JARAMOGI OGINGA ODINGA UNIVERSITY OF SCIENCE AND TECHNOLOGY

SCHOOL OF MATHEMATICS AND ACTUARIAL SCIENCE

UNIVERSITY EXAMINATION FOR DEGREE OF BACHELOR OF SCIENCE ACTUARIAL

2ND YEAR 1ST SEMESTER 2016/2017 ACADEMIC YEAR

REGULAR (MAIN)

COURSE CODE: SMA 3231

COURSE TITLE: STATISTICS

EXAM VENUE: **STREAM: (BSc. Renewable resources)**

DATE: **EXAM SESSION:**

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) Explain FOUR importances of statistics. (8 Marks)

b) Define arithmetic mean (2 Marks)

c) Calculate the arithmetic mean for the following marks from the following table

Marks	0-10	10-20	20-30	30-40	40-50	50-60
No. Of Students	12	18	27	20	17	6

(3 Marks)

d) The average salary of male employees in a firm was kshs. 520 and that of female was kshs 420. The mean salary of all the employees was kshs 500. Find the percentage of male and female employees. (4 Marks)

e) An incomplete frequency distribution is given as follows

Variable	Frequency
10-20	12
20-30	30
30-40	?
40-50	65
50-60	?
60-70	25
70-80	18
Total	**229**

Given that the median value is 46, determine the missing frequencies using the median formula.

(4 Marks)

f) A cyclist pedals from his house to his college at a speed of 10 km/h and back from college to his house at 15 km/h. Find the average speed. (3 Marks)

g) The first of the two samples has 100 items with the mean of 15 and the standard deviation of 3. If the whole group has 250 items with the mean of 15.6 and standard deviation of $\sqrt{13.44}$, find the standard deviation of the second group. (6 Marks)

QUESTION TWO (20 MARKS)

a) Outline FOUR merits of mean (4 Marks)

b) Outline FOUR merits of mode (4 Marks)

c) An analysis of monthly wages paid to workers of two firms A and B belonging to the same industry gives the following results.

	Firm A	Firm B
Number of workers	500	600
Average monthly Wage	Rs 186	Rs 175
Variance of distribution of wage	81	100

i. Which firm has the larger wage bill

ii. Which firm has greater variability in industrial wages

iii. Calculate
   a. The average monthly wage
   b. The variance of distribution of wages of all the workers in the firm A and B taken together. (12 Marks)

QUESTION THREE (20 MARKS)

The first four moments of a distribution about the value 4 of the variable are -1.5, 17,-30 and 108

i. Find the moments about β_1 and β_2

ii. Find also the moments about
   a. The origin
   b. The point $x = 2$

QUESTION FOUR (20 MARKS)

a) The median and mode of the following wage distribution are known to be Kshs. 33.50 and Kshs. 34 respectively. Find the values of f_3, f_4 and f_5

Wages	0-10	10-20	20-30	30-40	40-50	50-60	60-70
Frequency	4	16	f_3	f_4	f_5	6	4

Total frequency 230 (10 Marks)

b) Find the mean deviation from the mean and standard deviation of an A.P, $a, a+d, a+2d, \ldots . a+2nd$ and verify that the latter is greater than the former.

(10 Marks)

QUESTION FIVE (20 MARKS)

a) If X is a binomial distribution with parameters n and p such that;

$$p(X=k)=\binom{n}{k}p^k(1-p)^{n-k}; \qquad k=0,1,2,\ldots\ldots n$$

Find the mean and variance of the distribution X (14 Marks)

b) The probability that a certain Company manufactures defective items is 0.3. If 200 items are to be manufactured by the Company follows a binomial random variable, find the mean and variance and then use Chebyshev's theorem to interpret the interval $\mu \pm 2\sigma$

(6 Marks)