KENYA METHODIST UNIVERSITY

END OF 1ST TRIMESTER 2010 (SCHOOL BASED) EXAMINATIONS

FACULTY	**:**	**COMPUTING AND INFORMATICS**
DEPARTMENT	**:**	**COMPUTER INFORMATION SYSTEMS**
UNIT CODE	**:**	**MATH 130**
UNIT TITLE	**:**	**BASIC STATISTICS**
TIME	**:**	**2 HOURS**

Instructions:

- *Answer question 1 and any other 2 questions.*
- *You need a scientific calculator, the standard normal table and a graph paper to answer the questions in this paper. All graphs should be on the graph paper(s) provided.*

Question 1 (30 marks)

a) Define the following terms;

i) Statistics

ii) Population

iii) Data (6 mks)

b) Sampling is the process of picking a sample from a given population. State three techniques that are used in sampling. (3 mks)

c) Consider the following grouped frequency table;

Class (x)	f(x)
1-5	3
6-10	1
11-15	6
16-20	7
21-25	3
	Σf=20

Determine the mean and standard deviation for the data. (6 mks)

d) Given a normal distribution variable with mean 12.3 and variance 2.42, determine:

i) $P(x \leq 10)$ (2 mks)

ii) $P(8 \leq x \leq 14)$ (4 mks)

e) What is probability? (2 mks)

f) A farmer has five mangoes, three oranges and three apples in a basket. What is the probability of picking a mango and an orange from the basket? (4 mks)

g) A binomial distribution consists of ten Bernoulli trials. Given that the probability of success per trial is 0.53. Determine the mean for the distribution. (3 mks)

Question 2 (20 marks)

a) Using an appropriate skill, draw a scatter diagram to illustrate the following data. (5 mks)

x	2	3	2	4	3	2	1	4	5
y	7	6	8	7	7	3	5	6	8

b) Determine the correlation coefficient of the following two variables. (5 mks)

Age	11	14	16	18	10	12	14	16	18	20
Performance	68	58	58	50	48	58	48	42	36	62

c) State and briefly describe the two divisions of statistics. (4 mks)

d) Consider two variables x and y such that;

$\bar{x} = 15.4$

$\bar{y} = 49.8$

$\sum(x-\bar{x})^2 = 108.4$ and $\sum(x-\bar{x})(y-\bar{y}) = -12.2$

i) Determine the regression line for x and y. (3 mks)

ii) Determine the value of y when x = 17. (3 mks)

Question 3 (20 marks)

a) The following data shows the number of malaria related infant deaths in a local hospital between June and December 2009.

Month	June	July	August	September	October	November	December
No. of Deaths	8	25	10	14	21	16	27

i) Draw a line graph to represent the data. (5mks)

ii) Draw a pie chart to represent the data. (5 mks)

b) A study of ten primary schools in Meru South district indicated the number of students who joined class 1 in January 2010 as follows; 47, 29, 52, 33, 39, 56, 44, 40, 60, 50

Determine the mean and variance for the data. (5 mks)

c) Complete the following frequency table; (5 mks)

x	**f(x)**	**r.f**	**c.f**	**%f**
3	5			
5	7			
7	2			
9	6			
11	3			
	Σf=23			

Question 4 (20 marks)

a) Consider a normally distributed variable x with;

$\Sigma f(x) = 10$

$\Sigma xf(x) = 55$

$\Sigma x^2 f(x) = 327$

i) Determine the mean and standard deviation for the variable. (5 mks)

ii) Determine the probability that x falls between 5.2 and 5.6. (5 mks)

b) Consider two events x and y, such that P(x) = 0.3; and P(y) – 0.52. Determine;

i) P(x or y)

ii) P(x and y) (4 mks)

c) Briefly describe the following terms as used in probability theory;

i) Mutually exclusive events.

ii) Exhaustive events

iii) Independent events (6 mks)

IMPORTANT FORMULAE

1. Mean:

i) $$\bar{x} = \frac{\sum x_i}{n}$$

ii) For frequency distribution $$\bar{x} = \frac{\sum xf(x)}{\sum f(x)} = \frac{\sum xf(x)}{n}$$

2. Variance:

i) $$\partial^2 = \frac{1}{n}\sum x^2 - (\bar{x})^2$$

ii) For frequency distribution $$\partial^2 = \frac{1}{N}\sum x^2 f(x) - (\bar{x})^2$$

3. Sample Correlation

$$r = \frac{n\sum xy - \sum x \sum y}{\sqrt{\left\{n\sum x^2 - \left(\sum x\right)^2\right\}\left\{n\sum y^2 - \left(\sum y\right)^2\right\}}} = \frac{\sum (x-\bar{x})(y-\bar{y})}{\sqrt{\left[\sum (x-\bar{x})^2\right]\left[\sum (y-\bar{y})^2\right]}}$$

4. The simple linear regression line is given by:

Y = $\beta_0 + \beta_1 x + \varepsilon$

Where:

$\beta_1 = \dfrac{\sum (x - \overline{x})(y - \overline{y})}{\sum (x - \overline{x})^2}$ and $\beta_0 = \overline{y} - \beta_1 \overline{x}$