FACULTY OF SCIENCE
M.Sc. III - Semester Examination, December 2014

Subject: Organic Chemistry
Paper - IV: Spectroscopy and Photo Chemistry

Time: 3 hours
Max. Marks: 80

Note: Answer all questions from Part - A and Part - B.
Each question carries 4 marks in Part - A and 12 marks in Part - B.

PART – A (4 x 8 = 32 Marks)
(Short Answer Type)

1. a) Write the principle and application of INEPT.
   b) Explain the factors that effect $^{13}$CNMR spectroscopy.

2. a) Write a short notes on NOESY.
   b) Discuss the Hyperfine splitting in ESR spectroscopy.

3. a) Explain the de-π-metall rearrangement.
   b) Write notes on cis-trans isomerism in photochemistry.

4. a) Explain Paterno-Buchi reaction.
   b) Write notes on inter molecular abstraction of hydrogen with examples.

PART – B (4 x 12 = 48 Marks)
(Essay Answer Type)

5. a) Discuss the application of $^{13}$CNMR spectroscopy.
   b) Explain briefly the α, β and γ effect in $^{13}$CNMR spectroscopy.
   c) Discuss in details the principles involved in APT.
   d) The proton-de coupled $^{13}$CNMR spectrum of an unknown compound shown resonances at δ 126.3, 128.2, 128.4, 132.9, 137.1 and 197.6. Which of the following structure is consistent with the data. Explain.

6. a) Explain in detail homo cosy with two examples.
   b) Describe in brief principles of ESR spectroscopy.
   c) Discuss the ESR spectra of P-benzoquinone, 1, 4 – napthaquinone.
   d) Discuss any two application of $^1$HNMR spectroscopy.

7. a) Write notes on [3, 3] sigmatropic rearrangement with suitable examples.
   b) Explain the photo-isomerisation of benzene.
   OR
   c) Explain i) Photo dimerization ii) Photo conjugated olefins
   d) Write a note on photo substitutions reactions in photochemistry.

8. a) Write a note on Norrish-Type-II reactions.
   b) Explain the photoreduction with suitable examples.
   OR
   c) Discuss in brief chemiluminescent reactions.
   d) Explain the Ene reactions with two examples.

******