



REDEEMER'S UNIVERSITY, EDE, OSUN STATE, NIGERIA

FACULTY OF NATURAL SCIENCES

DEPARTMENT OF CHEMICAL SCIENCES

M.Sc. ENVIRONMENTAL/ANALYTICAL CHEMISTRY DEGREE

CHE 832: SAMPLING AND SAMPLE PREPARATION

SECOND SEMESTER EXAMINATION

2019/2020 SESSION

UNITS: 2

**Instruction: Answer THREE Questions in All**

**Time Allowed: 2 Hours**

**Question 1**

- (a) What is a representative sample? [02]
- (b) What is selective sampling? [02]
- (c) Itemize the various steps involved, questions are to be asked and the location to sample target population when designing a sampling plan. [13]
- (d) Describe random sampling. [03]
- [20]

**Question 2**

- (a) With the aid of an example, describe judgmental sampling within the target population. [05]
- (b) What do you understand by systematic sampling? [05]
- (c) State the advantages and disadvantages of random, systematic and stratified sampling. [07]
- (d) Suppose you are to analyze solid particles comprising analyte which represents  $10^{-7}\%$  of the population. How many particles must be collected to give a relative sampling variance of 1%? [03]
- [20]

**Question 3**

- (a)(i) Define air sampling. [01½]
- (ii) What is ambient quality? [01½]
- (iii) Briefly describe the filter sampling inhalable (total) dust. [02]
- (iv) Briefly, describe the sorbent sampling. [02]
- (b)(i) An operator is exposed to  $0.12\text{mg}/\text{m}^3$  for 7 h 20 min. Calculate the 8 h time weighted average (TWA). [02]
- (ii) Define maximum exposure limit (MEL), occupational exposure limit (OEL) and workplace exposure limit (WEL). [06]
- (c) Highlight five characteristics of high and low volume air samplers [05]
- [20]

**Question 4**

- (a) Itemize the processes involved in pre-sampling inspection as part of indoor air sampling protocol. [05]
- (b) Describe the processes for the collection of samples and quality assurance/quality control (QA/QC) during indoor air sampling. [06]
- (c) Differentiate between an active sampler and a passive sampler. [06]
- (d) What do you understand by grab sampling? [03]  
[20]

**Question 5**

- (a) Briefly, explain the importance of each of the following, in terms of preparation for sampling:
- i. Purpose and scope [02]
  - ii. Associated documents [02]
  - iii. Health and safety [02]
  - iv. Permits and approvals [02]
  - v. Skills, training and experience [02]
- (b) Mention ANY five reasons to contact the analysing laboratory before sampling. [05]
- (c) What do you understand by each of the following:
- i. Sample Register [02]
  - ii. Chain of custody (COC) documents [03]  
[20]