The Open University of Sri Lanka
B.Sc/B.Ed. DEGREE, CONTINUING EDUCATION PROGRAMME
Open Book Test (OBT) 2024/2025
Level 05 - Applied Mathematics
ADU5318– Biostatistics

Date: - 12.10.2024 **Time: 10.30a.m. – 11.30a.m.**

Instructions

- This examination is of **One hour** duration.
- Answer **All** questions.
- Each of the two questions is allocated fifty marks.

1. A study is being planned to predict the distribution of total votes among three candidates in an upcoming election to be held in October 2024, within a specific villege. The villege has 3,205 eligible voters, and a list of these voters, along with their national identification numbers (NIC), is available. The resources allow for a sample of 400 individuals to be selected for data collection.

   i) Clearly describe the population of this study.

   ii) Is the population is finite or infinite? Provide reasons to support your answer.

   iii) Clearly describe the errors that can occur under each of the following data collection designs:
   a) Drawing a simple random sample of eligible voters
   b) Drawing a stratified sample with age as the stratification variable.

   iv) Explain the following terms in relation to this study:
   a) Sampling
   b) Non-sampling error

2. A study is being planned to compare the effects of two drugs (A and B) on the blood sugar levels of rats. The study involves 40 adult rats and 50 juvenile rats. The drugs will be administered once daily, along with the regular diet given to the rat. Additionally, the researcher aims to examine whether there are differences in blood sugar response, depending on whether the drug is administered in the morning or in the evening. The researcher will prescribe the time at which each rat receives the drug with their diet.

   i) Do you recommend a completely randomized design for this study? Provide reasons to support your answer.

   ii) Explain each of the following terms, in relation to this study.

      a) Treatment

      b) Interaction

   iii) State whether each of the following statements is true or false, in relation to this study. In each case, give reasons for your answer.

      a) If gender differences exist in the response to the drugs, assigning all female rats to receive Drug A could lead to significant confounding errors.

      b) The proposed study is an observational study.

      c) The data collected in this study will have replicates.