



NATIONAL UNIVERSITY OF SCIENCE AND TECHNOLOGY

FACULTY OF APPLIED SCIENCE

DEPARTMENT OF APPLIED CHEMISTRY

INDUSTRIAL ORGANIC CHEMISTRY II

SCH 4115

SUPPLIMENTARY EXAMINATION PAPER

AUGUST 2024

This examination paper consists of 6 pages

Time Allowed: 3 hours
Total Marks: 100
Special Requirements: None
Internal Examiner: Ms. E. Bere.
External Examiner:

INSTRUCTIONS

1. Answer **ANY FOUR** questions
2. Each question carries 25 marks.
3. Use of calculators is permissible

MARK ALLOCATION

QUESTION	MARKS
1.	25
2.	25
3.	25
4.	25
5.	25
TOTAL	100

1. (a) Explain giving an example of each:
(i) systemic and
(ii) contact insecticides. [4]
- (b) Carbaryl is a very useful insecticide. Show how carbaryl can be synthesised from any one method. (No mechanism required). [4]
- (c) (i) Give two names of plants from which natural pyrethrins are obtained. [2]
(ii) draw the general structure of natural pyrethrin showing the difference between pyrethrin I and II. [3]
- (d) Naturally occurring pyrethroids are used with synergists. Explain the action of synergists. Draw the structure of a known synergist. [7]
- (e) Draw the structure of nicotine and any two analogous alkaloids found in tobacco plants. What is their suggested mode of action? [5]

[Total 25 marks]

2. (a) Paraquat is a bipyridinium herbicide which is available to farming community. If it is not used correctly, it can kill crops and also harm livestock and humans.
(i) Draw the structure of paraquat.
(ii) Suggest what type of herbicide it is?
(iii) and also indicate how it acts on plants? [5]
- (b) What do you understand by the term "anticoagulant"? Draw the structure of warfarin which acts as an anticoagulant to kill rodents. [4]
- (c) The metabolism of DDT by (i) reductive dechlorination (ii) oxidation and (iii) dehydrochlorination forms three different products. Draw structures of these compounds. [6]
- (d) Discuss the four different types of teratogens. [4]
- (e) Endosulfan has been used in agriculture around the world to control insect pests including whiteflies, aphids, leafhoppers, Colorado potato beetles and cabbage worms. Show how it is synthesised and the products from its acid and alkali hydrolysis. [6]

[Total 25 marks]

3. (a) Draw the structure of atropine and suggest its function. [5]
(b) Explain with the aid of chemical reactions and schematic diagram how organophosphate insecticide mimics acetylcholine. [10]
(c) Discuss the advantages and disadvantages of organophosphorus insecticides [10]
[Total 25 marks]

4. Repellents are a very useful for the control of pests in households and agriculture. Discuss any five (5) repellents, natural or synthetic that are in common use or part of an emerging class of "organic" repellents. Draw the structure(s) of active ingredient(s), manufacture or extraction methods, mode of application and the target pests. In your opinion do repellents offer effective pest control when compared to traditional pesticides? Explain why you think so. [25]
[Total 25 marks]

5. (a) What is the difference between a soap and a detergent? [4]
(b) With the aid of a diagram, describe the batch process for the manufacture of soap. [10]
(c) Discuss how soap can be made using the cold process [5]
(c) What are the functions of the following compounds in detergents.
(i) sodium salt of aromatic sulphonates
(ii) phosphates
(iii) sodium sulphate
(iv) silicates
(v) sodium perborate
(vi) sodium carboxyl methyl cellulose.

[6]
[Total 25 marks]

----- END OF QUESTION PAPER -----