



TECHNICAL UNIVERSITY OF MOMBASA

School of Engineering and Technology

Department of Electrical and Electronic Engineering

UNIVERSITY EXAMINATION FOR:

Bachelor of Technology in Electrical and Electronic Engineering

TEE 4308 Engineering Research Methods

SPECIAL/SUPPLEMENTARY EXAMINATION

SERIES: JULY 2025

TIME: 2 HOURS

DATE: July 2025

Instructions to Candidates

You should have the following for this examination

-Answer Booklet, examination pass and student ID

This paper consists of **five** Questions; Answer questions ONE and any TWO Questions.

Do not write on the question paper.

QUESTION ONE

- a) Differentiate between reference list and bibliography [4 marks]
- b) In conducting literature review, the researcher ought to conduct review in sequential way commonly referred to as funnel. Explain this statement. [8 marks]
- c) Secondary data should be used commonly when undertaking research. Explain the criteria to use in evaluating your secondary data sources. [8 marks]
- d) You have been asked to prepare a questionnaire to collect data on attitudes. Describe the steps you will take to ensure that the questionnaire measures the attitudes which you wish to explore. Give reasons for the steps you suggest. [10 marks]

Question TWO

- a)
 - i) In research, particularly in fields like healthcare, education, and social sciences, it's essential to choose the appropriate study design. Two common types are observational and intervention studies. These approaches differ in how data is collected and how variables are handled, affecting the conclusions researchers can draw. Differentiate between observational and intervention research studies
 - ii) Describe the following research designs
 - I) Exploratory

II) Descriptive

III) Analytical

[10 marks]

b)

- i) Describe any THREE ethical principles any research work.
- ii) Oceans Five is a major national charity which provides energy services for elderly people living alone. Cuts in funding have put the charity's future at risk. One possible option which would help Oceans Five continue to deliver its services is to merge with The Home Service, another national charity with a similar remit. The Board of Oceans Five is unsure if this option would provide the best outcome for the people who use their services and for the care-givers who work for the organisation. It has approached an insight provider to help the charity gain the insight needed to inform the decision.

Describe what you understand by the term 'insight' and how it differs from more traditional market research. Illustrate your answer with examples.

marks]

[10

Question THREE

- a) Explain any TWO characteristics of a well planned research [4 marks]
- b) Explain the difference between scientific and non-scientific methods of research [4 marks]
- c) Explain the main components of any research work [6 marks]
- d) Credibility of research findings is influenced by reliability and validity. Explain four threats to reliability of data collection techniques. [6 marks]

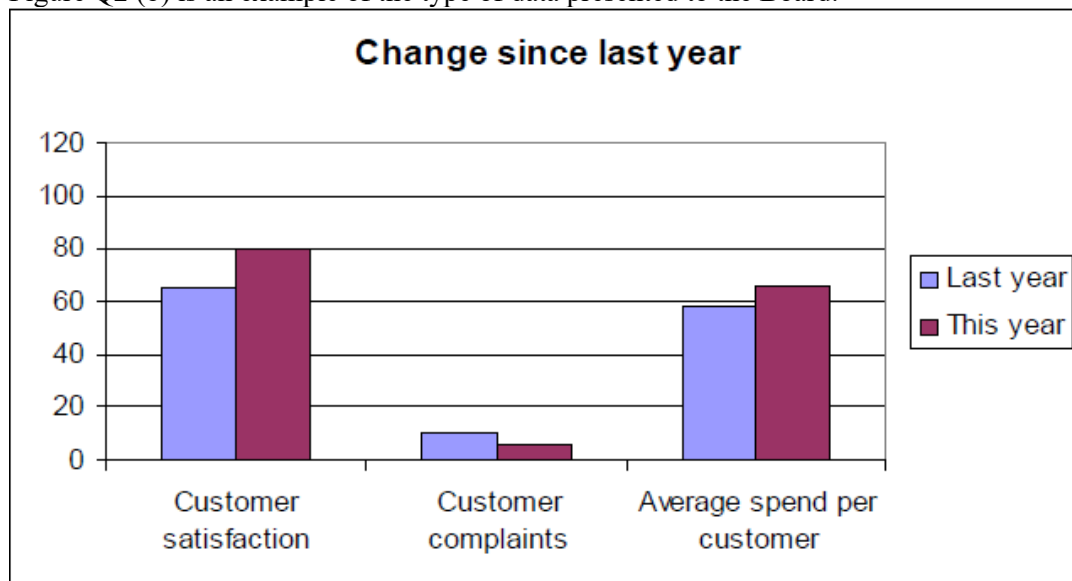
Question FOUR

a)

- i) Explain any FOUR criteria for selecting and research topic.
- ii) State the THREE conditions under which a research problem can be identified

[11 marks]

- b) A supermarket regularly monitors a wide range of measures. Key data is presented to the Board every three months. Figure Q2 (b) is an example of the type of data presented to the Board.



Identify the strengths and weaknesses of the graph in conveying information about the research findings, giving reasons for your suggestions. [9 marks]

Question FIVE

a) Define the following terminologies giving an example in each case

- i) General objectives
- ii) Specific objective
- iii) Hypotheses

[6

marks]

b)

- i) List the characteristics of good research objectives [5 marks]
- ii) State some of the problems that may arise as a result of having too many objectives in a study

c)

- i) Explain the importance of literature review when preparing a research proposal
- ii) Explain any FOUR sources of research information and describe how such information could be summarised on index card.

[9 Marks]

[6 marks]