

**National Open University of Nigeria**

**Plot 91, Cadastral Zone, Nnamdi Azikiwe Expressway, Jabi - Abuja**

**Faculty of Science**

**APRIL/MAY, 2019 EXAMINATIONS**

**COURSE CODE: ESM 341**

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

**CREDIT: 2 Units**

**TIME ALLOWED: 2 Hours**

**Instruction:** Attempt question number ONE (1) and any other THREE (3) questions.

Q1. ai) Explain how Gas Chromatography can be carried out. **(4 marks)**

 ii) Enumerate four applications of Gas Chromatography. **(4 marks)**

bi) Explain the principle of operation of Vacutainer Syringe System. **(5 marks)**

ii) List four advantages of Vacutainer Syringe System **(4 marks)**

ci) What is Meteorology? **(3 marks)**

1. List any five Meteorological variables. **(5 marks)**

Q2. a) What is a Colorimeter? **(2 marks)**

 b) Enumerate any four uses of a Total Station. **(4 marks)**

 c) State five advantages of sampling rather than an entire population for a study

  **(5 marks)**

 d) Mention four essential characteristics of a Graphic Level Recorder. **(4 marks)**

Q3. a) Define Ecology. **(2 marks)**

b) What is the essence of using a quadrant in a study? **(2 marks)**

ci) Why is it that grab samplers should not be used to collect reactive gases?

 **(2 marks)**

ii) How can this problem be overcome? **(2 marks)**

d) Explain the operating principles of direct reading instruments. **(7 marks)**

Q4. a) Define instrumentation? **(2 marks)**

 b) Mention two survey equipment that are also remote sensing devices. **(4 marks)**

ii) Why is it that some field survey equipment are also called remote sensing

 devices? **(2 marks)**

 c) State three criteria for using integrated sampling procedure for air borne gaseous

 agents. **(3 marks)**

 d) Differentiate between sampling and population. **(4 marks)**

Q5. ai) What are the factors that control the intervals at which samples are taken in a

 Quadrant Survey? **(3marks)**

ii) What is the implication of using small interval? **(2 marks)**

iii) What is the implication of using great interval? **(2 marks)**

1. What normally determines the choice of a quadrant to be used in a study?

 **(2 marks)**

1. What is the main criterion for using random sampling in quadrant survey?

 **(2 marks)**

b) Outline four particular metadata of radiation measurements. **(4 marks)**