MURANG'A UNIVERSITY OF TECHNOLOGY

SCHOOL OF PURE AND APPLIED SCIENCE

DEPARTMENT OF APPLIED SCIENCE

UNIVERSITY ORDINARY EXAMINATION

2017/2018 ACADEMIC YEAR

FIRST YEAR **SECOND** SEMESTER EXAMINATION FOR THE DEGREE BACHELOR OF SCIENCE IN MATHEMATICS AND COMPUTER SCIENCE

AMS 101 – PROBABILITY AND STATISTICS I

DURATION: 2 HOURS

DATE: 26TH APRIL, 2018

TIME: 2.00 – 4.00 P.M.

Instructions to Candidates:

1. Answer **Question 1** and **Any Other Two** questions.
2. Mobile phones are not allowed in the examination room.
3. You are not allowed to write on this examination question paper.

SECTION A – ANSWER ALL QUESTIONS IN THIS SECTION

QUESTION ONE

a) Define the following terms:

i. Statistics (1 mark)

ii. Descriptive statistics (1 mark)

iii. Inferential statistics (1 mark)

iv. Qualitative variables (1 mark)

v. Quantitative variables (1 mark)

b) Explain the following field methods of data collection

i. Census (2 marks)

ii. Sample survey (2 marks)

c) Construct an ungrouped frequency table for the data below

16 14 15 13 12 14 16 15 15 14 17 16 13 16 15 14 18 13 15 17

(4 marks)

d) The frequency distribution table below shows the number of pounds of each snack food eaten during the super bowl. Construct a pie chart for the data

Snack	Potato chips	Doughnut	Cookies	Biscuits	Popcorn
Pound (in millions)	11.2	8.2	4.3	3.8	2.5

(5 marks)

e) The maximum temperature measured to the nearest centigrade was recorded in a certain town each day on June. The results were as follows. Draw a stem and leaf diagram with classes 50-54, 55-59, 60-64, 65-69, 70-74 and 75-79

52, 62, 51, 50, 69, 58, 77, 66, 53, 57, 75, 56, 55, 67, 73, 79, 59, 68, 65, 72, 57, 51, 63, 69, 75, 65, 53, 78, 66, 55 (5 marks)

f) The grades of a student in six examinations were 84, 91, 72, 68, 91, 72. Find the

i. Arithmetic mean (1 mark)

ii. Standard deviation (3 marks)

g) The following are the counts of fish of each type that you have caught before

Fish Type	Tilapia	Cat fish	Blue gill
No of times caught	13	17	10

Find the probability that the next fish you catch will be a

i. Tilapia (1 mark)

ii. Cat fish (1 mark)

iii. Blue gill (1 mark)

SECTION B – ANSWER ANY TWO QUESTIONS IN THIS SECTION

QUESTION TWO

a) These data represent the record high temperatures in degrees Fahrenheit (F) for each of the 50 states. Construct a grouped frequency distribution for the data (2 marks)

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	122	106	110	116	108	110	121
113	120	119	111	104	111	120	113	120	117	105	110	118	112	114	114

b) Use the table in (a) above to compute

i. Mean (3 marks)

ii. Median (2 marks)

c) Construct a histogram, frequency polygon and a cumulative frequency curve (ogive) for the data below:

Class	100-104	105-109	110-114	115-119	120-124	125-129	130-134
Frequency	2	8	18	13	7	1	1

(8 marks)

d) The number of stories in two selected samples in two selected samples of tall buildings in Nairobi and Eldoret is shown. Construct a back-to—back stem and leaf plot and compare the distributions (5 marks)

Nairobi									Eldoret								
55	70	44	36	40	63	40	44	30	61	40	38	32	30	58	40	40	25
34	38	60	47	52	32	32	50	26	30	50	38	36	54	40	36	30	30
53	32	28	31	52	32	34	32	29	53	39	36	34	33	39	32		

QUESTION THREE

a) Find the mean, median, mode and standard deviation for the following frequency distribution

Class	5-9	10-14	15-19	20-24	25-29	30-34	35-39
Frequency	5	12	32	40	16	9	6

(15 marks)

b) Find the variance hence standard deviation for the data below:

3, 6, 9, 10, 7, 12, 13, 15, 6, 5, 13 (5 marks)

QUESTION FOUR

a) Calculate the coefficient of skewness $\propto_3$ and the coefficient of kurtosis $\propto_4$ for the data below:
5, 6, 7, 6, 9, 4, 5 (6 marks)

b) A study was conducted to find whether there is nay relationship between the weight and blood pressure of an individual. The following set of data was arrived at from a clinical study. Determine the pearson product moment correlation coefficient for this set of data

Weight	78	86	72	82	80	86	84	89	68	71
Blood Pressure	140	160	134	144	180	176	174	178	128	132

(10 marks)

c) Suppose that of all individual buying a certain digital camera 60% include an optional memory card in their purchase, 40% include a set of batteries and 30% include both a card and batteries. Consider randomly selecting a buyer and Let A = {memory card purchased} and B = {battery purchased}; Find

i. P(A/B) (2 marks)

ii. P(B/A) (2 marks)

QUESTION FIVE

a) The data below was obtained from student records. Calculate the rank correlation coefficient R for the data.

Subject	1	2	3	4	5	6	7	8	9	10
X	8.3	8.6	9.2	9.8	8.0	7.8	9.4	9.0	7.2	8.6
Y	2300	2250	2380	2400	2000	2100	2360	2350	2000	2260

(9 marks)

b) Scores made by students in a probability and statistics class in the mid-term and final examination are given below.

i. Develop a regression equation which may be used to predict final examination scores from the mid-term score

Student	1	2	3	4	5	6	7	8	9	10
Mid-term scores	98	66	100	96	88	45	76	60	74	82
Final exam scores	90	74	98	88	80	62	78	74	86	80

(8 marks)

ii. Represent the above data in a graph and draw a regression line on the same plot (3 marks)