

**Department of Animal Science
BSc Agricultural Science Part II Examination
Statistical Methods and Experimental Designs**

2 HOURS (70 Marks)

NOV 2024

INSTRUCTIONS TO CANDIDATES

Answer question number 1 from SECTION A, and any two from SECTION B.

SECTION A (COMPULSORY)

1.

- a) Explain and illustrate the advantages and disadvantages of a broad research topic and a narrow research topic. **[6 marks]**
- b) Discuss the role played by the researcher's personal interests and expertise to the success of a research study. **[4 marks]**
- c) Discuss the difference between qualitative and quantitative research methodologies **[6 marks]**
- d) Describe the key components that should be included in the research methodology section of a research proposal. **[8 marks]**
- e) Discuss the different types of justifications that can be used to support a research study. **[6 marks]**

SECTION B (CHOOSE ANY TWO QUESTIONS)

2.

- a) Define non-random sampling and provide three examples of non-random sampling techniques. [4 marks]
- b) Compare and contrast convenience sampling and purposive sampling. [8 marks]
- c) Discuss the potential biases associated with non-random sampling methods. [8 marks]

3.

- a) Explain the concept of replication in experimental designs. [4 marks]
- b) Explain how replication contributes to the validity and reliability of experimental results. [6 marks]
- c) A researcher wants to conduct an experiment to investigate the effects of three different fertilizers on plant growth, however the land is uneven, and it is known to have 3 different soil types. Design an appropriate experimental layout, including the randomization and blocking strategies. [10 marks]

4.

- a) Describe the process of piloting a research questionnaire for safety evaluation in a construction company. [4 marks]
- b) Identify the key objectives of a pilot study, and how the findings can be utilized to refine the questionnaire. [6 marks]
- c) Identify and explain the potential sources of bias or limitations that may arise when using a questionnaire in research. [5 marks]
- d) Suggest how researchers can mitigate these limitations. [5 marks]

5.

- a) Discuss the ethical considerations that researchers need to address when conducting research with vulnerable populations, such as children, elderly individuals, or individuals with disabilities. [10 marks]
- b) Compare and contrast the principles of informed consent and voluntary participation in research. [4 marks]
- c) Outline the potential risks and benefits associated with data privacy and confidentiality. [6 marks]