



NATIONAL UNIVERSITY OF SCIENCE AND TECHNOLOGY

FACULTY OF APPLIED SCIENCE

DEPARTMENT OF APPLIED CHEMISTRY

INDUSTRIAL ORGANIC CHEMISTRY II

SCH 4115

Supplementary Examination Paper

AUGUST 2016

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

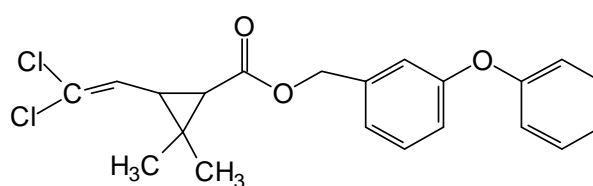
| QUESTION | MARKS |
|-----------------------------|--------------|
| 1. | 40 |
| 2. | 20 |
| 3. | 20 |
| 4. | 20 |
| 5. | 20 |
| TOTAL POSSIBLE MARKS | 100 |

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SECTION A:

1. (a) Give two names of plants from which natural pyrethrins are obtained. (4 marks)
- (b) What is the function of acetylcholine. Draw the structure of acetylcholine. (4 Marks)
- (c) What are pesticides? Classify pesticides and give one example of each. (6 Marks)
- (d) Suggest four principal areas where pyrethrin products are in use. (4 Marks)
- (e) What are the advantages and disadvantages of soapless detergent? (4 Marks)
- (f) Name the plant from which rotenoids insecticide is extracted. Draw the structure of rotenone. (4 Marks)
- (g) Draw the structures of the starting material to produce the following compound.



permethrin

- (h) Draw the structure of malathion and describe its toxicity in humans. (2 Marks)
 - (i) Draw the general structure of carbamate. (4 Marks)
 - (j) Explain (i) systemic and (ii) contact insecticides. (2 Marks)
- (6 Marks)

SECTION B:

2. (a) MCPA (4-chloro-2-methylphenoxy acetic acid) is a well-known herbicide used in this country. Write the synthesis of MCPA from *o*-cresol (2-hydroxy methyl benzene) and any reagents of your choice. (6 Marks)
- (b) Auxins are a class of plant growth substances. Give the name and structure of one naturally occurring auxin and one synthetic analogue. (4 Marks)
- (c) Draw the structure of sarin, and explain why this organophosphate, despite the fact that it is a powerful insecticide, has never been extensively used as an insecticide. (10 Marks)

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3. (a) Draw the structures of acid moiety and the alcohol moiety of naturally occurring pyrethrines. (6 Marks)
- (b) Endosulfan breaks down slowly to endosulfan sulphate and is also readily hydrolysed by acid or alkali to diol. Draw the structures of these three compounds. (6 Marks)
- (c) Flocoumafen is a rodenticide known as Mortein. Draw the structure and describe its function (8 Marks)
4. (a) Draw the structure of malathion and in brief describe its toxicity in humans. (6 Marks)
- (b) Describe the insecticidal activity of organophosphorus insecticides. Explain the advantage of organophosphorus insecticides over organochlorine insecticides. (7 marks)
- (c) Naturally occurring pyrethroids are used with synergists. Explain the action of synergists. Draw the structure of a known synergist. (7 Marks)
5. (a) (i) What do you understand by anticoagulants? (2 Marks)
- (ii) Explain how rodenticides act as anticoagulants. (4 Marks)
- (b) The metabolism of DDT by (i) reductive dechlorination (ii) oxidation and (iii) dehydrochlorination forms three different products. Draw structures of these compounds. (6 Marks)
- (c) Paraquat is a bipyridinium herbicide which is available to the 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 (a) what type of herbicide is it? and (b) also indicate how it acts on plants? (4 Marks)
- (d) Suggest four different types of teratogens. (4 Marks)

END OF QUESTION PAPER!!!