JARAMOGI OGINGA ODINGA UNIVERSITY OF SCIENCE AND TECHNOLOGY

SCHOOL OF MATHEMATICS AND ACTUARIAL SCIENCE

UNIVERSITY EXAMINATION FOR DEGREE OF BACHELOR OF   SCIENCE

ACTUARIAL/BED ARTS/SCIENCE

1ST   YEAR 1ST SEMESTER 2015/2016 ACADEMIC YEAR

MAIN REGULAR

COURSE CODE: SAS 101

COURSE TITLE: DESCRIPTIVE STATISTICS

EXAM VENUE: AH   **STREAM: (BSc. Actuarial/BEd Arts/science)**

DATE: 28/04/16   **EXAM SESSION: 11.30 – 1.30pm**

TIME: 2.00 HOURS

<u>**Instructions:**</u>

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) Assume that you are a manager of a big organization that deals in goods and services and that you have a big team of human resource to work with. Suggest and explain briefly some 4 ways in which statistics will be useful to you in everyday running of the organization. (4marks)

b) Explain the differences between: (6marks)
  i.   A sample and a population.
  ii. Inferential and Descriptive statistics
  iii. Skewness and Kurtosis

c) Given the following data set

   16, 18, 22, 19, 3, 21, 17, 20

  i.   Find the 15th percentile   (1mark)
  ii. Check data set for outliers.   (3marks)

d) The following are the numbers of text messages sent last week by the cellular phone users on one floor of a college dormitory. Display the data in a stem-and-leaf plot.

   (4marks)
155 159 144 129 105 145 126 116 130 114 122 112 112 142
126 118 118 108 122 121 109 140 126 119 113 117 118 109
109 119 139 139 122 78 133 126 123 145 121 134 124 119
132 133 124 129 112 126 148 147

e) Explain two importance of scatter plots
   (2marks)

f) A teacher is teaching 3 classes: There are 30 students in the first Class with the average of 70 on the final exam. The second class has 40 students with the average of 60 on the final exam. The 3rd class has 20 students with the average of 80 on the final exam. Find the weighted (combined) average of the three classes combined together
   (2marks)

g) The data below represents the masses of some containers sampled from a warehouse

Mass	30 – 34	35 – 39	40 – 44	45 – 49	50 – 54	55 – 59	60 – 64	65 – 69	70 – 74
Frequency	1	2	4	5	10	8	5	2	1

Use the data to calculate:

a. The interquartile range (3marks)
b. The Geometric Mean (3marks)
c. The Coefficient of variation (4marks)

QUESTION TWO (20 marks)

These data represent the record high temperatures in degrees Fahrenheit (_F) for each of the 50 states.

112 100 127 120 134 118 105 110 109 112
110 118 117 116 118 122 114 114 105 109
107 112 114 115 118 117 118 122 106 110
116 108 110 121 113 120 119 111 104 111
120 113 120 117 105 110 118 112 114 114

(i) Construct a grouped frequency distribution for the data using 7 classes. (using inclusive method of grouping)
(5marks)

(ii) Use the grouped data to calculate the Mean Deviation and Co-efficient of mean deviation
(10marks)

(iii) The 51st Percentile was used to estimate the arithmetic mean for this data, obtain the difference if any between this estimate and the arithmetic mean
(5marks)

QUESTION THREE (20 marks)

a) Find the coefficient of correlation between the use of fertilizers and productivity from the following figures and comment on its value
(10marks)

Fertilizers used(tonnes)	15	18	20	24	30	35	40	45
Productivity of land(tonnes)	85	93	95	105	120	130	150	160

b) An office contains 10 clerks. The longer-serving clerks feel that they should have a seniority increment based on length of service built into their salary structure. An assessment of their efficiency by their departmental manager and the personnel department produces a ranking of efficiency. This is shown below together with a ranking of their length of service. Do the data support the clerks claim for seniority increment?
(10marks)

Ranking according to length of service	1	2	3	4	5	6	7	8	9	10
Raking according to efficiency	2	5	3	10	6	4	8	9	7	1

QUESTION FOUR (20 marks)

a) Explain any two differences between dispersion and skewness
   (5marks)

b) The following data relate to the profits of 1000 companies

Profits	No. of companies
100-120	17
120-140	53
140-160	199
160-180	194
180-200	327
200-220	208
220-240	2

Calculate the Karl Pearson co-efficient of skewness and comment on its value   (15marks)

QUESTION FIVE (20 marks)

a. The ages and incomes of the 10 employees at Computer Services Inc. are given in Table 3.8.

Table 3.8

Age	Income
25	23,500
30	25,000
40	30,000
53	47,500
29	32,000
45	37,500
40	32,000
55	50,500
35	40,000
47	43,750

Compute the standard deviation of ages and incomes for these employees. Assuming that all employees remain with the company 5 years and that each income is multiplied by 1.5 over that period, what will the standard deviation of ages and incomes equal 5 years in the future?
(12marks)

b. The 51th percentile was used to estimate the simple mean for data below.

class	Number o observations
Less than 100	10
$100 \leq X < 150$	20
$150 \leq X < 200$	30
$200 \leq X < 250$	45
$250 \leq X < 300$	55
$300 \leq X < 350$	25
$350 \leq X < 400$	20
$400 \leq X < 450$	15
Above 450	10

Obtain the difference if any between this estimate and the estimate of the simple mean given mode and median. (8 marks)