

CHUKA



UNIVERSITY

UNIVERSITY EXAMINATIONS

**FIRST YEAR EXAMINATION FOR THE AWARD OF DEGREE OF BACHELOR OF
SCIENCE AND BACHELOR OF EDUCATION**

MATH 141: INTRODUCTORY STATISTICS**STREAMS: B.ED & BSC****TIME: 2 HOURS****DAY/DATE: TUESDAY 16/04/2019****8.30 A.M. – 10.30 A.M.****INSTRUCTIONS:**

- Attempt question one (compulsory) and any other TWO
- Do not write anything on the question paper
- Electronic calculators may be used

QUESTION ONE (30 MARKS)

- (a) With the help of relevant examples, state and explain the four scales of measurements in statistics. (8 marks)
- (b) Distinguish between the following terms
- (i) Discrete and continuous variables (2 marks)
- (ii) Descriptive and inferential statistics (2 marks)
- (iii) Population and sample (2 marks)
- (c) An environmental study on a certain species of tree from mountain Kenya is summarized in the table given below.

Marks	30-39	40-49	50-59	60-69	70-79	80-89	90-99
Frequency	3	18	20	17	15	5	2

Required:

- (i) the mode (2 marks)
- (ii) the median (2 marks)
- (iii) the standard deviation (3 marks)
- (iv) State two advantages of the median compared to the mean. (2 marks)

- (d) A box contains 3 red balls and 6 green balls. 3 balls are to be picked one after the other without replacement. Find the probability that;
- (i) Three balls picked are of the same colour (3 marks)
 - (ii) At least 2 balls picked are green (3 marks)
 - (iii) Only one ball is red (2 marks)

QUESTION TWO (20 MARKS)

- (a) In a recent survey, 100 people were asked if they thought that the next Kenyan president should be a woman. The result of the survey is given below.

Gender	Yes	No	Total
Male	32	18	50
Female	8	42	50
Total	40	60	100

Find these probabilities:

- (i) The respondent answered YES given that the respondent was a female. (4 marks)
 - (ii) The respondent was a male, given that the respondent said NO. (4 marks)
- (b) Consider the following data

Class interval	Frequency
90-99	5
100-109	8
110-119	22
120-129	27
130-139	17
140-149	9
150-159	5
160-169	5
170-179	2

Compute,

- (i) The mean absolute deviation (4 marks)
- (ii) Quartile deviation (4 marks)
- (iii) The seventh decile (2 marks)
- (iv) The 85th percentile (2 marks)

QUESTION THREE (20 MARKS)

- (a) Discuss at least four roles of statistics in decision making process. Use relevant examples. (4 marks)

- (b) A random sample of 64 students were selected and given IQ tests. The following are the IQ scores:

111	85	83	98	107	101	100	94	101	86
105	122	104	106	90	123	102	107	93	109
141	86	91	88	98	128	93	114	87	116
99	94	94	106	136	102	75	96	78	116
107	106	68	104	91	87	105	97	110	91
107	107	85	117	93	108	91	110	105	99
85	99	99	96						

- (i) Present the above data in a stem-and-leaf plot (5 marks)
- (ii) From the plot, determine the most common IQ score range (2 marks)
- (iii) Determine the range for the IQ scores (1 mark)
- (c) A box contains 24 transistors, 4 of which are defective. If 4 are sold at random, find the following probabilities
- (i) Exactly 2 are defective (2 marks)
- (ii) All are defective (2 marks)
- (iii) None is defective (2 marks)
- (iv) At least 1 is defective (2 marks)

QUESTION FOUR (20 MARKS)

- (a) The owner of a video store is interested in how many videos a typical customer watches during a year. She randomly selects the records of 90 customers and counts the number of videos rented during the previous year. The data are presented in the company table.

67	63	64	57	56	55	53	53	54	54
45	45	46	47	37	23	34	44	27	44
35	37	24	24	14	43	37	27	36	26
25	36	26	5	44	13	33	33	17	33
56	17	26	5	14	23	45	59	19	49
37	42	32	29	90	44	46	45	66	28
28	75	32	31	52	49	65	54	15	23
59	61	40	41	43	49	38	31	19	24
45	41	38	14	57	25	20	15	16	12

Construct a grouped frequency distribution using 5 to 9 as the lowest class. (5 marks) and hence compute:

- (i) the 50th percentile (2 marks)
- (ii) the mode (2 marks)
- (iii) the mean and the standard variation (5 marks)

- (b) A bag contains 4 black balls, 5 red balls and 4 green balls. If 4 balls are selected at random what is the probability that the 4 selected contain
- (i) No red ball? (2 marks)
 - (ii) Exactly 1 black ball? (2 marks)
 - (iii) Exactly 1 red ball and exactly 2 green balls (2 marks)

QUESTION FIVE (20 MARKS)

- (a) Explain the role of statistics in scientific research. (5 marks)
- (b) A large Kenyan bank is planning on introducing a new word processing system to its secretarial staff. To learn about the amount of training that is needed to effectively implement the new system, the bank chose eight employees of roughly equal skill. These workers were trained for different amounts of time and were then individually put to work on a given project. The following data indicate the training times and the resulting times (both in hours) that it took each worker to complete the project.

Training time (X)	Time to complete project (Y)
22	18.4
18	19.2
30	14.5
16	19.0
25	16.6
20	17.7
10	24.2
14	21.0

- (i) Compute and interpret the Pearson’s correlation coefficient. (5 marks)
- (ii) What is the estimated regression line? (8 marks)
- (iii) Predict the amount of time it would take a worker who receives 28 hours of training to complete the project. (2 marks)