NATIONAL UNIVERSITY OF SCIENCE AND TECHNOLOGY

FACULTY OF APPLIED SCIENCE

DEPARTMENT OF APPLIED CHEMISTRY

INDUSTRIAL ORGANIC CHEMISTRY II

SCH 4115

First Semester Examination Paper

December 2015

This examination paper consists of 3 pages

Time Allowed: **3 hours**

Total Marks: **100**

Special Requirements: **NONE**

Examiner's Name: **DR C T PAREKH**

INSTRUCTIONS

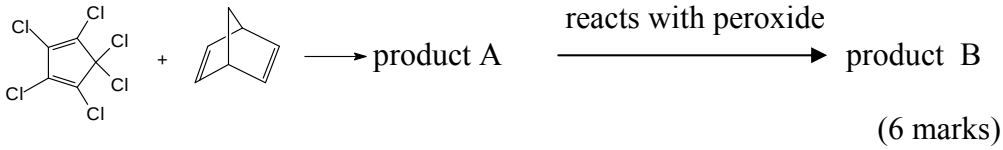
1. ANSWER ALL QUESTIONS FROM SECTION A AND ANY THREE QUESTIONS FROM SECTION B.
2. SECTION A CARRIES 40 MARKS AND EACH QUESTION IN SECTION B CARRIES 20 MARKS. MARKS ARE INDICATED IN BRACKETS.

MARK ALLOCATION

QUESTION	MARKS
1.	**40**
2.	**20**
3.	**20**
4.	**20**
5.	**20**
TOTAL POSSIBLE MARKS	**100**

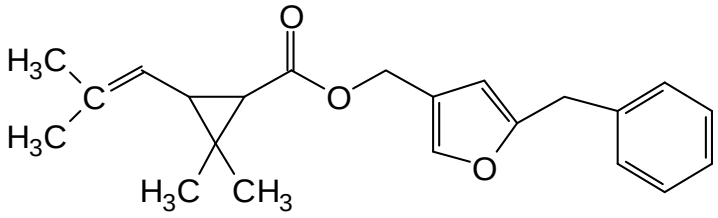
SECTION A

1. (a) (i) Draw the structure of the product A arising from the following pericyclic reaction. Product A further reacts with peroxide and produces product B. Draw the structures of A and B and also give the names of the products. Use curved arrows for the pericyclic reaction.



(6 marks)

(ii) Draw the structures of the starting materials to produce the following pesticide.



(2 Marks)

(b) Suggest four principal areas where pyrethrin products are in use.

(4 Marks)

(c) Draw structures of sarin and tabun, and explain why these two organophosphates, despite the fact that they are powerful insecticides, have never been extensively used as insecticides.

(6 Marks)

(e) Explain (i) systemic and (ii) contact insecticides.

(4 Marks)

(f) What do you understand by teratogenic agents? Draw the structure of one of the compounds that you may know?

(4 Marks)

(g)What is the difference between a soap and a detergent?

(2 Marks)

(h) Draw the structure of atropine and indicate its function.

(4 Marks)

(i) There are three different types of detergents available: (i) anionic (ii) cationic and (iii) neutral detergents. Draw structures of these detergents.

(3 Marks)

(j) Draw the general structure of carbamate.

(2 Marks)

(k) Draw the structure of glyphosate and indicate the use of it.

(3 marks)

SECTION B:

2. (a) Draw the schematic diagram for the manufacture of a detergent.
(12 Marks)

(b) What do you understand by synergist? Explain how synergists act on insects.
(8 Marks)

3. (a)There are four different pathways where carbaryl is synthesised. Draw any two pathways to synthesise carbaryl. (6 Marks)

(b) Deltamethrin is produced by the esterification of dibromo permethrin acid with α-cyano-3-phenoxybenzyl alcohol. Draw the structures of these three compounds. (4 Marks)

(c) Illustrate the disruption of nervous system in insects with organophosphate or carbamate insecticide which result in death?
(10 Marks)

4. (a) Draw structures of (i) 2,4-D and (ii) 2,4,5-T. What are the uses of these herbicides in agriculture industry? Can you explain why 2,4,5-T has been banned as a pesticide?
(6 Marks)

(b) Draw the structure of insect repellent, DEET and methyl antranilate which act as bird repellents.
(4 Marks)

(c) Describe the process of extraction of natural pyrethroids from the Chrysanthemum flower.
(6 Marks)

(d) Draw the structures of the following compounds.
(i) bromadiolone and (ii) endosulfan.
(4 Marks)

5. (f) Sythesise DDT from chloral and chlorobenzene. Use regents of your choice.
(10 Marks)

(g) 2015 Nobel Prize in Physiology or Medicine was awarded to William C. Campbell and Satoshi Ōmura for discovering avermectins. Avermectin is produced by fermentation of soil bacteria.
(i) Draw the structure of Avermectin B1a which is widely used. (5 marks)
(ii) Give the name of the bacteria. (2 Marks)
(iii) Indicate the use of avermectine. (3 Marks)

End of Question Paper!!!!