NATIONAL UNIVERSITY OF SCIENCE AND TECHNOLOGY

FACULTY OF APPLIED SCIENCES

DEPARTMENT OF APPLIED CHEMISTRY

INDUSTRIAL ORGANIC CHEMISTRY II
SCH 4115
FOR SCH STUDENTS ONLY

Supplementary Examination Paper
August 2017

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 <u>all</u> questions from Section A and <u>any three</u> from Section B. Section A carries 40 marks and each question in Section B carries 20 marks.**

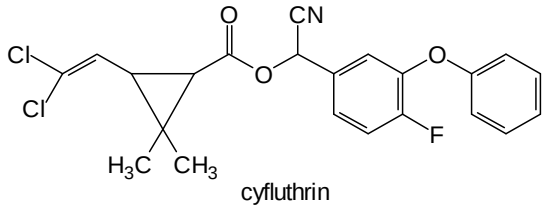
2. **Show mechanism, chemical steps or synthesis by means of curved arrows.**

MARK ALLOCATION

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

SECTION A:

(a) Draw the structure of the acid moity and alcohol moity for the following pyrethroid. What is the name given to acid moity?



cyfluthrin

(4 Marks)

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

(4 Marks)

(c) Draw the structure of cholinesterase and suggest its function in the animal kingdom.

(6 Marks)

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

(2 Marks)

(f) Suggest the name of the plant from which atropine is extracted. Draw the structure and indicate the function of atropine.

(6 Marks)

(g) Give one of the two names (botanical name) of plants from which natural pyrethrines are obtained.

(2 Marks)

(h) Draw the general structure of carbamate.

(2 Marks)

(i) Why are avermectins very useful insecticides?

(2 Marks)

(j) Define plant hormone in your own words.

(2 Marks)

(k) Draw the structure of parathion and briefly describe its toxicity in humans.

(6 Marks)

(l)) Draw the structures of 2,4-D, 2,4,5-T and the teratogenic agent that is produced as a by-product during the production of 2,4-D and 2,4,5-T.

(4 Marks)

SECTION B:

2. (a) transfluthrin (Baygon mosquito coil) is synthesised by the esterification of permethrin acid with 2,3,5,6-tetrafluorobenzyl alcohol. Write the synthesis of transfluthrin. Use reagents of your choice. (Use curved arrows).

(6 Marks)

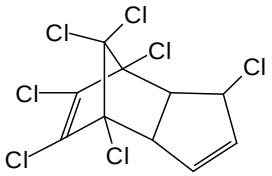
(b) Carbaryl is a very useful insecticide. There are four different methods by which carbaryl can be synthesised. Show the synthesis of carbaryl from any one method. (No mechanism required).

(4 Marks)

(c) Draw a schematic diagram for the manufacture of detergent.

(10 Marks)

3. (a) Heptachlor's insecticidal activity is three times that of chlordane. The structure of the insecticide is shown below. One of the starting materials to synthesise heptachlor is cyclopentadiene. Using any chemicals and reagents needed for the synthesis of heptachlor, write the reaction mechanism for heptachlor synthesis. Use curved arrows.



(8 Marks)

(b) MCPA (4-chloro-2-methylphenoxy acetic acid) is a well-known herbicide used in this country. Write a synthesis of MCPA from *o*-cresol (2-hydroxy methyl benzene) and any reagents of your choice.

(5 Marks)

(c) what do you understand by acute and subacute rodenticides?

(4 Marks)

(d) what do you understand by Pre-emergent herbicides? (3 Marks)

4. (a) Write a reaction mechanism for the synthesise of DDT from chlorobenzene trichloroacetaldehyde and sulphuric acid.

(15 Marks)

(b) Describe the process of extraction of natural pyrethroids from the chrysanthemum flower.

(5 Marks)

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

(3 Marks)

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

(c) Methoxychlor is an analogue of DDT. Draw the structure of methoxychlor and suggest its advantages and disadvantages.

(7 Marks)

***********************END OF QUESTION PAPER**********************