



NATIONAL OPEN UNIVERSITY OF NIGERIA
14-16 AHMADU BELLO WAY, VICTORIA ISLAND LAGOS
MARCH/APRIL 2016 EXAMINATION

SCHOOL OF SCIENCE AND TECHNOLOGY

COURSE CODE: ESM341
COURSE TITLE: *INTRODUCTION TO INSTRUMENTATION MEASUREMENTS
AND FIELD METHODS IN ENVIRONMENTAL SCIENCE .*

TIME: 2 1/2 HOURS
Answer question one and any other three questions
Question 1 Compulsory (25 marks)

- 1a. Define the following: i. Instrumentation. 2mks
ii. Specialized techniques. 2mks
iii. Universal techniques. 2mks
bi. List 5 examples of field and laboratory equipments that use remote sensing technique.
(5marks)
ii. State the particular requirements in a particular application that the selection of a technique will be based on. (4marks)
(c). Write short notes on the remote sensing equipments.
i. Spectrometer (2marks)
ii. Colorimeters (2marks)
iii. Total station (3marks)

iv. Global positioning systems (3marks)

Question 2 (15 MARKS)

- a. What are composite variables and give two examples? (3mks)
- ii. Explain the terms pH and electrical conductivity. (4marks)
- bi. Mention some environmental factors that affect pH and EC measurements. (2marks)
- c. Briefly discuss how the pH and electrical conductivity of a soil sample can be detected. (6mks)

Question 3 (15 MARKS)

- a. With the aid of a well labelled diagram represent a typical block Atomic Absorption Spectrophotometer (AAS). (8marks)
- b. Outline and state the uses (where necessary) the essential parts of a colorimeter. (7marks)

Question 4 (15 MARKS)

- ai. Mention and explain in details the basic causes of sampling error. (8marks)
- b. Enumerate the sample history documentation and procedures requirements. (7marks)

Question 5 (15 MARKS)

- a. Explain the following: (6marks)
 - i. Sampling
 - ii. Population
 - iii. Sample.
- bi. Define the three types of samples. (6mks)
- ii. Outline the three steps in turning a liquid sample into an atomic gas in an AAS spectrometry. (3marks)

Question 6 (15 MARKS)

- ai. Outline the main reasons for sampling. (6mks)
- b. Mention five things a sample method and procedure documentation must include. (10 marks)