



**TECHNICAL UNIVERSITY OF
MOMBASA**

FACULTY OF APPLIED AND HEALTH SCIENCES
MATHEMATICS AND PHYSICS

UNIVERSITY EXAMINATION FOR:

BACHELOR OF SCIENCE IN TELECOMMUNICATION AND INFORMATION TECHNOLOGY/
BACHELOR OF SCIENCE IN INFORMATION TECHNOLOGY

**AMA 4107: PROBABILITY AND STATISTICS I
SPECIAL/ SUPPLIMENTARY EXAMINATIONS**

SERIES: September 2018

TIME: 2 HOURS

DATE: September 2018

Instructions to Candidates

You should have the following for this examination

-Answer Booklet, examination pass and student ID

This paper consists of 5 questions. Answer ONE AND ANY OTHER TWO QUESTIONS

Do not write on the question paper.

QUESTION ONE (30 MARKS)

a) List three qualities of a good measure of central tendency. (3 marks)

b) Find the Spearman's rank correlation coefficient between poverty and overcrowding from the Information given below: (8 marks)

Town	A	B	C	D	E	F	G	H	I	J
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Poverty	17	13	15	16	6	11	14	9	7	12
Overcrowding	36	46	35	24	12	18	27	22	2	8

c) Given the following frequency distribution;

Group	40-50	50-60	60-70	70-80	80-90	90-100
Frequency	20	25	36	72	51	40

Calculate the harmonic mean.

(4 marks)

d) With the help of a relevant example in each case, explain the following terms as used in random experiment.

(4 marks)

- i. Mutually exclusive events
- ii. Independent events

e) The high temperatures for the selected cities are as shown: 32, 19, 57, 48, 44, 50, 42, 49, 53, and 46. find,

i. The range. (1 marks)

ii. The standard deviation. (6 marks)

f) A machine produces non-defectives with a probability of 0.7. How many parts should be picked at random so that the probability of getting at least one non-defective is 0.95?

(4 marks)

QUESTION TWO (20 MARKS)

a) A' speaks truth in 70%cases and 'B' in 85% cases. In what percentage of cases they likely to contradict each other in stating the same fact?

(6 marks)

b) A candidate is selected at random for an interview as a management trainee in three companies. For the first there are 12 candidates, for the second there are 15 candidates and for the third there are 10 candidates. What are the chances of him being picked in at least one of the company?

(8 marks)

- c) A university has to select an examiner from a list of 50 persons. 20 of them are women and 30 men. 10 of them know Hindi and 40 do not. 15 of them are teachers and remaining are not. What is the probability that the university selecting a Hindi knowing woman teacher? (6 marks)

QUESTION THREE (20 MARKS)

In a survey, it was found that 64 families bought milk in the following quantities in a particular month.

19 16 22 9 22 12 39 19 14 23 6 24 16 18 7 17
 20 25 28 18 10 24 20 21 10 7 18 28 24 20 14 23
 25 34 22 5 33 23 26 29 13 36 11 26 11 37 30 13
 8 15 22 21 32 21 31 17 16 23 12 9 15 27 17 21

- i. Using Sturges rule , form a frequency distribution table with inclusive class intervals of magnitude 5 (5 marks)
- ii. Compute the mean. (3 marks)
- iii. Draw a frequency polygon from the distribution. (4 marks)
- iv. Draw a cumulative frequency curve and use it to determine the quartile deviation and 45th percentile. (8 marks)

QUESTION FOUR (20 MARKS)

The following distribution represent the length of a particular rare fish caught in the Indian Ocean in a particular month.

Length (mm)	Frequency
118-126	3
127-135	5
136-144	9
145-153	12
154-162	5
163-171	4

From the distribution above, calculate the following measures:

- i. Mode (4 marks)
- ii. Median (4 marks)
- iii. Standard deviation (4 marks)
- iv. Coefficient of variation (2 marks)
- v. Pearson Coefficient of the skewness and kurtosis (6 marks)

QUESTION FIVE (20 MARKS)

The following table shows research findings on the ages of husbands and wives at the time of their marriage in a certain community:

Age of husband (yrs): 23 27 28 28 28 30 30 33 35 38

Age of wife (yrs) : 18 20 22 27 21 29 27 29 28 29

Assume there is a linear relation between the sets of ages

- a. Determine the Pearson correlation coefficient between age of husband and age of wife and interpret your answer (8 marks)
- b. Determine the coefficient of determination and interpret your answer (3 marks)
- c. Fit a simple linear regression model between age of husband and age of wife. (7 marks)
- d. Predict the age of husband if the wife is 37 years now, five years into the marriage (2 marks)