NATIONAL UNIVERSITY OF SCIENCE AND TECHNOLOGY
DEPARTMENT OF APPLIED CHEMISTRY
BACHELOR OF SCIENCE HONOURS DEGREE
END OF SECOND SEMESTER EXAMINATIONS – MAY 2011
INDUSTRIAL ORGANIC CHEMISTRY III – SCH 4215
TIME: 3 HOURS

INSTRUCTIONS TO CANDIDATES:

1. ANSWER **ALL** QUESTIONS FROM 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 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 INSTRUCTION.

SECTION A:

1. (a) Give five differences between condensation polymer and addition polymer. (5 marks)

(b) Give chemical structures for the following polymers.

(i) MF
(ii) Nylon 6,6 (4 marks)

(c) What is epileptic seizure? (2 marks)

(d) Give the therapeutic class of each of the following drugs: (do not repeat the class)

(i) valium (ii) amoxil (iii) ranitidine
(iv) phenobarbital (v) aspirin (vi) prozec
(6 marks)

(e) What are vitamins? (4marks)

(f) What do you understand by the term bioavailability? (3 marks)

(g) What do you understand by ***"first pass effect"***? (4 marks)

(h) Why is β-naphthol and not 2-naphthyl amine used to manufacture Amino dyes? (3 marks)

(i) Give three ways of administering a drug to patient. (3 marks)

(j) Write reaction mechanism (use curved arrows) of a diazo coupling reaction between phenol and aniline (phenyl amine). Indicate reagents and reaction conditions. (6 marks)

SECTION B:

2. (a) Describe the manufacture of ethanol by fermentation.. (10 marks)

(b) Write reaction mechanism for the synthesis of aspirin from phenol. Use reagents of your choice. Use curved arrows to illustrate the mechanism. (5 marks)

(c) Explain what the letter A, E, M, D and Z stand for in dye industry. (5 marks)

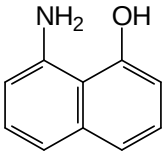
3. (a) There are two alkaloids namely vincrestine and vinbastine among other alkaloids extracted from a plant which are used in the treatment of cancer.
(i) Give the botanical name and the common name of the plant.
(ii) Draw the chemical structure of any one of the alkaloids.

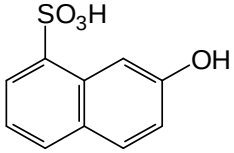
(2+4 marks)

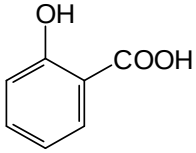
(b) Suggest the synthesis of anthraquinone from phthalic anhydride. Use reagents of your choice. (5 marks)

(c) Hormones are secreted by ductless glands called endocrine glands. Give names of two ductless glands and name the hormones they secrete. (4 marks)

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

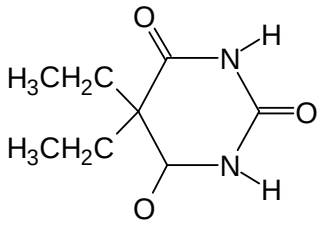
(i) 

(ii) 

(iii) 

(5 marks)

4. (a) Outline the synthesis of barbital, from diethylmalonate. Use reagents such as sodium ethoxide, chloroethane, urea etc.



barbital

(10 marks)

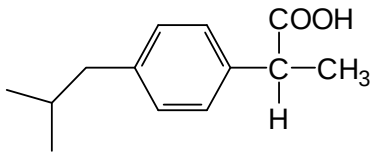
(b) Draw the structure of oseltamivir phosphate known as Tamiflu which is prescribed for swine flu.

(4 Marks)

(c) Draw the structure of zanamivir known as relenza, also prescribed for swine flu. How was this drug discovered?

(6Marks)

5. (a) Outline the synthesis of ibuprofen which is used as an anti-inflammatory drug from t-butyl benzene.
Use reagents such as ethanoyl chloride, phosphorus bromide, sodium cyanide, acid, base and any other reagents needed.



ibuprofen

(10 marks)

(b) You are given 1-amino-8-naphthol-4-sulphopnic acid (S-acid), 4-aminobenzene sulphonic acid (sulphanilic acid), 1-naphthyl amine, acidic solution and alkaline solution. Draw the structure of the unknown dye step by step with coupling conditions. Indicate the Winther's formula for it.

(10 marks)

End of question Paper!!!