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UNIVERSITY EXAMINATIONS
2017/2018 ACADEMIC YEAR

THIRD YEAR FIRST SEMESTER
SUPPLEMENTARY/SPECIAL EXAMINATIONS

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)