NATIONAL UNIVERSITY OF SCIENCE AND TECHNOLOGY

FACULTY OF APPLIED SCIENCES

DEPARTMENT OF APPLIED CHEMISTRY

INDUSTRIAL ORGANIC CHEMISTRY I

SCH 2215

End of Second Semester Examination Paper

May 2017

This examination paper consists of 3 pages

Time Allowed: **3 hours**

Total Marks: **100**

Special Requirements:

Examiner's Name: Mr Donatus Dube

INSTRUCTIONS

1. Answer any four (4) questions
2. Each question carries 25 marks
3. Use of calculators is permissible

MARK ALLOCATION

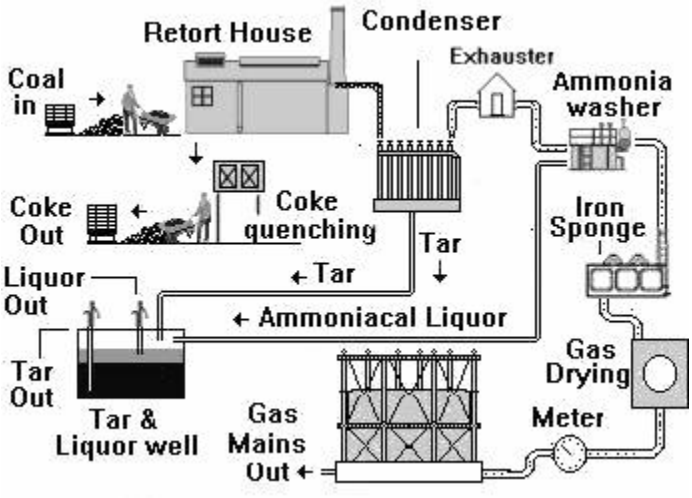
QUESTION	MARKS
1.	**25**
2.	**25**
3.	**25**
4.	**25**
5.	**25**
TOTAL POSSIBLE MARKS	**100**

1. a) Write down the chemical formulae and draw the chemical structures of the following explosives:

   i) 2,4,6-trinitrotoluene
   ii) Nitrocellulose
   iii) Tetryl
   iv) Pentaerythritol tetranitrate (PETN)
   v) (lead 2,4,6-trinitroresorcinate) lead styphnate (20 marks)

   b) Why do you think PETN is the preferred explosive for terrorist activities? (5 marks)

2. Study the following manufacturing flow chart and answer the subsequent questions.



   a) What is designated by "Retort House"? (2 marks)
   b) Write an account of the process in the retort house. (8 marks)
   c) Why is coke made lumpy and porous? (6 marks)
   d) Write a balanced reaction equation of Ammonia and sulphuric acid in the saturator. (3 marks)
   e) Draw a flow chart clearly showing the process of removal and recovery of benzol (light oil) from coke oven flue gas. (6 marks)

3. Draw the process flow chart for manufacture of bond paper from a mixture of softwood and cotton lint pulp. Clearly show the following:

   a) Wood preparation
   b) Digestion

c) Liquor recovery
d) Pulp processing
e) Pulp blending
f) Pulp refining
g) Addition of sizes and fillers
h) Paper rolling
i) Calendaring (25 marks)

4. i) Draw structures of the following wood chemical extractives:
   a) Quinine
   b) Coumarin
   c) Anthraquinone
   d) Ellagic acid
   e) Methanol (20 marks)

   ii) State the best method of extraction of the above-named chemicals. (5 marks)

5. Discuss the following processes stating their advantages and disadvantages:
   a) Coal tar distillation
   b) Solvent extraction of naval stores
   c) BTX Acid Washing Train
   d) Bachmann process for explosives
   e) Otto hoffman process (25 marks)

End of question Paper!!!