



KENYATTA UNIVERSITY
SPECIAL/SUPPLEMENTARY EXAMINATIONS 2023/2024
EXAMINATION FOR THE DEGREE OF MASTER OF SCIENCE
(COMPUTER SCIENCE)
SCO 800: RESEARCH METHODOLOGY

APRIL/MAY 2024

TIME: 3 HOURS

INSTRUCTIONS: ANSWER QUESTION ONE AND ANY OTHER TWO QUESTIONS.

Question One (compulsory) (20 marks)

- (a) Distinguish how random sampling method differs from stratified random sampling. (5 marks)
- (b) Imagine that you are writing up a report for a research project.
 - i. What will be the purpose of the introduction section on the report? (2 marks)
 - ii. What will be the purpose of literature review section on the report? (4 marks)
- (c) Some studies have suggested that there may be a relationship between the level of intelligence and happiness. To investigate this claim, a psychologist used a standardized test to measure intelligence in a sample of 35 children aged 15 years, who were chosen from a county secondary school. He also asked the children to complete a self-report questionnaire designed to measure happiness.
 - i. Write an operationalized non-directional hypothesis for this study. (2 marks)
 - ii. Identify an alternative method which could have been used to collect data about happiness in this study. Explain why this method might be better than using a questionnaire. (4 marks)
 - iii. Describe how you could assess the internal validity of the happiness questionnaire assessed. (3 marks)

Question Two (15 marks)

- (a) Discuss four main issues which should receive the attention of the researcher when identifying the research design approach. Give suitable examples to support your answer. (4 marks)
- (b) A computer science teacher wondered whether there was a relationship between programming ability and mathematic ability. She decided to test this with secondary school students. From 100 students, she randomly selected 20 and gave each of them two tests. She used part of a KCSE exam paper to test their computer studies ability. The higher the mark, the better the computer studies ability. She could not find a mathematic ability test so she devised her own. She then rated their mathematical performance on a scale of 1 – 10, where 1 is fail and 10 is excellent performance.
- i. State a suitable non-directional hypothesis for this study. (3 marks)
 - ii. Why might the measure of mathematical ability used by the teacher lack validity? (3 marks)
 - iii. Explain how the teacher could have checked the reliability of the mathematical ability test. (3 marks)
 - iv. Explain why the teacher chose to use a random sample in this study. (2 marks)

Question Three (15 marks)

- (a) Discuss five key issues a research should pay the attention in formulating a research problem. (5 marks)
- (b) In a study highway, two people observe whether or not passengers across the road at the designated point (zebra crossing mark). They make 240 observations and disagree 37 times. What is the interrater reliability? Is this good, or should it be a concern to the researchers? (5 marks)
- (c) With suitable examples, explain four main issues which should receive the attention of the research in formulating the research problem. (5 marks)

Question four (15 marks)

- (a) With a suitable example, explain how internal validity is different from external validity. (5 marks)
- (b) In a study of the effects of using two types of Learning Management Systems (LMS) on student performance in a programming unit, subjects are randomly assigned to one of two softwares. In one software, subjects study in using a computer game: In the second software, subjects study using LMS with no games. The amount of time spent studying is held constant. All students then take the same exam on the material.
- i. Identify the dependent variable in this study and justify. (2 marks)
 - ii. Identify the independent variable in this study and justify. (2 marks)
 - iii. 'Identify the control and experiential group's variable in this study. (2 marks)
 - iv. Is the independent variable manipulated, or it is a subject variable. (2 marks)
 - v. Justify the use of random method in this study? (2 marks)