KIBABII UNIVERSITY

2021/2022 ACADEMIC YEAR

THIRD YEAR FIRST SEMESTER

SUPPLIMENTARY EXAMINATIONS

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

COURSE CODE: REN314

COURSE TITLE: ENERGY MANAGEMENT

DATE: 15/11/2022 **TIME: 11:00AM-1:00PM**

INSTRUCTIONS TO CANDIDATES

Answer question **ONE** and any other **TWO** questions

This paper consists of 5 printed pages. Please Turn over

QUESTION ONE

a. Differentiate between the following terms as used in energy management
   i. Maximum demand (2mks)
   ii. Kilowatt hours used (2mks)
   iii. Demand profile (2mks)

b. State FOUR benefits of energy management in an organization (4mks)

c. Give TWO advantages of using statistical survey as a source energy management data (2mks)

d. Briefly explain the following steps in energy management (4mks)
   i. Optimize the energy supply.
   ii. Maximize the system efficiency

e. Explain the following terms as used in energy management steps?
   i. Internal comparison (2mks)
   ii. External comparison (2mks)

f. Give two main sources of data used in energy management (2mks)

g. Which are the two main ways in which energy managers obtain data during energy management? (2mks)

h. List any THREE types of energy audit (3mks)

QUESTION TWO

a. The table below shows the average hourly energy consumption data for a typical day recorded at one of the lecture rooms at Kibabii University. Use it to answer the questions that follows:

Hour	Kw	Hour	kW	Hour	kW
1.00 am	45	9.00am	120	5.00pm	110
2.00am	47	10.00am	122	6.00pm	82
3.00am	43	11.00am	121	7.00pm	60
4.00am	46	12.00pm	100	8.00pm	61
5.00am	45	1.00pm	124	9.00pm	63
6.00am	62	2.00pm	135	10.00pm	61
7.00am	69	3.00pm	120	11.00pm	65
8.00am	95	4.00pm	123	12.00pm	50

   i. Draw the demand profile using the data in the table above (5mks).

ii. Describe the nature of the nature of the demand profile drawn in (i) above (3mks)
iii. Identify the peak and off peak demand from the demand profile drawn (2mks)
iv. List any THREE low cost measures that can be employed to reduce the peak power demand (3mks)

b. State the main objective of demand profile in energy management procedures (2mks)
c. Explain how the concept of consumer awareness can help in energy management in any organization (5mks.)

QUESTION THREE

a. State the energy efficiency indicators in the following sectors:
   i. Transport sector. (2mks)
   ii. Manufacturing sector. (2mks)
   iii. Residential sector. (2mks)
   iv. Service sector (2mks)
b. Explain how weather patterns affect energy demand and supply if other factors are held constant (3mks).
c. Give FIVE causes of energy wastage in an industry (5mks)
d. Explain why and how change in consumer income can influence his/her energy demand. (4mks)

QUESTION FOUR

a. During energy monitoring, Bungoma referral hospital produced data as shown in the table below:

Degree days experienced per month (x)	72	88	95	106	169	204	244	265	290	298	332	345
Gas Consumption per month (y) (GJ)	482	520	634	570	671	860	903	940	1007	1210	1020	1131

i. Find the base fit curve equation for the data given in the table above (12mks).
ii. Use the data in the table above to draw a regression analysis curve. (6mks)

e. Why is energy data analysis important in energy management (2mks).