



KIBABII UNIVERSITY

UNIVERSITY EXAMINATIONS 2020/2021 ACADEMIC YEAR

SECOND YEAR SECOND SEMESTER MAIN EXAMINATIONS

FOR THE DEGREE OF B.SC (CHEMISTRY)

COURSE CODE:

SCH 221

COURSE TITLE: ANALYTICAL CHEMISTRY I

DATE: 4/10/2021

TIME: 2:00-4:00PM

INSTRUCTIONS TO CANDIDATES:

Answer question ONE and any TWO of the remaining

KIBABII observes ZERO tolerance to examination cheating

Question 1 [30 Marks]

	Explain how analytical chemistry differs from the other major branches of c	chemistry							
i.	Explain now analytical elicinistry differs from the								
ii. iii.	List three types of errors in analytical measurements Citing a relevant example, describe propagation of errors Discuss the importance of method validation in analytical chemistry	[3 Marks] [4 Marks] [4 Marks]							
iv.	Highlight two reasons why it is important to define the analytical problem	[4 Marks]							
v.	B. C. Amatagail analysis as applied in analytical chemistry	[2 Marks]							
vi.	Explain why it is important to determine the precision of analytical measur	ements							
vii.	Explain why it is important to determine are present	[4 Marks]							
	Highlight the importance of proper sample handling	[3 Marks]							
viii.	Highlight the importance of proper sample	[3 Marks]							
ix.	Define confidence interval								

Question 2 [20 Marks]

Your firm has been tasked with monitoring the soil around the Kibabii University dumpsite

- a. List the steps you will follow in carrying out the exercise [10 Marks]b. Describe the sampling strategy you will employ to obtain accurate results [4 Marks]
- c. What strategies will you employ to ensure you obtain reproducible results [6 Marks]

Question 3 [20 Marks]

- i. Describe each of the following types of analysis
 a. Qualitative analysis
 b. Quantitative analysis
 - c. Characterization analysis
- d. Fundamental analysis
 ii. Explain some of the considerations to be applied during sample handling and storage
 [3 Marks]
- iii. Explain three sources of error on the analytical measurements and strategies to minimize them [9 Marks]

Question 4 [20 Marks]

When performing a routine analysis, a researcher recorded the following data for Cr standard with a concentration of 90 ppm

Run	Conc. (ppm)
1	88
2	72
3	90
4	93
5	86

Determine

i. The minimum and maximum absolute and relative errors [8 Marks]

ii. Whether the lowest and highest readings can be rejected as outliers at either 90 or 95 confidence levels [12 Marks]

Question 5 [20 Marks]

The content of calcium carbonate, an insoluble basic analyte in limestone, is analyzed by back titration. 0.2160 g of the sample is powdered and dissolved in 50.0 mL of 0.103M HCl solution. The reaction mixture is heated and stirred to ensure a rapid and complete reaction between the CaCO₃ and the HCl. After cooling, the remaining HCl is back titrated with 21.0 mL of 0.0978 M NaOH.

Determine

i. The mass of calcium carbonate in the limestone sample
 ii. The The % carbon content of the sample
 [6 Marks]

Table of Critical Values of Q

N	Q _{crit} (CL:90%)	Q _{crit} (CL:95%)	Q _{erit} (CL:99%)					
3	0.941	0.970	0.994					
4	0.765	0.829	0.926					
5	0.642	0.710	0.821					
6	0.560	0.625	0.740 0.680					
7	0.507	0.568						
8	0.468	0.526	0.634					
9	0.437	0.493	0.598					
10	0.412	0.466	0.568					

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4	LK							w	VB	23	>	50.94	41	ź	92.91	73	La	180.95	105	Db	(090)
F	4							4	IVB	22	Ë	47.90	40	7.7	91.22	72	Ht	178.49	104	Rf	(190)
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