The Open University of Sri Lanka

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

Open Book Test (OBT) 2021/2022

Level 05 - Applied Mathematics

ADU5318 – Bio Statistics

Date: - 02.09.2022   **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.
- At the end of answering, check whether you have entered the page number and the registration number, at the bottom of each page.
- Put the answer sheets together, in ascending order and prepare a single pdf file, as given in the instruction sheet provided to you earlier.
- **Add a cover page for your answer script:**
  A4 sheet mentioning the details Course code, Course title, Registration number, Name, and your contact phone number.
- Save your prepared pdf file in the name "Registration number_ADU5318" and keep a copy of the submission for yourself.
- **Upload your answers, saved as a pdf file in the above name, to the relevant drop box, within the allocated time.**
- Only one attempt is given to submit the answer script. Therefore, make sure that you select the correct file for submission.
- All communications must be done through official OUSL email only.

If you have any queries regarding submission, please contact the examination division immediately using the hotline or by sending an email to examsonline@ou.ac.lk using your OUSL email account.

1. The management of a company that produces a certain brand of electric equipment is interested in estimating the percentage of electric equipment sold in 2021, that will be returned for repairs, during the warranty period (two years from the date of purchase) and to assess the attitude of customers about the performance of the said electric equipment. The equipment is sold at three sales outlets located in Colombo, Kandy and Matara. Suppose that abrupt power breakdowns and fluctuations can damage the equipment. Due to differences in power fluctuations, items sold at Kandy are more likely to get returned compared to those sold at Colombo and Matara. Due to high travelling costs, the management decided to collect data only from randomly chosen 100 customers who bought the equipment in 2021, from the Colombo sales outlet.

State whether each of the following statements is true or false. In each case, give reasons for your answer:

a) The study described is an observational study.

b) If the management had collected data from all the customers who bought the equipment in 2021 at the Colombo sales outlet, the study cannot have sampling errors.

c) If the management had collected data from all the customers who bought the equipment in 2021, including Kandy and Matara sales outlets, the study cannot have non-sampling errors.

d) If 2021 had more abrupt power breakdowns, the estimate for the percentage of equipment sold in 2021 that will be returned under warranty, based on the data collected in this study is likely to have a bias.

e) The sampling procedure proposed by the management is a non-probability sampling procedure.

f) In this study, the three sales outlets can be treated as clusters.

2. In a company, 650 workers are male, and 150 workers are female. The management decides to sample 200 workers to find out the attitudes of workers, about the safety conditions in the workplace. Around 90% of the females work in the office and around 80% of males work in the machines and the safety requirement of the gender groups are likely to differ.

The management decides to collect a simple random sample of 200 workers and record their attitudes on safety available in the workplace.

i) Describe the population in this study.

ii) Classify the population as homogeneous or inhomogeneous.

iii) Classify the population as finite or infinite.

iv) Clearly describe one advantage of the proposed sampling procedure when compared with sampling the first 200 workers reporting to work on a randomly chosen day.

v) Describe one weakness of the design proposed by the management.

vi) If the management seeks your advice to design this study, clearly describe how you advise. Suppose the resources are only available to collect data from 200 workers.