



NATIONAL UNIVERSITY OF SCIENCE AND TECHNOLOGY

FACULTY OF APPLIED SCIENCE

DEPARTMENT OF APPLIED CHEMISTRY

INDUSTRIAL ORGANIC CHEMISTRY III
SCH 4215

FOR SCH STUDENTS ONLY

Supplementary Examination Paper

July 2017

This examination paper consists of 4 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 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

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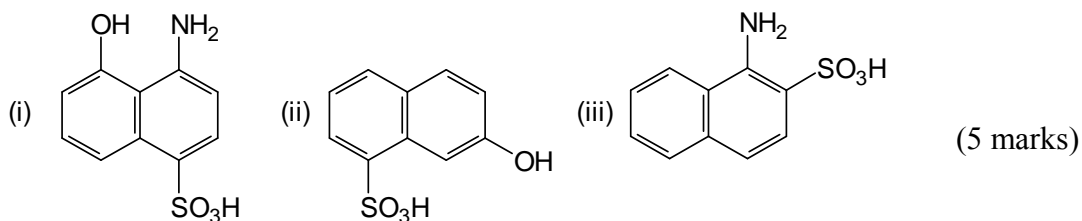
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SECTION A:

1. (a) Define dyes in your own words. (3 marks)
- (b) Give chemical structures for the following polymers:
(i) folic acid
(ii) vitamin A (4 marks)
- (c) What is an 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) renitidine
(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) 2-naphthyl amine was found to be a very useful starting component for manufacturing azo dyes but it has been banned for the manufacture of this compound and for its use in most of the countries. Give reasons for it. (3 marks)
- (i) Give three ways of administering a drug to patient. (3 marks)
- (j) Write the reaction mechanism (use curved arrows) of a diazo coupling reaction between β -naphthol and aniline (phenyl amine). Indicate reagents and reaction conditions. (6 marks)
- (i) What is the difference between dyes and pigments? (2 marks)

SECTION B:

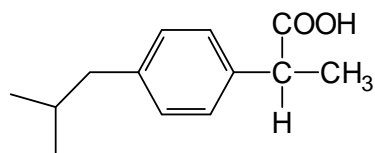
2. (a) Describe the manufacture of citric acid by fermentation and suggest three main uses of it. (10 marks)
- (b) Outline the synthesis of aspirin, an analgesic from phenol. Use reagents of your choice. (5 marks)
- (c) Explain what the letters A, E, M, D and Z stand for in dye industry. (5 marks)
3. (a) There are two alkaloids, namely, vincristine and vinblastine 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. One of them is the adrenal(medulla). Draw and name the structure of the hormone and suggest its function in the body. (4 marks)
- (c) State the condition(s) and indicate the position by an arrow where the following intermediate couple occurs during dye manufacturing. Also indicate wherever possible where the first coupling will take place.



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4. (a) Write the reaction mechanism for the formation of benzene diazonium salt from phenyl amine. You will require NaCl and HCl. Reaction generally takes place below 10°C. (Use curved arrows). (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 PAPER*****