



ZIMBABWE EZEKIEL GUTI UNIVERSITY

COLLEGE OF LIFELONG LEARNING

EXAMINATION PAPER

MODULE CODE : DUWC125
MODULE TITLE : RESEARCH METHODS
DURATION : 3 Hours
LEVEL : 1.1
DATE :

INSTRUCTIONS TO CANDIDATES:

1. No cell phones are allowed in the examination venue.
2. Use of silent, non-programmable calculators is allowed
3. Answer **Question 1** and any other **one** in Section B.
4. Begin each question on a new page.
5. The number of marks for each question or part question is shown in brackets []
6. Show all workings, where applicable.

SECTION A (Compulsory)

Question 1

Dr. Kureya, a neuroscientist specializing in circadian rhythms, launched a controlled study to examine the effects of blue light exposure from digital devices on adolescent sleep quality. With the rise in screen time among teenagers—averaging 7.5 hours per day according to recent surveys—concerns have grown about its impact on melatonin production and sleep hygiene.

The study involved 120 high school students aged 13 to 17, randomly assigned to two groups. The experimental group was instructed to wear blue light-blocking glasses for two hours before bedtime over a 4-week period, while the control group maintained their usual screen habits without any intervention.

Sleep quality was measured using both actigraphy wristbands and self-reported sleep diaries, focusing on metrics such as sleep onset latency, total sleep time, and sleep efficiency. At the end of the study, the experimental group showed:

- A 23% reduction in sleep onset latency (from an average of 42 minutes to 32 minutes),
- An increase of 38 minutes in total sleep time,
- And a 12% improvement in sleep efficiency.

Required:

- a) Suggest a topic and justify your choice. [6 marks]
- b) Construct a research problem. [7 marks]
- c) Why do you think it was necessary to *randomly* assign students to two groups? [4 marks]
- d) State and explain three variables which were used to measure sleep quality. [6 marks]
- e) Justify the statistics to be calculated to find if there are differences or not. [6 marks]
- f) Suggest recommendations based on these findings. [4 marks]

SECTION B (Choose one question)

Question 2

After a severe hurricane, researchers conducted a field experiment to examine the psychological impact of displacement on children. The study found that children who were forced to change schools due to storm damage exhibited higher levels of aggression compared to those who remained in their original schools.

- a. Explain what is meant by the terms independent and dependent variables.

[10 marks]

- b. Identify and justify the independent and dependent variables in this study. [15 marks]

Question 3

- a. Explain fully the concept of sampling. [10 marks]
b. Assess the strengths and weaknesses of the major random sampling techniques? [15 marks]

Question 4

A biotechnology company is developing a new gene-editing therapy aimed at reversing neurodegenerative diseases such as Alzheimer's. To test the therapy, researchers plan to genetically modify lab mice to express symptoms similar to human Alzheimer's and then administer the treatment. The mice will undergo behavioral tests, brain imaging, and post-mortem analysis over a 12-month period. While the potential human benefit is substantial, the procedure involves significant distress for the animals, including cognitive impairment, invasive procedures, and eventual euthanasia. Animal rights advocates argue that the suffering inflicted is unjustifiable, especially given the uncertainty of translating results from mice to humans. Researchers, however, maintain that such studies are essential for medical breakthroughs.

- a. Explain what is meant by ethical considerations in research. [10 marks]
b. Considering this scenario, what ethical boundaries should be placed on scientific curiosity when using animals in research? [15 marks]

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