The Open University of Sri Lanka

B.Sc/B.Ed. DEGREE, CONTINUING EDUCATION PROGRAMME

Open Book Test (OBT) 2023/2024

Level 05 - Applied Mathematics

ADU5318 – Biostatistics

Date: - 27.08.2023   **Time: 2.30p.m. – 3.30p.m.**

Instructions

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

1) A principal of a school decided to find out whether students of his school in Grades 6 to 10 in the year 2023 are in favour of introducing regular school based assessments in place of end of term tests and to find out whether there are differences in the opinion depending on the Grade in which the student is currently studying. Each Grade has five parallel classes labeled *A, B, C, D* and *E*. Grades *D* and *E* are English medium classes and the rest are Sinhala medium classes. The principal also suspects possible medium-wise differences in the opinions of the students. Suppose each class has 40 students and the principal plans to collect data from 200 students, using a questionnaire.

i) Describe the population of this study.

ii) State whether the population is finite or infinite. Give reasons for your answer.

iii) State whether the population is homogeneous or inhomogeneous. Give reasons for your answer.

iv) Suggest a suitable design for this study.

v) Explain the following terms in relation to this study:

   a)   Sampling unit

   b)   Non-sampling error

2) A study is to be designed to compare the effects, after one month of applying, two fertilizers (say *A*, *B*), on the dried weight of a medicinal plant species. For this study, he plans to use 80 plants that are four weeks old, at the initial application of the fertilizer. Out of these plants, 50 are grown in plots near a stream that have high moisture levels and the rest are in plots with low moisture levels. The researcher suspects possible effects of moisture levels on the dried weight. Suppose that the spacing between plants are adequate to prevent mixing up of the effects of fertilizers applied to different plants and the researcher has the freedom to assign fertilizers to plants.

i) Do you recommend using a completely randomized design for this study. Give reasons for your answer.

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

    a) Treatment

    b) Confounding

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

iii) If there are large differences in the growths of plants prior to applying the fertilizer, one can expect large sampling errors in the estimated differences of the effects of the two fertilizers.

iv) The proposed study is an observational study.

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