Reg. No. | | | | | | | | | |

CHE 506

III Semester M.Sc. Degree Examination, December 2018
Chemistry
(CBCS : 2016-17 Syllabus) (New Syllabus)
ANALYTICAL AND GREEN CHEMISTRY
(Open Elective)

Time : 3 Hours Max. Marks : 70

***Note** : Answer Part **A** and **any four** questions from Part **B**.*

PART – A

1. Answer **all** the following sub-questions : **(9×2=18)**

   a) State the Beer-Lambert law and explain its limitations.

   b) Explain the deshielding in NMR spectroscopy with an example.

   c) How do you identify the ketones and aldehydes by IR ?

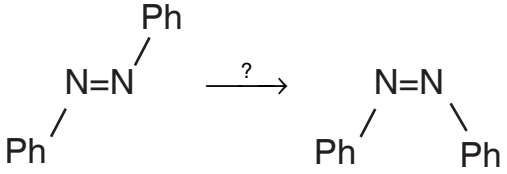
   d) Define standard water quality.

   e) What is reverse osmosis ?

   f) Write the reactions involved in Winkhr's method of DO determination.

   g) What are ionic liquids ? Give their uses in organic synthesis.

   h) Suggest the suitable green condition for the following conversion and justify.



   i) Predict the product in following reaction.

$$Ph - NH_2 + CHCl_3 + NaOH \xrightarrow{PhCH_2-\overset{\oplus}{N}HEt_3\ \overset{\ominus}{Cl}} ?$$

PART – B

Answer **any four full** questions : **(4×13=52)**

2. a) State Woodward-Fieser rules to determine λ_{max} for conjugated dienes.

   b) Discuss the various electronic transition encountered in organic molecules.

P.T.O.

c) An organic compound with molecular formula $C_9H_{10}O_2$ exhibits the following spectral data :

IR (cm^{-1}) : 1745, 1225

UV (λ_{max}) : 268 nm

^1H NMR (δ) : 1.96 (s, 3H), 5.00 (s, 2H), 6.68 (s, 5H)

Mass : m/e 92 (base peak) **(4+4+5=13)**

3. a) Define the term 'chemical shift' in NMR spectroscopy. List out the factors affecting this.

b) Deduce the structure of organic compound containing ester group from the following data : Molecular formula : $C_6H_{10}O_4$, ^1H NMR data : δ1.5 (d, 3H) ; δ 2.1 (s, 6H) ; δ 6.8 (q, 1H).

c) Explain the application of functional group frequencies in IR spectroscopy. **(4+5+4=13)**

4. a) What is residual chlorine ? Explain its role in water treatment.

b) Discuss alkalinity and hardness of water.

c) Write a brief account of treatment of liquid radioactive waste. **(5+5+3=13)**

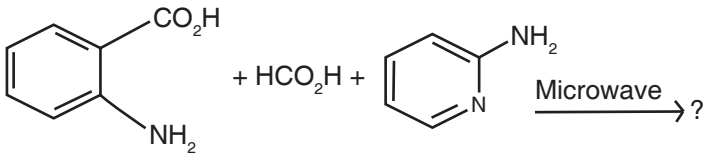
5. a) Discuss the chemistry of sea water.

b) How is BOD of water sample determined ?

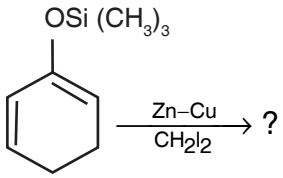
c) Discuss the measurements of colour and turbidity of water. **(4+5+4=13)**

6. a) Discuss the selectivity of crown ethers with suitable examples.

b) Mention the product with mechanism in the following reaction under solid phase condition.

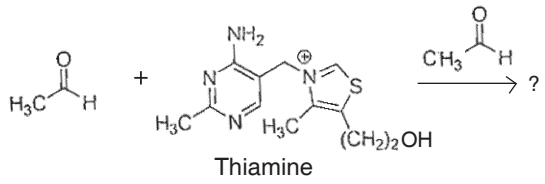


c) Explain the advantage of the sonication and predict the product of the following reaction.



(4+4+5=13)

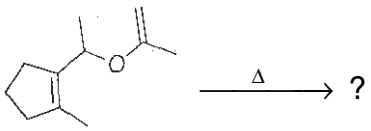
7. a) Discuss the mechanism of thiamine catalyzed acylation of the following reaction.



b) Enumerate the significance of microwave synthesis and highlight its limitations.

c) Give the Claisen product with mechanism of the following reaction.

(5+5+3=13)



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