



# MACHAKOS UNIVERSITY

University Examinations 2017/2018

SCHOOL OF EDUCATION

DEPARTMENT OF EDUCATION MANAGEMENT AND CURRICULUM STUDIES

FOURTH YEAR SECOND SEMESTER EXAMINATION FOR BACHELOR OF  
SCIENCE IN ELECTRICAL AND ELECTRONICS ENGINEERING

ECU 400: RESEARCH METHODS

DATE: 13/12/2017

TIME: 8:30 – 10:30 AM

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## INSTRUCTIONS

Answer Question One and Any Other Two Questions

### QUESTION ONE

- a) Explain the following methods of acquiring knowledge
  - i) Everyday way method (4 marks)
  - ii) Reasoning (4 marks)
- b) Explain the characteristics of qualitative research (5 marks)
- c) For each of the following classification of research, highlight any two types of research
  - i) Researcher's intention (2 marks)
  - ii) Nature of data (2 marks)
  - iii) Methods of data collection (2 marks)
  - iv) Source of data (2 marks)
- d) Outline the role of literature review in research (4 marks)
- e) Distinguish between the following as applied in research methods
  - i) Sampling error and sampling bias (2 marks)
  - ii) Research Questions and a Questionnaire (2 marks)

## QUESTION TWO

- a) Explain the four types of non-probability sampling designs (4 marks)
- b) Compute the number of elements which should be selected from each of the stratum to make a sample of 500 (8 marks)

| Stratum | Population ( $N_i$ ) | Standard Deviation( $S_i$ ) |
|---------|----------------------|-----------------------------|
| A       | 5000                 | 0.5                         |
| B       | 3500                 | 1.2                         |
| C       | 4200                 | 1.0                         |
| D       | 5500                 | 0.8                         |
| E       | 3000                 | 1.2                         |

- c) By the use of relevant examples, explain any two types of research hypotheses (4 marks)
- d) Outline any four strategies that can be used to determine the sample size (4 marks)

## QUESTION THREE

By use of an illustration or otherwise, explain the types or categories of each of the following types of research designs

- a) Survey research designs (4 marks)
- b) True experimental designs (6 marks)
- c) Quasi-Experimental designs (5 marks)
- d) Naturalistic designs (5 marks)

## QUESTION FOUR

- a) Explain the advantages and disadvantages of the following methods of data collection
- i) Observation (4 marks)
- ii) Interview (4 marks)
- b) Explain any four sources of measurement errors in research (4 marks)
- c) By the use of relevant examples, explain any four types of scales in measurement (8 marks)

### **QUESTION FIVE**

- a) Explain any six ethical principles that should be upheld when conducting research (6 marks)
- b) By use of an illustration, explain four ways through which processed data can be presented (4 marks)
- c) Explain the characteristics of scientific research (4 marks)
- d) Outline the sources of research topics in Engineering (6 marks)