BIRLA INSTITUTE OF TECHNOLOGY, MESRA, RANCHI
(END SEMESTER EXAMINATION)

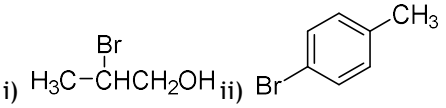
CLASS: IMSc **SEMESTER : VI**
BRANCH: CHEMISTRY **SESSION : SP/19**

SUBJECT: IMC6005 ORGANIC CHEMISTRY III

TIME: 3.00 Hrs. **FULL MARKS: 60**

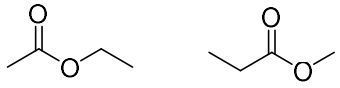
INSTRUCTIONS:
1. The question paper contains 7 questions each of 12 marks and total 84 marks.
2. Candidates may attempt any 5 questions maximum of 60 marks.
3. The missing data, if any, may be assumed suitably.
***4*. Before attempting the question paper, be sure that you have got the correct question paper.**
5. Tables/Data hand book/Graph paper etc. to be supplied to the candidates in the examination hall.

Q.1(a) How many types of hydrogens in the following compound to demonstrate distinguished 1H NMR peak. [2]



Q.1(b) What is coupling constant. Write down the factors which effect on coupling constant. [4]

Q.1(c) Explain in details how you would distinguish between the following two compounds using 1H NMR. [6]



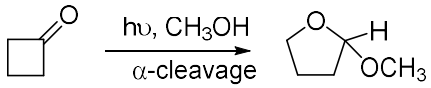
Q.2(a) Why piperidine is a stronger base than pyridine? [2]

Q.2(b) Why nucleophilic substitution is preferred at C-2 and C-4 in Pyridine? Draw the resonance structures for C-2, C-3 and C-4 nucleophilic attack for explanation. [4]

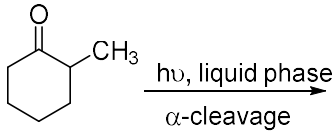
Q.2(c) Discuss Bischler-Napieralski synthesis with one example and stepwise mechanism involving imine-ester. [6]

Q.3(a) Excited molecule in T1 state can come to ground state through phosphorescence. True or False? [2]

Q.3(b) Write the mechanism for the formation of following product through ring expansion. [4]



Q.3(c) Write the products formed along with stepwise mechanism. [6]

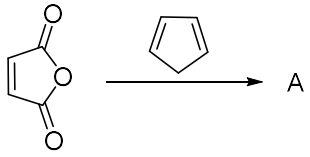


Q.4(a) Write the structure of Vitamin C. [2]

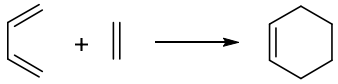
Q.4(b) Describe the metabolic functions of Vitamin A. [4]

Q.4(c) Describe the functions of Vitamin C and disease related to its deficiency. [6]

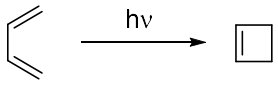
Q.5(a) Identify the product A in following reaction. [2]



Q.5(b) Discuss FMO method and determine the reaction feasibility in thermal and photochemical mode for the following cycloaddition reaction: [4]

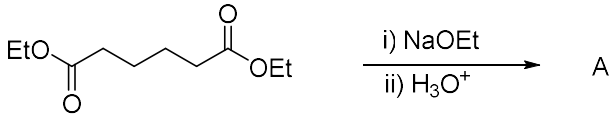


Q.5(c) Draw a correlation diagram for the following electrocyclic reaction. Determine the ring closure mode in conrotatory or disrotatory using Molecular Orbital Symmetry Correlation under photochemical condition. [6]



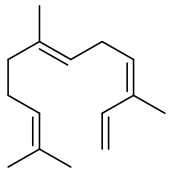
Q.6(a) Draw and Discuss Keto-Enol tautomerism of ethyl acetoacetate under basic condition. [2]

Q.6(b) Identify the product and demonstrate with reaction mechanism: [4]



Q.6(c) Draw the steps with mechanism for malonic ester synthesis to pentanoic acid. [6]

Q.7(a) Demonstrate with drawing (Circle) the isoprene units in the following terpene.: [2]



Q.7(b) Discuss the classification of Terpenes with an example. [4]

Q.7(c) Draw the synthetic steps with reagent for Nicotine. [6]

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