MURANG'A UNIVERSITY OF TECHNOLOGY

SCHOOL OF PURE AND APPLIED SCIENCES

DEPARTMENT OF PHYSICAL AND BIOLOGICAL SCIENCES

UNIVERSITY ORDINARY EXAMINATION

2018/2019 ACADEMIC YEAR

SECOND YEAR **SECOND** SEMESTER EXAMINATION FOR BACHELOR OF SCIENCE IN ANALYTICAL CHEMISTRY

ACH 207– INTRODUCTION TO UNIT OPERATIONS

DURATION: 2 HOURS

DATE: 15/4/2019

TIME: 9.00 – 11.00

Instructions to candidates:

1. Answer question One and Any Other Two questions.
2. Mobile phones are not allowed in the examination room.
3. You are not allowed to write on this examination question paper.

SECTION A: ANSWER ALL QUESTIONS IN THIS SECTION

QUESTION ONE (30 MARKS)

a. Clearly explain the scope of industrial chemistry (4 marks)

b. Identify two raw materials whose sources is lithosphere (2 marks)

c. Identify five sources of industrial waste water. (5 marks)

d. Differentiate between block and process flow diagrams. (2 marks)

e. Explain two reasons for the determination of materials and energy balances. (4 marks)

f. Complete the table below: (6 marks)

Unit Operation	Purpose	Application
Crystallization		
	Separation of solids from liquids by gravitation forces	
		Production of pigments, powdered milk, detergent powder.

g. State the advantages of emulsion polymerization (4 marks)

h. List three advantages of using ceramic material in chemical industry. (3 marks)

SECTION B – ANSWER ANY TWO QUESTIONS IN THIS SECTION

QUESTION TWO (20 MARKS)

a. Explain five reasons why size reduction is an important process in industrial production. (10 marks)

b. Identify three equipment used in size reduction (3 marks)

c. State five reasons for Agglomeration. (5 marks)

d. Explain the working of pellet mills. (2 marks)

QUESTION THREE (20 MARKS)

a. A company intends to set up a cement factory in Kenya. You are required to carry out a feasibility study and advice the company.

(i) Identify the raw materials used in cement making. (4 marks)

(ii) Explain three factors to consider before locating the industry in a given area? (6 marks)

b. Explain two methods used in the separation of solid- solid mixtures in industry. (10 marks)

QUESTION FOUR (20 MARKS)

a. Sulphuric acid is an important chemical product produced in a chemical industry.

(i) Name the raw materials used. (1 mark)

(ii) Draw a block diagram to show the processes involved in its production. (5 marks)

(iii) Write chemical equations to show chemical changes in each of the processes. (3 marks)

b. Explain the term green chemistry. (3 marks)

c. Explain how industrial waste water from iron and steel making industry is purified. (8 marks)