KIBABII UNIVERSITY

UNIVERSITY EXAMINATIONS
2017/2018 ACADEMIC YEAR

THIRD YEAR FIRST SEMESTER
SUPPLEMENTARY/SPECIALEXAMINATIONS

FOR THE DEGREE OF B.ED (SCIENCE)

COURSE CODE: SCH 322

COURSE TITLE: ADVANCED INSTRUMENTAL ANALYSIS

DURATION: **2 HOURS**

DATE: 19/10/2018 **TIME: 8-10AM**

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

1.

a) Discuss the basic principles of instrumentation (4mks)
b) Explain why method validation is important in chemical analysis (2mks)
c) State the meaning of method modeling as used in analytical chemistry (2mks)
d) Outline the information that should be included in method planning (4mks)
e) List any three spectroscopic techniques (3mks)
f) For each of the instrumental techniques below identify the property that could be measured:
   i. Mass spectrometry (1mk)
   ii. X-ray spectroscopy (1mk)
   iii. Differential scanning calorimetry (1mk)
   iv. Nuclear activation analysis (1mk)
   v. Turbidimetry (1mk)
g) Why should an analyst bother with connecting a computer to an analytical instrument (2mks)
h) Using a schematic diagram describe the flow of information in an instrument (4mks)
i) Discuss the advantages of instrumental methods (4mks)

2.

a)
   i. What is a transducer? (1mk)
   ii. What name is given to a transducer that acts on a chemical signal (2mks)
   iii. Define an interface (1mk)
b) State the combinations of interactions between the analytical instrument computer and analytical chemist. Discuss each of these interactions (6mks)
c) Discuss the basis of mass spectrometry and name two area of application (5mks)
d) What is the principle behind electrophoretic techniques? (3mks)
e) State the significance of hyphenated techniques (2mks)

3.

a) Why should an analyst keep records (4mks)
b) Discuss the future of odern instrumentation under the following headings:
   i. Improved performance (4mks)
   ii. Miniaturized instruments (4mks)
   iii. Remote and process analysis (4mks)
   iv. Computers

4.

a) Give five reasons for interfacing instruments with computers (5mks)
b)

i. What is an operational amplifier?

ii. What are the ideal properties of an operational amplifier?

iii. State the applications of an operational amplifier (6mks)

c) List three components of a computer (3mks)