NATIONAL UNIVERSITY OF SCIENCE AND TECHNOLOGY

DEPARTMENT OF APPLIED CHEMISTRY

BACHELOR OF SCIENCE HONOURS DEGREE

END OF SECOND SEMESTER EXAMINATIONS – JUNE 2010

INDUSTRIAL ORGANIC CHEMISTRY III – SCH 4215

TIME: 3 HOURS

INSTRUCTIONS TO CANDIDATES:

1. ANSWER ***ALL*** QUESTIONS IN SECTION A AND ***ANY THREE*** QUESTIONS IN SECTION B. SECTION A CARRIES 40 MARKS AND EACH QUESTION IN SECTION B CARRIES 20 MARKS. MARKS DISTRIBUTION WITHIN QUESTIONS IS AS INDICATED IN BRACKETS.
2. START EACH QUESTION ON A NEW PAGE. (NOT EACH PART OF THE QUESTION).
3. SHOW MECHANISM, CHEMICAL STEPS OR SYNTHESIS BY MEANS OF CURVED ARROWS.

TOTAL MARKS = 100

THIS QUESTION PAPER CONSISTS OF ***FOUR PRINTED PAGES*** (ON ONE SIDE ONLY) INCLUDING THE TOP PAGE WITH THE INSTRUCTIONS.

SECTION A:

1. (a) There are two alkaloids were extracted from *vinca rosea* plant which are used in the treatment of cancer. Give the names of these two alkaloids and the also the common name of the plant.
(3 Marks)

(b) Name the microbial organism that is used in the industrial fermentation of lactic acid.
(2 Marks)

(c) Give three ways of administering a drug to a patient.
(3 Marks)

(d) What do you understand by the term bioavailability?
(2 Marks)

(e) Draw the structures of the following polymers.
(i) nylon 6,6
(ii) PET
(4 Marks)

(f) Briefly explain the importance of vitamins to humans.
(4 Marks)

(g) What is the source of shikimic acid? Draw the structure of shikimic acid..
(4 Marks)

(h) Why is β- naphthol and not β-naphthylamine used in the manufacture of amino G-acid?
(3 Marks)

(i) Name one drug (do not repeat) for each of the following therapeutic classes.

(i) antipyretics	(ii) antibiotics	(iii) antiulcer
(iv) sedatives	(v) analgesics	(vi) antianxiety

(6 Marks)

(j) Write reaction mechanism of a diazo coupling reaction between aniline and phenol. Use reagents of your choice.
(3 Marks)

(k) What is the name of the first synthetic dye? Who synthesised the dye?
(2 Marks)

(i) What do you understand by **"first pass effect"**?
(4 Marks)

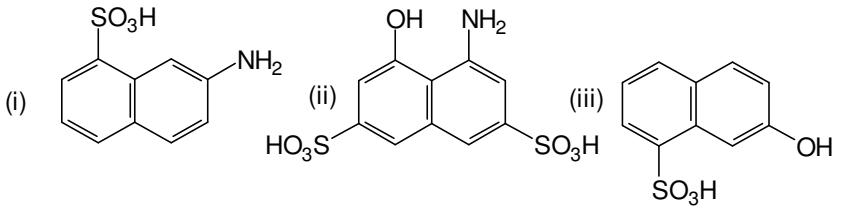
SECTION B:

2. (a) Hormones are secreted by ductless glands called endocrine glands. Give names of four ductless glands and name the hormones they secrete.
(4 Marks)

(b) "Naphthalene derivatives are more useful coupling components than benzene derivatives". Explain with the aid of chemical equations.
(9 Marks)

(c) Outline synthetic route to sulphanilamide from phenyl amine.
(7 Marks)

3. (a) State condition(s) and indicate the position by an arrow where the following intermediates couple during dye manufacturing. Also indicate, wherever possible, where the first coupling will take place.



