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**UNIVERSITY EXAMINATIONS  
2022/2023 ACADEMIC YEAR**

**THIRD YEAR SECOND SEMESTER  
SPECIAL/SUPPLEMENTARY EXAMINATIONS**

**FOR THE DEGREE OF BACHELOR OF SCIENCE IN RENEWABLE  
ENERGY AND BIOFUELS TECHNOLOGY**

**COURSE CODE:** REN 326

**COURSE TITLE:** RESEARCH METHODS

**DURATION:** 2 HOURS

**DATE:** 10/8/2023

**TIME:** 11:00-1:00PM

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**INSTRUCTIONS TO CANDIDATES**

- Answer **QUESTION ONE** (Compulsory) and any other two (2) Questions.
- Indicate **answered questions** on the front cover.
- Start every question on a new page and make sure question's number is written on each page.

**QUESTION 1 (30 marks)**

- a. Define the following terms: (1 mark)
- i. Research (1 mark)
  - ii. Independent variable (1 mark)
  - iii. Point estimate of a parameter (1 mark)
  - iv. Significant level (1 mark)
  - v. Data Analysis (5 marks)
- b. State any five (5) purposes of Literature review. (5 marks)
- c. Explain any five (5) ways of identifying a project problem. (5 marks)
- d. Describe any five (5) information presentation methods. (5 marks)
- e. Explain the two broad types of data giving three (3) examples of each. (5 marks)
- f. Find the range of the mean  $\mu$  of a population using  $\alpha = 0.01$ ,  $n = 20$ ,  $\bar{x} = 151.6$ ,  $\sigma = 10$  and  $Z_{0.95} = 2.576$ . (5 marks)

**QUESTION 2 (20 marks)**

- a. State any five (5) applications of probability distribution. (5 marks)
- b. State any three (3) factors that construction confidence intervals depends on. (3 marks)
- c. Give an example scenario of:
- i. Probabilistic reasoning. (3 marks)
  - ii. Statistical reasoning. (3 marks)
- d. Describe any experiment and identify the dependent and independent variables. (6 marks)

**QUESTION 3 (20 marks)**

- e. Describe any five (5) sections in a project proposal. (5 marks)
- f. Explain what SMART objectives mean. (5 marks)
- g. State any five (5) ways of identifying a project problem. (5 marks)
- h. Describe any five (5) information presentation methods. (5 marks)

**QUESTION 4 (20 marks)**

An electricity company wishes to construct a hydro power plant project along river Nzioa. Write a short project proposal for the company that includes the following: (5 marks)

- a. Introduction.

- b. Objectives. (5 marks)
- c. Methodology. (5 marks)
- d. Budget. (3 marks)
- e. Work schedule. (2 marks)

**QUESTION 5 (20 marks)**

- a. Explain any four (4) roles of statistics in research. (4 marks)
- b. State any six (6) purposes of research. (6 marks)
- c. From the Fig. 1,
  - i. Find the area under the Thermal generation curve. (1 mark)
  - ii. Is the wind energy reliable? (1 mark)
  - iii. What is the mean demand for power? (1 mark)
  - iv. Describe the three curves. (3 marks)
  - v. Explain how the curves were plotted. (2 marks)
  - vi. State the rule for security of supply. (2 marks)

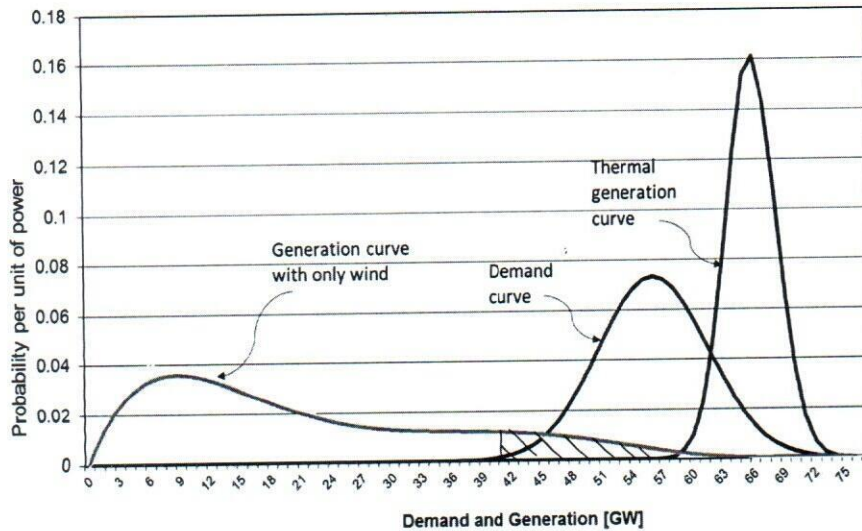


Fig. 1