



KENYATTA UNIVERSITY
UNIVERSITY EXAMINATIONS 2011/2012
SECOND SEMESTER EXAMINATION FOR THE DEGREE OF BACHELOR OF SCIENCE
INDUSTRIAL CHEMISTRY
SCH 419: AGRO BASED INDUSTRIES

DATE: Friday 30th March, 2012

TIME: 2.00 p.m. – 4.00 p.m.

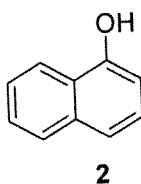
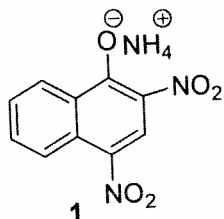
INSTRUCTIONS: Answer ALL questions.

Question 1 (20 marks)

a) Briefly explain the importance of the following:

- i) Builders in detergent manufacture [3mks]
- ii) Mordant in dying process [2mks]
- iii) sizing in textile finishing [2mks]
- iv) Vulcanisation of natural rubber [2mks]
- v) A nutritionist in animal feed manufacture [2mks]

b) i) Martius Yellow, **1**, is an example of a synthetic dye can be prepared starting from naphthol, **2**, and other inorganic reagents. Write chemical equations to show how this is achieved [5mks]



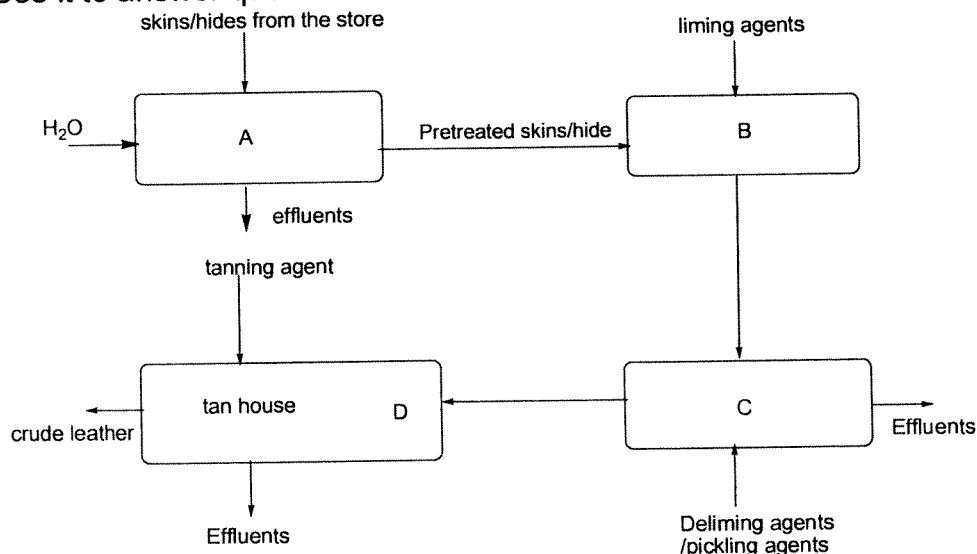
- ii) State any two applications of dyes in textile industries [2mks]
- ii) Give reasons why natural dyes are rarely used in textile industries [2mks]

Question 2 (18 marks)

- a) Explain the difference between
- i) A dye and a coloured object [3mks]
 - ii Printing and proper dyeing of fabrics [2mks]
 - iii) Bleaching of fibres and decolorizing of fabrics [3mks]
- b i) Name any four classes of fibres [2mks]
- ii) State how knowledge of their structural differences is important in the finishing process in the textile industries [2mk]
 - iii) State the role natural fibres have played in the development of the modern synthetic production of fibres [2mks]
- c) During the study of industrial chemistry course, you paid visits to various industries eg Marine and Fisheries and Spectra International. Explain briefly:
- i) How as a student taking industrial chemistry benefit from such visits [2mks]
 - ii) How the industries may benefit from your visit [2mks]

Question 3 (17 marks)

- a) The following is a conceptual flow chart showing the processing of leather from skins or hides using basic chromium salt $\{Cr_2(OH)_2(SO_4^{2+})\}$ as a tanning agent. Use it to answer questions that follow



- i) Hides or skins are soaked in **A** and then liming in **B** using chemicals such as Ca(OH)_2 and Na_2S . State what is achieved at the end of each of the processes in **A** and **B** [4mks]
- ii) With the help of chemical equations explain how tanning to crome leather is achieved in **D** [6mks]
- b) Suggest two major reasons that lead to low quality hides or skins from farmers and the corresponding possible remedies [2mks]
- c i) Give the main application of surfactants in textile industries [2mks]
- ii) Why is very important that surfactants have to be biodegradable? [3mks]

Question 4 (15 marks)

- a) Despite the fact that obtaining ethyl alcohol (ethanol) by synthesis is usually preferred, industrial fermentation of biomass has drawn a lot of global attention in the recent times as alternative method as is indicated by investors pumping in large sums of money for plants to produce biofuel (agrofuel)
- i) Define industrial fermentation as used above [2mks]
- ii) State any two crops that can be used as sources of biofuels [1mk]
- iii) Why is obtaining ethyl alcohol by synthesis preferred? [3mks]
- b) Before fibres from cotton are used in textile industries, they are chemically modified by undergoing through many chemical processes such as mercerization, oxidation etc. Explain what is involved in mercerization and give its importance [3mks]
- c) i) Cotton is an example of a fibre of vegetable origin while leather is of animal origin. Briefly give the difference between the two types of fibres in terms of chemical composition and suggest the type of dyes suitable for each [5mks]
- ii) State the main by products and their uses from a cotton processing plant [2mks]

END