



MACHAKOS UNIVERSITY

University Examinations for 2018/2019

SCHOOL OF ENGINEERING AND TECHNOLOGY

DEPARTMENT OF COMPUTING AND INFORMATION TECHNOLOGY

THIRD YEAR SECOND SEMESTER EXAMINATION FOR
BACHELOR OF SCIENCE INFORMATION TECHNOLOGY)

BACHELOR OF SCIENCE (COMPUTER SCIENCE)

SCO 309: RESEARCH METHODS

DATE: 23/4/2019

TIME: 11.00-1.00 PM

INSTRUCTIONS

Answer **question ONE** and any other **TWO** questions.

QUESTION ONE (30 MARKS) (COMPULSORY)

- a) Define the following terms:
- i. Sampling (2 marks)
 - ii. Population (2 marks)
 - iii. Research (2 marks)
 - iv. Universe (2 marks)
 - v. Hypothesis (2 marks)
 - vi. Experiment (2 marks)
- b) What do you understand by the following expressions as used in research?
- i. Ex post facto research (2 marks)
 - ii. Extraneous variable (2 marks)
 - iii. Control (2 marks)
 - iv. Treatment (2 marks)
 - v. Research question (2 marks)
- c) Compare the following pairs:
- i. Sampling unit versus sample frame (2 marks)
 - ii. Descriptive versus Analytical research (2 marks)

- iii. Applied versus Fundamental research (2 marks)
- iv. Conceptual versus empirical research (2 marks)

QUESTION TWO (20 MARKS)

- a) Describe in details what you understand by the following sampling methods:
 - i. Probability sampling (6 marks)
 - ii. Non-probability sampling (6 marks)
- b) An educational researcher is interested in the relationship between students' participation in two after school programs and academic achievement. She states the following hypothesis in the description of her study:

H1. Children who participate in and after school program that emphasizes critical thinking skills will score higher on measures of academic achievement and self-esteem than students who participate in a program that emphasizes rote memorization.

 - i. Identify all the variables in the study and classify them into independent variable(s) and dependent variable(s). (3 marks)
 - ii. Describe how each variable varies. Provide justification for why each variable varies the way you describe (3 marks)
- c) Distinguish between pure research and applied research (2 marks)

QUESTION THREE (20 MARKS)

- a) Explain the purpose of carrying out research (6 marks)
- b) Describe the phases of the scientific research process (8 marks)
- c) What are the characteristics of the following:
 - i. A good questionnaire (3 marks)
 - ii. A good measurement (3 marks)

QUESTION FOUR (20 MARKS)

- a) Describe briefly the following data analysis techniques in research:
 - i) Univariate analysis (2 marks)
 - ii) Inferential analysis (2 marks)
 - iii) Bivariate analysis (2 marks)
- b) What is the purpose of sampling in research? (3 marks)
- c) What is the purpose of carrying out data analysis in research? (6 marks)
- d) Describe the steps in data analysis (5 marks)

QUESTION FIVE (20 MARKS)

- a) For each of the following scenarios, choose an appropriate measurement scale and justify your choice
- i. A researcher wants to determine whether the circadian temperature cycle is less stable for older compared to middle aged adults. Body temperature in degrees Fahrenheit is measured every 15 minutes over a period of 3 days. (2 marks)
 - ii. As part of a test preparation course, students are asked to take a practice version of the Graduate Record Examination (GRE). This is a standardized test. Scores can range from 200 to 800 with a population mean of 500 and a population standard deviation of 100. (2 marks)
 - iii. Children in elementary school are evaluated and classified as non-readers (0), beginning readers (1), grade level readers (2), or advanced readers (3). The classification is done in order to place them in reading groups. (3 marks)
- b) Describe the four operations used in processing of data pointing out the significance of each in context of research study in computer science. (3 marks)
- c) Distinguish between inductive and deductive research giving examples where it is applied (5 marks)
- d) Distinguish between Qualitative research and Quantitative Research (5 marks)