



**UGANDA INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY
END OF SEMESTER TWO EXAMINATIONS**

ACADEMIC YEAR 2024/2025

DEPARTMENT: ICT

SEMESTER: TWO
PROGRAMME(S): DECE, DITB, DEEE, DCS

YEAR OF STUDY: ONE

COURSE: RESEARCH METHODS

COURSE CODE : BSM 121

DATE: SATURDAY 21ST JUNE 2025

TIME: 9AM- 12PM

DURATION: 3 HOURS

INSTRUCTIONS:

- (i) This paper contains two Sections: A (40 marks) & B (60 marks).**
- (ii) Attempt ALL questions in Section A, and ONLY THREE questions in Section B.**
- (iii) All questions in Section B carry equal marks.**
- (iv) Credit will be given for use of relevant examples and illustrations.**
- (v) Begin each number in Section B on a new page of the answer sheet.**
- (vi) DO NOT write on this question paper**

SECTION A – COMPULSORY (40%)

PART I (20marks)

1) Which of the following is a characteristic of good research?

- A. Subjective interpretation
- B. Systematic process
- C. Unverifiable results
- D. Biased conclusions

2) Which of the following is a primary method of data collection?

- A. Reading a book
- B. Interviewing people
- C. Watching television
- D. Downloading from the internet

3) A good research process must:

- A. Be done quickly
- B. Avoid using past data
- C. Follow a clear methodology
- D. Be always theoretical

4) Which of the following is NOT a characteristic of good research?

- A. Empirical
- B. Random speculation
- C. Logical
- D. Controlled

5) Descriptive research is mainly concerned with:

- A. Establishing cause and effect
- B. Testing a theory
- C. Describing the current situation
- D. Conducting experiments

6) Which of the following is an example of descriptive research?

- A. Analyzing the impact of exercise on heart rate
- B. Surveying student satisfaction with online learning
- C. Testing a new drug
- D. Measuring soil fertility changes

7) What best defines qualitative research?

- A. Uses statistics and numerical data
- B. Explores behaviors, experiences, or opinions
- C. Relies on laboratory testing
- D. Predicts future events

8) **Which of the following is a characteristic of experimental research?**

- A. Manipulation of the independent variable
- B. Observation without intervention
- C. Analysis of historical data
- D. Use of open-ended interviews

9) **One person's age is listed as 200 and their gender as “maybe ” What should you do?**

- A. Ignore the mistake
- B. Fix or remove wrong data after checking
- C. Change all data to average values
- D. Change age to 20 and gender to male

10. **Which of the following best describes a hypothesis in research?**

- A. A summary of research findings
- B. A tentative explanation or prediction that can be tested
- C. A list of data collection tools
- D. A statistical analysis method

PART II (20marks)

Access to reliable electricity remains a major challenge in many rural areas of Uganda, particularly in schools where power is essential for lighting, charging devices, operating ICT tools, and running basic educational infrastructure. Solar energy has emerged as a sustainable and cost-effective solution due to its abundance, especially in off-grid regions.

However, many existing solar power systems in rural schools face significant limitations. These include poor system design, lack of monitoring tools, substandard components, improper usage, and insufficient technical support. As a result, schools experience frequent power interruptions, shortened battery lifespans, and increased maintenance costs—affecting both learning and administration.

This project challenges you to work in a multidisciplinary team to analyze, improve, and optimize a solar energy system suitable for rural schools. The goal is to develop a more reliable, efficient, and user-friendly solution that ensures consistent energy supply while minimizing maintenance needs.

Answer the following questions precisely

1. Define a clear research problem from the scenario above. (4 marks)
2. State two SMART objectives for the proposed research. (4 marks)
3. Propose a suitable research scope and justify its relevance to this project. (4 marks)
4. Suggest and briefly explain appropriate methods for collecting data in this engineering context. (4 marks)
5. Identify two ethical considerations your team should observe during this research. (4 marks)

SECTION B (*Attempt any three numbers – 60%*)

Question 2

- (a) Differentiate between the following types of research and give an example of engineering in each of the category (10marks)
 - (i) applied and basic research
 - (ii) Qualitative and quantitative
- (b) Outline and explain the key steps involved in conducting engineering research. (10 marks)

Question 3

- (a) Discuss the purpose and characteristics of a good research design. Use examples relevant to engineering research. (10marks)
- (b) Compare and contrast interviews and questionnaires as tools of data collection. Which one would you recommend for a study on power usage habits in rural Uganda and why? (10marks)

Question 4

- (a) Describe the challenges a researcher may face during data analysis and interpretation. Suggest ways in which these challenges can be addressed (10marks)
- (b) Explain the ethical considerations involved in data analysis and interpretation. Why is it important for a researcher to be honest and objective during this stage? (10marks)

Question 5

- a) After completing a project on designing a low-cost power inverter, your teacher asks for a report. Based on your notes, what key sections should be included in your research report, and why? (10 marks)
- b) A student is researching "Cybersecurity threats for small businesses" and finds three types of sources: A YouTube video explaining common hacking techniques, A research paper from a university cybersecurity lab, A news article about a recent cyberattack on a small business.
 - i) Which source is the most reliable for a literature review? Why? (7 marks)
 - ii) How can students ensure they are using high-quality sources in their research? (3 marks)

Question 6

- a) Describe any 3 common forms of plagiarism done by UICT students. (6 marks)
- b) Your lecturer has emphasized the importance of referencing your work. Describe 4 benefits. (8 marks)
- c) *Africa has recently gotten some attention. China has scrapped all import tariffs on goods from Africa, meaning that this is a game changer for the continent, However, as we know, there is no free lunch. There is a concern that the export of raw materials is going to increase and the narrative of Africa consumes what it does not produce and produces what it does not consume will become pronounced. Rewrite highlighting the quotations and possible citations.* (4 marks)
- d) Which type of citation was used in the statement below: (2 marks)
[1] A. Sharma and P. Kumar, "A Review on Soil Moisture Monitoring Using IoT," International Journal of Advanced Research in Computer Science, vol. 9, no. 3, pp. 45–50, Mar. 2023.

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