CHUKA   **UNIVERSITY**

UNIVERSITY EXAMINATIONS

EXAMINATION FOR THE AWARD OF DEGREE OF BACHELOR OF

MATH 141: INTRODUCTION STASTICS

STREAMS: **TIME: 2 HOURS**

DAY/DATE : TUESDAY 17/04/2018   **2.30 P.M – 4.30 P.M**

INSTRUCTIONS:
- **Answer question one and any other two questions**
- **All workings must be shown clearly**

(i)   (a) State with examples the differences between ;
       (i)   Descriptive statistics and a data set.
       (ii)   Marginal and conditional probability
       (iii) Event and a sample space.   [6marks]

(b) Calculate the rank correlation coefficient for the following data on two tests.

Test	x	84	77	62	54	93	86
Test	Y	73	85	53	58	84	90

Comment on the correlation between X and Y.   [5marks]

(c) Define probability and state two laws of probability.   [3marks]

(d) Write down three questions as a questionnaire about usage of a tooth paste. Your respondents are from the rural areas.   [3marks]

(e) Find the standard deviation of the following data.

1330   1305   1310   1320   1315   [3marks]

(f) Differentiate between observation and interview as methods of data collection.

[5marks]

(g) Kokopey company has tendered two independent contracts. It estimates that it has a probability of 0.5 for obtaining contrast A and 0.3 for obtaining contract B. Find the probability that the company obtains.

(i) At most one contract   [2marks]

(ii) Contract A given contract B   [2marks]

Are the contracts independent?

2.   (a) Explain briefly the methods of least squares in regression analysis.   [5marks]

(b) The following are weights and heights of a group of seven students taking probability and statistics course.

Weight	X	56	60	62	65	70	80	90
Height	Y	138	148	150	156	153	160	173

Required :

(i)   Fit a least squares line to the data.   [6marks]
(ii)   Estimate the height when the weight is 58 kg.   [1marks]
(iii)   Obtained the correlation coefficient.   [3marks]

(c) The following frequency distribution has a mean of 34.66 and total frequency of 125.

Class	0-9	10-19	20-29	30-39	40-49	50-59	60-69	70-79
frequency	15	15	X	22	25	Y	5	10

Determine X and Y   [5marks]

3.   (a) The data below represent scores of two basket ball teams.

Kenya	30	41	22	54	50	39	47	43	57	28
Rwanda	29	40	38	56	47	59	58	58	38	56

Required :

Create a "back to back" stem and leaf plot   [4marks]

(b) Two fair dice are tossed and the following events are defined.

A = {sum of the numbers showing is odd}

B = { sum of the numbers showing is 9,11 & 12}

Are the events A &B independent? Why? Show your working.   [4marks]

(c) Two events E and F are such that $P(E) = 0.7$,$P(F) = 0.6$ and $P(E \cup F)=0.8$

Find (i) $P(E \cap F)$ [2marks]

(ii) $P(E^c \cap F)$ [2marks]
(iii) $P(E^c \cap F^c)$ [2marks]

(d) The blood type distribution in the united states is as follows ;

Type A = 40%

Type B = 9%

Type AB -= 4%

Type 0 = 46%

It is estimated that during world war II 4% of inductees with type 0 blood were typed as having type A, 88% of those with type A were correctly typed, 4% with type B blood were typed as A and 10% with type AB were type as A. A soldier was wounded and brought to surgery. He was typed as having type A blood. What is the probability that this his true blood type?   [6marks]

4.   (a) A class consists of 24 boys and 26 girls. The mean score of the boys in a certain subject is 68 while mean score of the whole class is 70.08. Find the mean score of the girls in the class.   [3marks]

(b) The table below shows the distribution of marks scored by 50 candidates in an examination.

Mark	Number of students
0 -10	3
10-20	7
20-30	10
30-40	14
40-50	11
50-60	5
60-70	2

Calculate ;

(i)   Mean absolute deviation   [7marks]

(ii)   Standard deviation   [6marks]

(iii)   Coefficient of variation   [2marks]

(iv)   Mode   [5marks]

5.   The data below shows the weight to the nearest cm of height of 100 seedlings in a nursery.

33	68	31	36	16	34	56	38	43	52
24	49	76	52	36	85	4	44	56	19
46	38	7	34	65	44	95	63	30	22
11	29	48	50	27	31	24	29	14	39
43	86	55	15	69	43	52	17	45	65
37	42	46	67	32	58	34	89	47	28
24	16	32	31	6	45	28	67	29	52
35	37	43	63	56	25	48	55	78	49
73	48	59	18	38	77	35	26	33	31
26	40	38	25	26	39	72	13	8	24

(a) Using the class 1-10, 11-20 etc construct a frequency distribution table for the data.   [5marks]

(b) Draw a frequency distribution curve (ogive) on the graph paper provided. [5marks]

(c) Use the curve construct above to determine.

    (i)   Median   [2marks]

    (ii)   1st quartile and 3rd quartile   [4marks]

    (iii)   6th decile   [2marks]

    (iv)   The number of seedlings to be transplanted if any seedling having height of 35 cm and above has to be transplanted.