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TECHNICAL UNIVERSITY OF MOMBASA

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Faculty of Engineering and Technology  
Department of Mechanical & Automotive Engineering  
UNIVERSITY EXAMINATION FOR:  
BSc. Mechanical Engineering  
EMG 2415 : Research Methods  
SUPPLEMENTARY EXAMINATION  
TIME: 2 HOURS

**Instructions to Candidates**

You should have the following for this examination

- Answer booklet
- Non-Programmable scientific calculator

This paper consists of FIVE questions. Attempt question ONE and any other TWO questions.

Maximum marks for each part of a question are as shown.

**Do not write on the question paper.**

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**Question ONE (Compulsory)**

- a. Define the term research and explain any FIVE characteristics of research. **(12 marks)**
- b.
- Define the term hypothesis as used in research.
  - Distinguish between Null hypothesis and alternative hypothesis. **(6 marks)**
- c. Distinguish between the following types of research:
- Pure research and applied research
  - Exploratory and explanatory research
  - Quantitative and qualitative research **(6 marks)**
- d. State and explain briefly any THREE types of knowledge that research can add to. **(6 marks)**

**Question TWO**

- a. Define the terms "Data collection" as used in research and briefly explain any TWO challenges faced by researchers during data collection. **(4 marks)**
- b. State and explain briefly five factors to consider during data collection. **(10 marks)**
- c. Explain the essential steps that a researcher should use in data collection. **(6 marks)**

### **Question THREE**

- a. Explain the meaning and significance of a literature review when carrying out a research study. **(8 marks)**
- a. State and explain any four challenges that might affect the researcher during the formulation of a literature review. **(4 marks)**
- b. State and explain briefly the steps involved in formulating literature review. **(8 marks)**

### **Question FOUR**

- a. Briefly describe the steps involved in a research process with suitable illustrations. **(16 marks)**
- b. State any FOUR major problems and constraints faced by researchers. **(4 marks)**

### **Question FIVE**

- a. State and explain briefly any four qualities of an effective research thesis **(8 marks)**
- b. State and explain briefly any FOUR data-presentation techniques. **(12 marks)**