



JARAMOGI OGINGA ODINGA UNIVERSITY OF SCIENCE AND TECHNOLOGY

SCHOOL OF MATHEMATICS AND ACTUARIAL SCIENCE

UNIVERSITY EXAMINATION FOR DEGREE OF BACHELOR OF SCIENCE

RENEWABLE ENERGY

2ND YEAR 1ST SEMESTER 2023/2024

REGULAR (MAIN)

COURSE CODE: WMB 9201

COURSE TITLE: STATISTICS

EXAM VENUE:

STREAM: (B.sc Renewable Energy)

DATE: 20/12/23

EXAM SESSION: 3-5.00 PM

TIME: 2.00 HOURS

Instructions:

- 1. Answer question 1 (Compulsory) and ANY other 2 questions**
- 2. Candidates are advised not to write on the question paper.**
- 3. Candidates must hand in their answer booklets to the invigilator while in the examination room.**

QUESTION ONE (30 MARKS)

- (a) The following data gives the number of ball bearings manufactured by a company per day for a sample of 12 days.

24 32 27 23 35 33 29 21 23 28 25 33

Calculate the arithmetic mean, median, mode and standard deviation for these data

(7mks)

- (b) On final examination, the mean mark of a group of 125 students was 75 and the standard deviation was 6. In mathematics, however the mean mark of the group was 70 and standard deviation was 7. In which subject was there greater variability? (4mks)

- (c) Fifty students took up a test. The results of those who passed the test are given below.

Marks	4	5	6	7	8	9
Number of Students	8	10	9	6	4	3

If the average marks of all fifty students were 5.16. Find the average mark of those who failed

(5mks)

- (d) Differentiate between
- (i) Descriptive statistics and inferential statistics (2mks)
 - (ii) Qualitative data and quantitative data (2mks)
- (e) Describe two limitations of descriptive statistics (2mks)
- (f) The first three moments of a distribution about the point 7 are 3, 11 and 15 respectively. Obtain
- (i) The mean and variance of the distribution (4mks)
 - (ii) The third and fourth central moments (4mks)

QUESTION TWO (20 MARKS)

Consider the masses of 50 oranges (measured to the nearest gram) as given in the following table

86	95	98	107	101	87	92	93	116	105
102	105	100	105	96	111	96	117	100	106
118	101	86	103	113	101	102	104	99	99
107	97	114	88	110	100	103	108	92	109
95	101	93	118	108	113	99	106	116	101

- (a) Construct a frequency distribution consisting of class intervals of equal length, with the first being 85- under 90 (3mks)
- (b) Draw the histogram corresponding to the distribution above together with the frequency polygon (3mks)
- (c) Compute the average mass of the oranges using an assumed mean of 102.5 gm (3mks)
- (d) Using the frequency distribution, calculate
- (i) The harmonic mean (3mks)

- (ii) Geometric mean
- (iii) Standard deviation

(3mks)

(5mks)

QUESTION THREE (20 MARKS)

The daily expenditure in Ksh of 100 families is given below

Daily Expenditure	0-20	20-40	40-60	60-80	80-100
Number of families	13	f_2	27	f_4	16

- (a) If the mode is 44, find the missing frequencies f_2 and f_4 (8mks)
- (b) Calculate to one decimal point, the first, second, third quartiles and the quartile coefficient of skewness. Comment on this skewness (12mks)

QUESTION FOUR (20 MARKS)

The following data refer to the weights (X) in kgs and heights (Y) in inches of 8 students in a certain class in Nairobi County

X	62	63	55	58	72	65	77	71
Y	62	57	56	64	79	66	70	61

- (a) (i) Construct a scatter diagram for these data (2mks)
- (ii) What relationship does the scatter suggest (1mk)
- (b) Determine Karl Pearson correlation coefficient between weights (X) and height (Y) (6mks)
- (c) Obtain a regression line that would predict a person given his/her weight. Use this line to estimate the height of a person whose weight is 68 kgs. (6mks)
- (d) Find the spearman's rank correlation between weights and heights (5mks)

QUESTION FIVE (20 MARKS)

Consider the following frequency distribution table

Class interval	0-10	10-20	20-30	30-40	40-50	50-60
Frequency	5	10	11	10	6	5

- (a) Find the mean and standard deviation (7mks)
- (b) Find the coefficient of variation based on standard deviation (3mks)
- (c) Obtain the first four central moments (10mks)