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KIBABII UNIVERSITY

**UNIVERSITY EXAMINATIONS
2019/2020 ACADEMIC YEAR**

**FIRST YEAR SECOND SEMESTER
SUPPLEMENTARY EXAMINATIONS**

FOR THE DEGREE OF B.SC AND B.ED (SCIENCE)

COURSE CODE: SCH 122

COURSE TITLE: INTRODUCTION TO ANALYTICAL CHEMISTRY

DURATION: 2 HOURS

DATE: 11/2/21 **TIME:** 11 - 1 Pm

INSTRUCTIONS TO CANDIDATES

- Answer **QUESTION ONE** (Compulsory) and any other two (2) Questions.
- Indicate **answered questions** on the front cover.
- Start every question on a new page and make sure question's number is written on each page.

This paper consists of 3 printed pages. Please Turn Over



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Question 1 (30 marks)

- a) Differentiate between qualitative and quantitative analysis as used in chemical analysis (3 marks)
- b) Differentiate between batch extraction and continuous extraction as used in solvent extraction (4 marks)
- c) What is Nernst partition or distribution law? (2 marks)
- d) Describe the term recrystallization as used in analytical chemistry. (3 marks)
- e) Name seven physio-chemical properties upon which separation techniques are based (4 marks)
- f) Explain the reason why results are compared in analytical chemistry (3 marks)
- g) Analysis of sample of copper ore gave the following percentage value for the copper content, 6.08, 6.21, 6.12, 6.09, 6.16, and 6.14. calculate (3 marks)
- i. Mean (3 marks)
- ii. Standard deviation (4 marks)
- iii. Coefficient of variation (3 marks)
- h) What is the property that is measured in gravimetric analysis? (1 mark)

Question 2 (20 marks)

- a) An analyst is set to reduce systematic errors during the analysis. Discuss five ways which the analyst can use. (10 marks)
- b) The following values were obtained for the determination of cadmium in a sample of dust; 4.3, 4.0, 3.2 $\mu\text{g/g}$. should the value 3.2 be rejected? (5 marks)
- c) Differentiate among the following (3 marks)
- i. Relative error and absolute error (3 marks)
- ii. Variance and coefficient of variation (2 marks)

Question 3 (20 marks)

- a) Discuss the seven basic steps followed by analysts in order to solve analytical problems (10 marks)
- b) What are the five advantages of instrumental methods of analysis? (5 marks)
- c) Explain how a sample plan is implemented by an analytical chemist. (5 marks)

Question 4 (20 marks)

- a) Sampling is a very important aspect in analytical chemistry. Differentiate among the following sampling techniques stating the advantages one has over the other. (3 marks)
- i. Random sampling (3 marks)
- ii. Judgmental sampling (3 marks)
- iii. Stratified sampling (3 marks)
- b) Differentiate among the following (3 marks)
- i. Grab sample and composite sample (3 marks)

- ii. Systematic errors and random errors **(3marks)**
- c) If the mean of 12 determinations is $\bar{x} = 8.37$ and the true value is $\mu = 7.91$. Say whether or not this result is significant if the standard deviation is 0.17. **(5marks)**