



KENYA METHODIST UNIVERSITY

END OF 2ND TRIMESTER 2010 (SCHOOL BASED) EXAMINATIONS

FACULTY : **SCIENCE AND TECHNOLOGY**
DEPARTMENT : **COMPUTER SCIENCE & BUSINESS INFORMATION**
UNIT CODE : **MATH 130**
UNIT TITLE : **BASIC STATISTICS**
TIME : **2 HOURS**

Instructions:

- Answer Question One and any other THREE questions from section B
- Show all your workings
- You need a scientific calculator, graph paper and standard normal table.
- All graphs should be on the graph paper provided

SECTION A: Answer ALL questions in this section

Question One (30 marks):

- a. Define the following terms as used in statistics;
- Probability
 - Statistics
 - Population
 - Sample
- (8 marks)
- b. State three methods used in data collection. (3 marks)
- c. Consider a normal distribution with mean 12.1 and a variance of 1.21. Determine the following:
- $P(x \leq 13)$ (2 marks)
 - $P(10 \leq x \leq 12.7)$ (3 marks)
- d. Given that A and B are independent events, and that $p(A) = 0.55$ and $p(B) = 0.62$. Determine:
- $P(A \text{ and } B)$ (2 marks)
 - $P(A \text{ or } B)$ (2 marks)
- e. Two random variables x and y have the following values: x(-1, 0, -2, 3, 1, 2) and y(4, 5, 3, 8, 6, 7). Determine the correlation coefficient of x and y (6 marks)
- f. The following marks were obtained from a class after the mid-term quiz:
37, 60, 71, 42, 55, 57, 70, 81, 40, 45, 58, 66, 61, 66, 70, 60, 45, 55, 67, 66
Construct a frequency distribution table indicating the relative and percentage frequencies for the data (4 marks)

SECTION B: Answer ANY THREE questions in this section:

Question Two (20 marks):

a. A survey of certain early-childhood development institution indicated that:

- 7 pupils were 10 years old
- 10 pupils were 9 years old
- 8 pupils were 7 years old
- 9 pupils were 11 years old
- 6 pupils were 8 years old

You are required to:

- (i.) Construct a frequency distribution table to represent the data, including all the necessary columns. (5 marks)
- (ii.) Determine the arithmetic mean, mode and median for the data. (5 marks)

b. The following data represents the comparison made between the price of a consumer product and the corresponding demand.

Price	32	33	35	40	47	46	44	38	50	58
Demand	28	25	27	30	20	18	18	31	12	10

You are required to:

- (i.) Compute the correlation coefficient for the distribution. (4 marks)
- (ii.) Determine the regression equation and draw the scatter diagram showing the regression line. (6 marks)

Question Three (20 marks):

a. The data below represents the percentage score of 25 students in a mid-term quiz. Given that the data has a normal distribution;

39, 41, 47, 58, 65, 37, 37, 49, 56, 59, 62, 36, 48, 52, 64, 29, 44, 47, 49, 52, 53, 54, 72, 50, 50

- (i.) Compute the mean and standard deviation for the score. (5 marks)
- (ii.) What is the probability that a student's score lies in the interval between 60 and 65? (5 marks)

b. State and briefly describe the two branches of statistics (4 marks)

c. The probability of a student passing the exam is 0.53. Given that this represents a Bernoulli trial, and a class has 20 students, determine:

- (i.) The probability that a student fails the exam (2 marks)
- (ii.) The mean and standard deviation for the distribution (4 marks)

Question Four (20 marks):

a. A school has 48 girls and 37 boys:

- (i.) A student is spotted at random. What is the probability that the student is a boy? (2 marks)
- (ii.) Given that the school captain is a girl is a girl, what is the probability that the games prefect is also a girl? (2 marks)

b. Consider the frequency table below:

x	f(x)	xf(x)	r.f	%f	c.f
3	20				
4	9				
11	14				
15	7				
19	10				

You are required to:

- (i.) Complete the remaining columns in the frequency table. (6 marks)
 - (ii.) Using the data in the table, compute the arithmetic mean, and variance. (5 marks)
- c. A survey of twenty secondary schools in Imenti North District indicated that; seven offer only pure sciences, six offer only physical sciences, four offer both pure and physical sciences, while the rest offer biological sciences. A school is picked at random. What is the probability that:
- (i.) The school offers physical sciences. (2 marks)
 - (ii.) The school offers biological sciences. (3 marks)