



# **MAASAI MARA UNIVERSITY**

## **REGULAR UNIVERSITY EXAMINATIONS 2018/2019 ACADEMIC YEAR THIRD YEAR SECOND SEMESTER**

### **SCHOOL OF SCIENCE AND INFORMATION SCIENCES BACHELOR OF SCIENCE IN CHEMISTRY**

**COURSE CODE: CHE 3228**

**COURSE TITLE: INDUSTRIAL CHEMISTRY I**

**DATE: 15-4-2019**

**TIME: 11:00AM -1:00PM**

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#### **INSTRUCTIONS TO CANDIDATES**

1. Answer Question **ONE** and any other **TWO** questions.
2. All Examination Rules Apply.

*This paper consists of 4 printed pages. Please turn over.*

## SECTION A

### Question One (30mks)

- a) (i) Define a pilot plant (1 mk)
- (ii) State any three purposes of a pilot plant (3 mks)
- (iii) Distinguish between a pilot plant and a demonstration plant (1 mk)
- (iv) Explain how a pilot plant reduces risks (2 mks)
- (v) Describe a situation where a pilot plant may not be necessary (1mk)
- (vi) State the first three steps in creating a pilot plant (3 mks)
- b) State and explain any;
- (i) Three geographical factors, (6 mks)
- (ii) Two non-geographical factors that influence the location of industries (4 mks)
- c) Define the following categories of products produced by chemical industries:
- (i) Basic chemicals (1 mk)
- (ii) Specialty chemicals (1 mk)
- (iii) Consumer Chemicals (1 mk)
- d) (i) State four purposes of research and development (R & D) in a chemical industry (4 mks)
- (ii) State the three steps followed from research to productivity (3 mks)

## SECTION B

Answer any TWO questions from this section, each question carries 20 marks

### Question Two (20mks)

- a) Define the following terms;
- (i) Ceramics (1mk)
  - (ii) Traditional ceramics (1 mk)
  - (iii) Advanced ceramics (1 mk)
- b) Briefly describe what happens in the ceramics manufacturing process at the following steps;
- (i) Raw material procuring (2 mks)
  - (ii) Green machining (2 mks)
  - (iii) Glazing (2 mks)
- c) (i) Define glass (1 mk)
- (ii) State the two categories of materials used to make glass and give one example of a material in each category. (4mks)
- (iii) State the function of each of the following materials in glass manufacturing;
- Sodium carbonate (1mk)
  - Calcium carbonate (1mk)
  - Metal oxides (1mk)
- (iv) State any two properties of glass (2 mks)
- (v) State the reason for the cold treatment of glass (1mk)

### Question Three (20mks)

- a) (i) State any three uses of Calcium carbide (3mks)
- (ii) State the origin of the smell exhibited by technical grade calcium carbide (1mk)
- (iii) State the reason why the smell mentioned in a) (ii) above is useful (1mk)
- b) State the four main steps applied in cement processing (4 mks)
- c) State any two advantages and two disadvantages of chemical industries (4 mks)
- d) Using a practical example, describe physical decolorization of glass (2 mks)
- e) Explain two main factors about raw materials that act as an incentive to the development of major chemical industries (4 mks)
- f) The atmosphere is a source of a major raw material for chemical industries. State any two constituents of this raw material (1 mks)

### Question Four (20mks)

- a) The natural environment is the source of raw materials for the chemical industry. Except the atmosphere, name two other areas in the natural environment that are sources of raw materials and give one example of a raw material obtainable from the sources. (4 mks)
- b) (i) State three processes that occur in a typical industrial process (3 mks)
- c) (i) Distinguish unit process from unit operation (1 mk)
- (ii) Classify the following processes as either unit operation or unit process by ticking under the right column (4 mks)

PROCESS	UNIT OPERATION	UNIT PROCESS
Alkylation		
Hydrogenation		
Distillation		
Crushing		

- d) (i) Distinguish block diagrams from process flow diagrams (1 mk)
- (ii) State two advantages of using accepted symbols in flow diagrams (1 mk)
- e) (i) State any three purposes of material balance calculations (3 mks)
- (ii) State two reasons why the following material balance equation is not true in practice (2 mks)
- INPUT = OUTPUT

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