



KIBABII UNIVERSITY

**UNIVERSITY EXAMINATIONS
2021 /2022 ACADEMIC YEAR**

**THIRD YEAR SECOND SEMESTER
MAIN EXAMINATIONS**

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

COURSE CODE: REN 326

COURSE TITLE: RESEARCH METHODS

DURATION: 2 HOURS

DATE: 05/09/2022

TIME: 9:00AM-11:00AM

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.

This paper consists of 3 printed pages. Please Turn Over



KIBU observes ZERO tolerance to examination cheating

QUESTION 1 (30 marks)

- a. Define the following terms:
- 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 (1 mark)
- b. Explain any five (5) data analysis techniques. (5 marks)
- c. State any five (5) purposes of Literature review. (5 marks)
- d. State any five (5) ways of identifying a project problem. (5 marks)
- e. Describe any five (5) information presentation methods. (5 marks)
- f. Find the range of the mean μ of a population using $\alpha = 0.05$, $n = 20$, $\bar{x} = 151.6$, $\sigma = 10$ and $Z_{0.95} = 1.96$. (5 marks)

QUESTION 2 (20 marks)

- a. State the two broad types of data giving three (3) examples of each. (5 marks)
- b. State any five (5) sections included in the introduction of a project proposal. (5 marks)
- c. State any four (4) main elements to be included in an abstract. (4 marks)
- d. Find the mean and standard deviation of three energy saving bulbs given their Watts and their probability of consuming power in a month in Table below. (6 marks)

Watts (x)	Probability [P(x)]
5	0.0625
7	0.375
9	0.5625

QUESTION 3 (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)

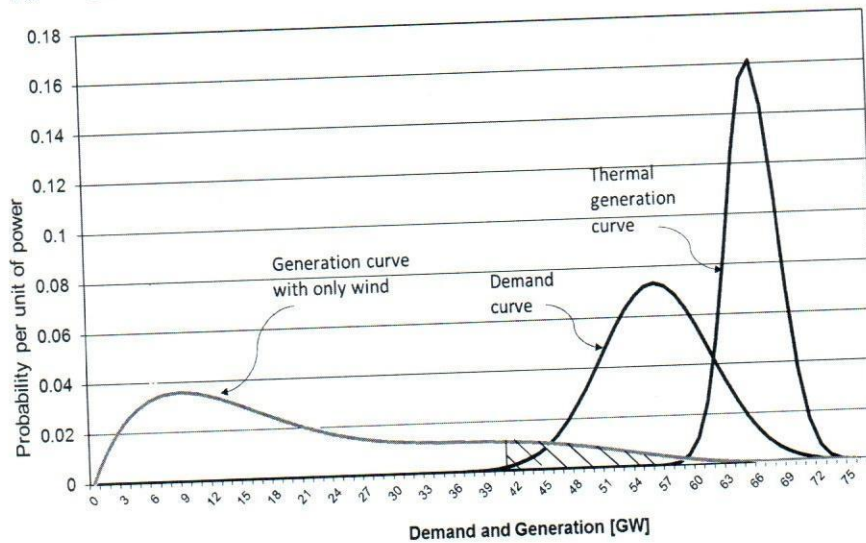


Fig. 1

QUESTION 4 (20 marks)

- a. Compare and contrast qualitative and quantitative data collection techniques using examples. (5 marks)
- b. Explain the steps involved in data analysis process. (5 marks)
- c. Explain any four (4) stages in research. (4 marks)
- d. A research is done on the use of renewable energy technologies (X). The probability that renewable energy is used is $p = 0.3$ and only two ($n = 2$) renewable energy Technologies are used. Find the probability that:
 - i. No renewable energy Technology is used. (2 marks)
 - ii. Only one renewable energy Technology is used. (2 marks)
 - iii. The two renewable energy Technologies are used. (2 marks)

QUESTION 5 (20 marks)

The University wishes to establish a solar plant project to generate electricity. Write a short project proposal for the university:

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