



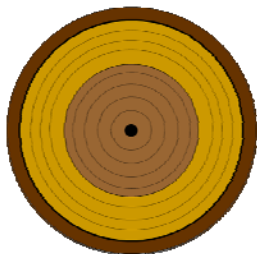
NATIONAL UNIVERSITY OF SCIENCE AND TECHNOLOGY
DEPARTMENT OF APPLIED CHEMISTRY
BACHELOR OF SCIENCE HONOURS DEGREE
END OF SECOND SEMESTER EXAMINATIONS – MAY 2013
INDUSTRIAL ORGANIC CHEMISTRY I – SCH 2215
TIME: 3 HOURS

Instructions to candidates

Answer any Four (4) Questions from the Five (5) provided. Each question carries 25 marks.

Start your answers to each question on a new page.

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1. a) What is the difference between oil, coal and coke? (6 marks)
- b) List three factors that can affect the ability for a coal specimen to coke. (3 marks)
- c) Differentiate between the four types of moisture found in coal. (4 marks)
- d) Describe how you would carry out a *float-sink test* on a coal sample (3 marks)
- e) Explain two uses of each of the following coal tar distillation products: (9 marks)
- Creosote
 - Pitch
 - Anthracene oil
2. a) List four products of wood hydrolysis. (4 marks)
- b) Explain the uses of any three of the products you listed in 2 (a). (6 marks)
- c) Draw and fully label the wood macroscopic structure shown in the following diagram:



(7 marks)

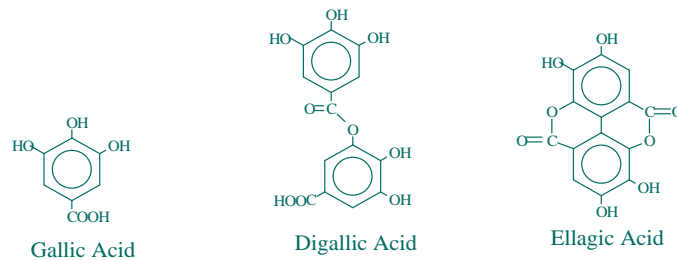
d) The pictures below show two types of trees. Name them and explain how they differ from each other.



(4 marks)

e) Using chemical structures differentiate between Gallic Acid and Ellagic Acid.

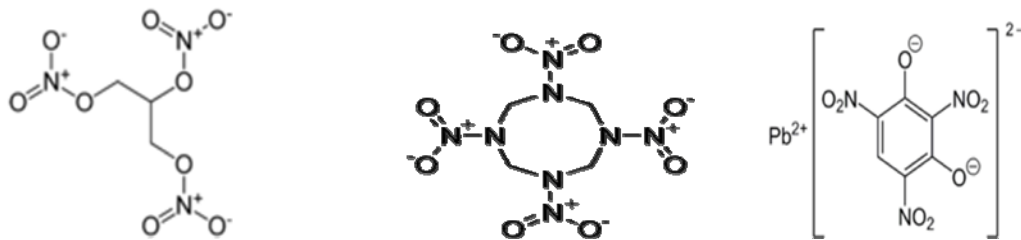
(4 marks)



3. a) Calculate the detonation pressure (in Pa) for a product with a detonation velocity of 4 800 m/s and a density of 1.2 g/cm³ (4 marks)

b) What are the four basic characteristics of an explosive? (4 marks)

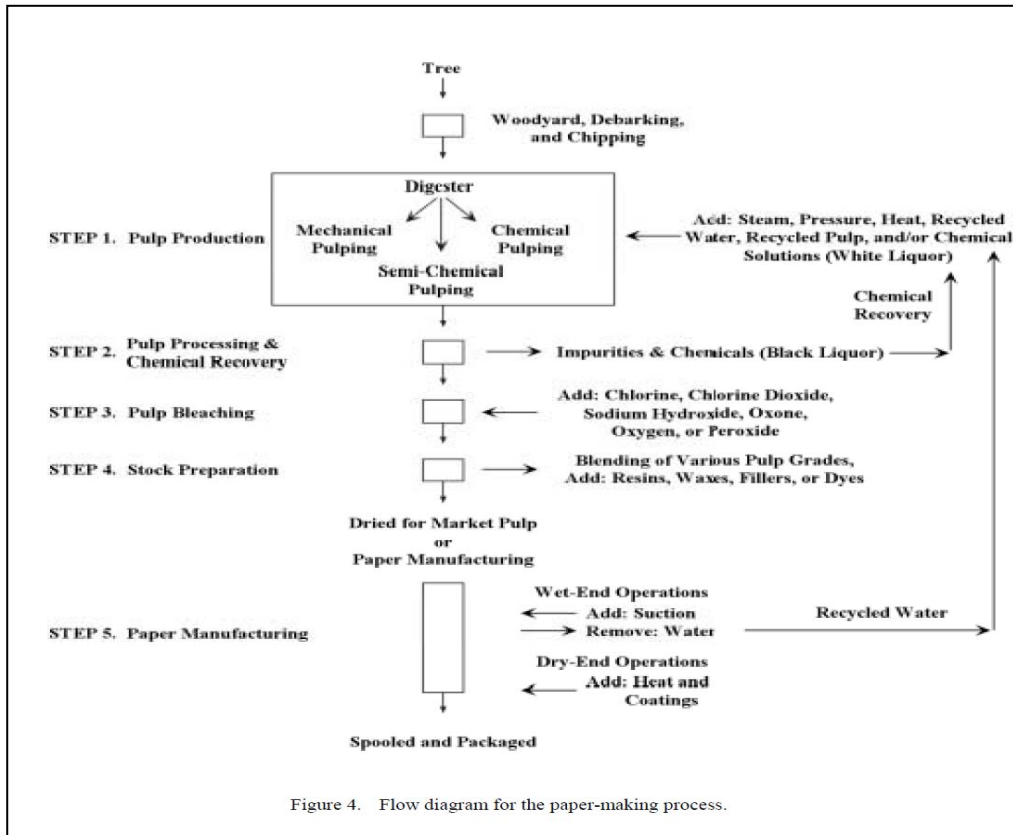
c) i. Name the explosives shown in these chemical structures.



(6 marks)

ii. Compare any three (3) properties of the three explosives. (6 marks)

iii. Which of the three explosives is most suitable for detonation? Why? (5 marks)



4.

a) The chart above shows some steps in the manufacture of paper from wood woody trees. Extend this chart to include all the steps necessary to produce bond paper reams. (8 marks)

b) What process changes are necessary for production of composite paper? (7 marks)

c) Suggest the chemical composition of effluents from kraft and sulphite processes for making pulp and suggest the best methods of treating the effluents. (10 marks)

5. With the aid of relevant diagrams explain the following:

a) Cellulose bio-ethanol process

b) Benzole de-fronting

c) Amination

d) Mustard gas production process

e) Room and pillar mining (25 marks)

.....*THE END*.....