MANIPAL UNIVERSITY

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DEPARTMENT OF SCIENCES, III SEMESTER M.Sc (Chemistry)
END SEMESTER EXAMINATIONS, Nov/Dec 2017

Subject: Advanced Organic Chemistry [CHM 703]

(REVISED CREDIT SYSTEM)

Time: 3 Hours Date: 17 Nov 2017 MAX. MARKS: 50

Note: (i) Answer any FIVE FULL questions

(ii) Draw diagrams, and write equations wherever necessary

1A. Write the chemical reaction and identify A, P and Q from the following data. An organic molecule P and Q can be reduced by the reducing agent A. P answers positively for bromine water, Q shows a peak at around 1650 cm^{-1} in IR and NOT answers for 2,4 DNP. 3

B. An organic molecule P with less than 4 carbon atoms, when treated with HX, gives Q monohalo hydrocarbon. When Q is dehalogenated using suitable reagent Z (not a carbon source), the product formed R has more than 4 carbon atoms. Propose the chemical reaction and identify P to R and Z. 3

C. Symmetric organic molecule P with empirical formula C_3H_6O, when treated with reducing agent X, gives product Q. When P is treated with peracid, R is obtained. Explain the halogenation of P and R. Comment on the product R, if P is not symmetric. 4

2A. Explain with suitable examples, the role of plant growth regulators in agrarian chemistry. 3

B. Describe the following;
(i) Hantzsch synthesis of pyrrole
(ii) Friedel-Crafts reaction of aziridine with benzene
(iii) Valence – bond isomerization of benzene 3

C. Which are the different types of insect repellants? Discuss the synthesis of DEET and give any two disadvantages of the synthetic process. 4

3A. With chemical reactions, list similarity and difference between the following reducing agents:
(i) Diimide and catalytic hydrogenation
(ii) $LiAlH_4$ and $NaBH_4$
(iii) Metal salts and catalytic hydrogenation 3

B. Justify your answer with appropriate chemical reaction. An organic molecule with empirical formula C_8H_{10} and C_7H_8 when treated with an oxidizing agent, gives the same 3

product. The isomer of C_8H_{10} when treated with same oxidizing agent gives different product altogether.

C. Explain the reactions of nitrenes by taking suitable example (any four) 4

4A. Explain the Diels-Alder reaction of furan with the following
i) Cyclopropene ii) Maleic anhydride iii) Maleimide 3

B. Give reason for the following statements:
(i) Pyridine undergoes electrophilic substitution with extreme difficulty.
(ii) Methoprene is considered as a biological pesticide.
(iii) N-substituted-1,2-diazepines are unstable above 150 °C. 3

C. What are synthetic pyrethroid pesticides? Explain the synthesis and use of fenvalerate. 4

5A. Identify A, B X and Y from the following data: An organic molecule X with empirical formula $C_5H_{12}O_2$ when treated with A gives ketone (1 eq). When another organic molecule Y with same empirical formula $C_5H_{12}O_2$ when treated with B gives ketone (2 eq). 3

B. Discuss any three methods of analyzing the reaction dynamics 3

C. Propose the reaction scheme for the following conversion in just one step
1. Unsaturated alcohol to unsaturated aldehyde
2. Unsaturated hydrocarbon to unsaturated aldehyde
3. Saturated alcohol to mixture of aldehyde and ketone
4. Unsaturated hydrocarbon to mixture of aldehyde and ketone 4

6A. Describe the following reactions;
(i) Fischer indole synthesis
(ii) Ring opening reaction of pyridine 3

B. Discuss the conventional and green synthesis of carbaryl. What are the uses of ziram in agrochemistry? 3

C. Discuss the following;
(i) Ring opening and desulfurization reactions of thietanes
(ii) Polymerization and photochemical reactions of oxiranes 4

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