(4 Marks)

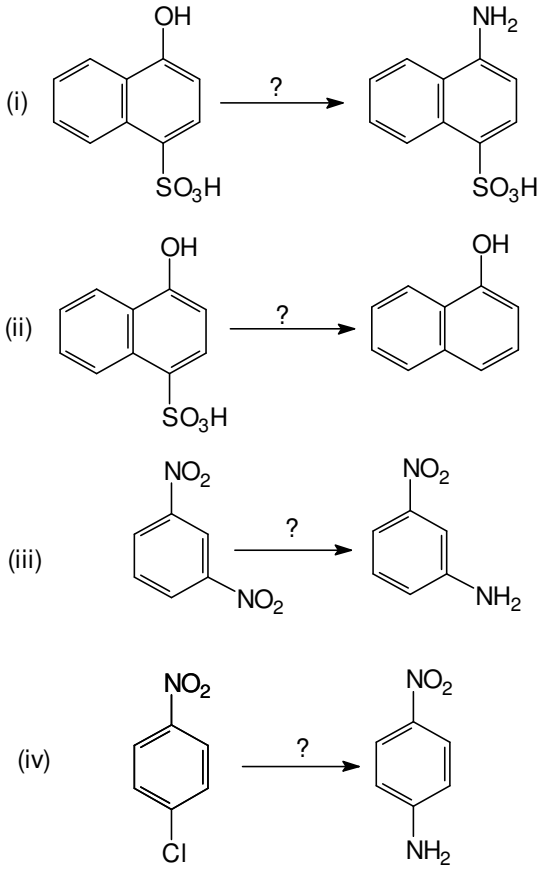
(b) Draw the structure of MF and bakelite resins.

(4 Marks)

(c) Outline the synthesis of phenobarbital from benzyl chloride. Use reagents of your choice.

(12 Marks)

4. (a) In the following reactions indicate what reagent is required.



(4 Marks)

(b) Suggest reaction mechanism for the synthesis of anthraquinone from phthalic anhydride. Use reagents of your choice .

(6 Marks)

(c) Explain what letters A, E, M, D and Z stand for in the dye industry.

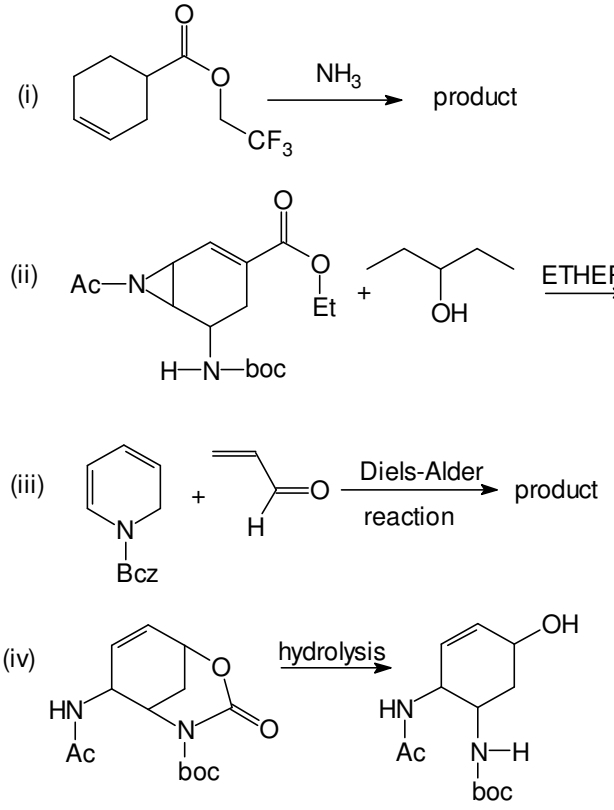
(5 Marks)

(d) Outline the synthesis of aspirin from phenol. Use reagents of your choice. Indicate wherever possible the name of the reaction.

(5 Marks)

5. (a) Swine flu is caused by a virus and there are two anti-viral drugs are available for the treatment of swine flu. (i) oseltmivir-phosphate (Tamiflu) and (ii) zanamivir (relenza). Among these two drugs Tamiflu is widely prescribed. There are two to three pathways to synthesise this drug such as Corey et al synthesis, Fukuyama synthesis and Sibasaki synthesis etc. they used different starting raw material to produce Tamiflu.You are given following steps from three different syntheses.

Write reaction mechanism for each of them.



(10 Marks)

(b) You are given 1-amino-8-naphthol-4-sulphonic acid (S-acid), 4-aminobenzene sulphonic acid (sulphanilic acid), 1-naphthyl amine, acidic solution and alkaline solution. Draw the structure of the unknown dye formed when they combine and indicate the Winther's formula for it.

(6 Marks)

(c) There are three synthetic methods by which phthalic anhydride can be produced. Write chemical equations for at least two methods, with reaction conditions, where phthalic anhydride can be produced.

(4 Marks)

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