



UNIVERSITY EXAMINATIONS

1ST SEMESTER 2022/2023 ACADEMIC YEAR

**THIRD YEAR EXAMINATION FOR THE DEGREES OF
BACHELOR OF SCIENCE (GEN), BACHELOR OF
EDUCATION (SCIENCE)**

CHEM 315: INDUSTRIAL AND APPLIED CHEMISTRY I

STREAM: R

TIME: 2 HRS

DAY: MONDAY [14.30PM – 16.30PM]

DATE: 05/12/2022

THIS QUESTION PAPER CONSISTS OF THREE (3) PAGES

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INSTRUCTIONS: - Attempt all questions**QUESTION ONE**

(a) Classify the following chemical processes into Unit operations or Unit Processes and explain using examples (10 marks)

- (i) Solvent extraction
- (ii) Hydrogenation
- (ii) Distillation
- (iv) Adsorption
- (v) Oxidation
- (vi) Hydration

(b) (i) State and explain three differences between an industrial process and a laboratory process. (3 marks)

(ii) State three reasons for setting up a pilot plant. (3 marks)

(iii) State four main factors that determine location of a chemical plant. (2 marks)

(c) (i) using the manufacture of ammonia as an example, discuss the basic chemical data. (5 marks)

(ii) Differentiate between batch and continuous process (4 marks)

(d) Define the terms as used in research and development

- (i) basic research
- (ii) applied research
- (iii) development (3 marks)

QUESTION TWO

(a) Soap and detergents are some of essential products in our day today activity: -

(i) Explain the Chemistry of Soap and Detergent Function (2 marks)

(ii) Discuss the manufacturing process of Soap by outlining the four main steps (use chemical equations where necessary) (4 marks)

(b) (i) Explain the various unit processes used in the production of sugar (4 marks)

(ii) Name two by-products of sugar production and give the major use of each. (3 marks)

(c) (i) Fats and oils are compounds which are extracted from natural sources. Using a flow chart outline the extraction of cotton seed oil (4 marks)

(ii) Discuss the bleaching and deodorization processes and their importance in oil refining (3 marks)

QUESTION THREE

- (a) Discuss the following steps involved in the Pulp and Papermaking (4 marks)
- (i) Preparation of raw Material
 - (ii) Separation of Fiber/pulping
 - (iii) Bleaching Process
 - (iv) Papermaking Procedure
- (b) Discuss two environmental problems that result from the paper and pulp industry. Give the mitigation measures (2marks)
- (c) (i) What is the feature that distinguishes glass from the traditional and new ceramics? (1 mark)
- (ii) Discuss three desirable properties for ceramics for kitchen use (3 marks)
- (iii) Discuss the various stages in the manufacture of glass (3marks)
- (d) (i) With the help of chemical equations explain how absolute ethanol is prepared industrially from starchy material ($5\frac{1}{2}$ marks)
- (ii) Discuss three primary sources of pollution from the Beer industries. ($1\frac{1}{2}$ marks)

