FACULTY OF SCIENCE
M.Sc. III Semester Examinations, January 2018

Subject: Chemistry (Organic Chemistry)

Paper: IV
Green Chemistry and Organic Materials

Time: 3 Hours
Max.Marks: 80

Note: Answer all questions from Part - A and Part - B.
Each question carries 8 marks in Part-A and 12 marks in Part-B

Part-A (4x8=32 marks)
(Short answer type)

1  a) Define atom economy and explain with two examples. 
b) Discuss briefly about design of biodegradable products.

2  a) What are green solvents? Give any two reactions carried out using green solvents. 
b) Discuss any two benefits and limitations of MAOS.

3  a) Define nano material, how they are different from bulk material? 
b) What are different types of carbon nano tubes? Explain.

4  a) Discuss about molecular recognition. 
b) What is pre- organisation? Explain.

PART-B (4X12=48 Marks)
(Essay Type Questions)

5  a) Discuss about prevention of unnecessary derivatization taking suitable examples. 
b) Write short notes on 
   i. Prevention of hazardous products
   ii. Use of catalysis
   (OR)
   c) Calculate percentage atom economy in the following reactions.

   \[
   \begin{align*}
   &\text{NaOEt} \\
   &\text{H}_3\text{C}-\text{CHBr}-\text{CH}_2\text{-CH}_3 \rightarrow \text{H}_3\text{C}-\text{H}=\text{CH}-\text{CH}_3 + \text{EtOH} + \text{NaBr}
   \end{align*}
   \]
   d) Write short notes on 
   i. Prevention of waste 
   ii. Designing safer chemicals
6 a) What are the microwave-assisted solvent free reactions? Explain with the following reactions.
   i. Saponification of esters
   ii. Deacetylation
   iii. Synthesis of nitriles from aldehydes
b) Write short notes on
   i. Phase transfer catalysis in organic synthesis
   ii. Biocatalysts in organic synthesis.
(OR)
c) Discuss the use of ultrasonic energy in organic synthesis?
d) Give advantages of aqueous phase reactions with Heck reaction, Diels-Alder reaction and Hydroxylation.

7 a) What are different approaches for making nano material? Give one method for each approach.
b) Explain the mechanism of spiropyran optical switch which gives different colours under different conditions.
(OR)
c) Write a short notes on the following
   i. Molecular wire
   ii. Molecular rectifier.
d) What are the natural Benzhteterazoles? Give their synthetic modifications as opto-electronic molecules.

8 a) What are supramolecular interactions? Explain in detail using suitable examples.
b) Explain how cyclodextrins act as enantioselective receptors?
(OR)
c) Explain in detail the shape and supramolecular behavior of carcerands and hemi-carcerands.
d) Explain the importance of enatioselective molecular recognition using chiral receptors from crown ethers and Kemp's triacid.

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