy diagram in this regard. 3
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