



THE MOMBASA POLYTECHNIC UNIVERSITY COLLEGE

(A Constituent College of Jkuat)

Faculty of Applied & Health Sciences

DEPARTMENT OF ENVIRONMENT & HEALTH SCIENCES

DIPLOMA IN ENVIRONMENT HEALTH (DEH 10J)
DIPLOMA IN COMMUNITY HEALTH AND HIV MANAGEMENT (DCH 10J)

AMA 2201: BIostatISTICS

SEMESTER EXAMINATION

SERIES: AUGUST/SEPTEMBER 2011

TIME: 2 HOURS

Instructions to Candidates:

Answer questions **ONE** which is (**COMPULSORY**) and any other **TWO** questions

Calculators may be used

This paper consist of **FOUR** printed pages

Question One

a) Define the following terms (6 marks)

- i) Statistics
- ii) Population
- iii) Parameter

b) Differentiate between

- i) Measures of central tendency and dispersion (2 marks)
- ii) Median and mode (2 marks)
- iii) Skewness and Kurtosis (2 marks)

c) A study was conducted to observe the effect of grape fruit juice on cyclosporine and prednisone metabolism in transplant patients. Among the measurements made was creatine clearance at the beginning of the study. The values for the 8 male patients in the study are as follows.

38, 66, 74, 99, 80, 64, 80 and 120

Determine

- i) The mode (1 mark)
- ii) The median (2 marks)
- iii) The mean (2 marks)

d) What is the advantage of using the mean over median (2 marks)

e) In two factories A and B engaged in the same industry, average weekly wages and standard deviation are as follows

Factory	Average Weekly Wages (£)	S.D of Wages	No. of Wages Earners
A	460	50	100
B	490	40	80

i) Which factory shows greater variability in the distribution of wages? (3 marks)

ii) What is the mean and S.D of all the workers in two factories taken together? (8 marks)

f) A husband and wife appear in an interview for two vacancies in the same post. The probability of husband's selection is $\frac{1}{7}$ and that of wife's selection is $\frac{1}{5}$. What is the probability that:

- i) Both of them will be selected (1 mark)
- ii) None of them will be selected (2 marks)

Question Two

In a clinical trial, the two drugs were tested on 11 patients at the Aga Khan University Hospital, Mombasa. The responses in the patients tested recorded on a scale of 1-30 as shown below.

	1	2	3	4	5	6	7	8	9	10	11
Drug A	4	5	1 4	1 7	26	12	1 4	15	13	1 2	10
Drug B	16	21	1 6	1 4	12	24	2 7	18	15	1 7	16

a) Calculate;

- i) The mean response for each drug (2 marks)
- ii) The variance for each drug (6 marks)
- iii) The standard deviation for each drug (2 marks)
- iv) The coefficient of variation for each drug (4 marks)

b) Determine the correlation coefficient between the two drugs (6 marks)

Question Three

Out of twelve patients tested for HIV, four of them are positive. A sample of three patients is randomly selected from the rest.

a) Determine the probability that the sample contains

- i) All the positive
- ii) Only one is positive (10 marks)

b) Give **FIVE** uses of Biostatistics to a health technician (10 marks)

Question Four

A study was made on the amount of converted sugar into grams used in certain process at various temperatures and recorded as below:

Temperature X	Converted Sugar Y
1.1	8.1
1.1	7.8
1.2	8.5
1.3	9.8
1.4	9.5
1.5	9.5
1.6	8.6
1.7	10.2
1.8	9.3

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|--|-----|------|--|
| | 1.9 | 9.2 | |
| | 2.0 | 10.5 | |
- a) Estimate the liner regression line of Y on X (13 marks)
- b) Graph the line on a scatter diagram (5 marks)
- c) Use the graph to find
- i) y if x= 1.4 (1 mark)
- ii) x if y= 6 (1 mark)

Question Five

The data in the table below represents the mean yields of soya bean plants (grain per plant) obtained in response to the indicated levels of ozone exposure over the growing season.

Ozone (ppm) : X	Yield (gm/PH): Y
0.02	242
0.07	237
0.11	231
0.15	201

- a) Determine the hypothesis
- $H_0: \alpha > vs$
- $H_1: \alpha > 0$
- Use t – test at 5% significant level (18 marks)
- b) Interpret your results in (a) above (2 marks)