



MACHAKOS UNIVERSITY

University Examinations for 2021/2022 Academic Year

SCHOOL OF ENGINEERING AND TECHNOLOGY

DEPARTMENT OF BUILDING AND CIVIL ENGINEERING

FOURTH YEAR FIRST SEMESTER EXAMINATION FOR

BACHELOR OF SCIENCE (ELECTRICAL AND ELECTRONICS ENGINEERING)

BACHELOR OF SCIENCE (MECHANICAL ENGINEERING)

BACHELOR OF SCIENCE (CIVIL ENGINEERING)

ECU 400: RESEARCH METHODOLOGY

DATE:23/8/2022

TIME: 8.30-10.30 AM

INSTRUCTIONS:

- This paper comprises of FIVE questions. Answer **THREE** questions
- Questions one is **Compulsory** and carries 20 marks
- Answer any other **TWO** questions

QUESTION ONE (20 MARKS)

- a) Define the following terms as used in research methodology.
- Variables (5 marks)
 - Research hypothesis (5 marks)
 - Conceptual framework (5 marks)
 - Non probability sampling (5 marks)
 - Data analysis (5 marks)
- b) Differentiate between qualitative and quantitative research studies. (5 marks)
- c) Literature review in research is very important; briefly outline basic steps to a successful literature search. (5 marks)
- d) i. Define 'statement of a problem' in an Engineering and Technology field. (2 marks)
- ii. Outline THREE characteristics of a good 'statement of a problem' in a study. (3 marks)

QUESTION TWO (15 MARKS)

- a) Differentiate between Theoretical framework and conceptual framework (2 marks)
- b) Explain briefly the characteristic of a good hypothesis (5 marks)
- c) Literature review forms a foundation on which further research is done. Briefly outline FOUR reasons to support this assertion. (8 marks)

QUESTION THREE (15 MARKS)

- a) Differentiate between:
 - i. Content validity and predictive validity
 - ii. Longitudinal growth and Cross sectional Research
 - iii. Descriptive research and Action Research (8 marks)
- b) A management Consulting firm based in Machakos has been commissioned by BP-Shell to evaluate the Company's Human Resource (HR) capacity needs in relation to its performance. The company has four categories of staff as follows:

Finance and administration	300
Building Engineering	100
Electrical Engineering	450
Research and development	150

Giving reason, suggest a suitable sampling technique for the above study. (7 marks)

QUESTION FOUR (15 MARKS)

- a) Define the following terms as used in research.
 - i. Sampling error
 - ii. Sequential sampling
 - iii. Predictive validity
 - iv. Moderator variable
 - v. Unit of analysis (5 marks)
- b) With an aid of a schematic diagram describe exhaustibly the term Research processes (10 marks)

QUESTION FIVE (20 MARKS)

- a) Define Ex-post facto Research (3 marks)
- b) Briefly outline THREE advantages and THREE disadvantages of stating a research problem in hypothesis form. (6 marks)
- c) Briefly outline SIX key ethical issues relating to research process. (6 marks)