TECHNICAL UNIVERSITY OF MOMBASA

Faculty of Applied & Health Sciences

DEPARTMENT OF MATHEMATICS & PHYSICS

DIPLOMA IN ANALYTICAL CHEMISTRY

AMA 2202: STATISTICAL TECHNIQUES

SPECIAL/SUPPLEMENTARY EXAMINATION
SERIES: FEBRUARY 2013
TIME: 2 HOURS

Instructions to Candidates:
You should have the following for this examination
- *Answer Booklet*

This paper consist of **FIVE** questions in **TWO** sections **A** & **B**

Answer question **ONE (COMPULSORY)** and any other **TWO** questions
Maximum marks for each part of a question are as shown
This paper consists of **THREE** printed pages

SECTION A (COMPULSORY)

Question One (20 marks)

a) Define the terms as used in statistics **(4 marks)**
- **i)** Statistics
- **ii)** Data
- **iii)** Mean
- **iv)** Median

b) List **FOUR** desirable properties of the mean. **(4 marks)**

c) Give the formular of finding the median and a brief explanation of each symbol. **(3 marks)**

d) Show that the standard deviation S can be expressed by:

$$S = \sqrt{\frac{\sum fx^2}{N} - \left(\frac{\sum fx}{N}\right)^2}$$

(5 marks)

Where the symbols used have their usual meanings.

e) The results for compressive strength test done on concrete cubes are as follows:

20	25	22	26	38	36	30	32	34	33
32	36	29	30	25	29	34	29	31	34
42	46	37	27	28	33	34	33	32	32
50	28	43	34	32	37	28	40	33	33

(i) Classify the data into a frequency distribution table using a class interval of size 4. **(5 marks)**

(ii) Use the results obtained in (a) to determine the median. **(3 marks)**

(iii) Calculate the mean compressive strength taking 33.5 as assumed mean and;

(iv) Standard deviation for the compressive strength. **(3 marks)**

SECTION B (Answer any TWO questions from this section)

Question Two (20 marks)

a) List and explain **TWO** types of Quantitative data. **(4 marks)**

b) (i) Represent the following data in the form of a frequency distribution. With a class interval of size of 2

5.1, 7.7, 2.4, 0.3, 4.5, 9.3, 3.0, 5.8, 0.3, 5.8, 6.4, 9.3, 1.5, 6.3, 0.9, 4.4, 2.1, 6.3, 9.1, 0.9, 4.7, 5.5, 6.2, 8.7, 5.0, 5.4, 3.9, 6.5, 5.3, 6.5, 6.2, 2.1, 5.5, 3.6, 5.6, 8.4, 6.5, 5.0, 5.5. **(8 marks)**

(i) Statistics is a multi-faceted discipline, hence give two importance. **(4 marks)**

(ii) List **FOUR** desirable properties of classes. **(4 marks)**

Question Three (20 marks)

a) Define the tour "frequency polygon" as used in statistics and hence **(2 marks)**

b) Draw a frequency polygon using the following data:

Class	10- 15.9	16 – 21.9	22 – 27.9	28 – 33.9
Frequency	1	3	7	4

(12 marks)

c) Given the following data, find the mean, using an appropriate assumed mean. **(6 marks)**
50, 67, 98, 68, 79, 96

Question Four (20 marks)

a) Define the following terms:
(i) Correlation
(ii) Quartiles
(iii) Deniles **(3 marks)**

b) List and explain the 3 modes of correlation. **(6 marks)**

c) The table below shows values of X and Y obtained from an experiment:

X	1	2	5	6	8	9
Y	3	5	9	8	10	12

i) Determine the coefficient linear correlation using the product moment formular. **(5 marks)**

ii) Determine the equation of regression line of X and y **(6 marks)**

Question Five (20 marks)

a) Give the **TWO** equations that give the regression line of X on Y and hence give its form. **(5 marks)**

b) List the steps involved in a statistical exercise. **(4 marks)**

c) Define the term frequency density. **(2 marks)**

d) Draw a Histogram using the data given below.

Class	10.00 – 10.99	11.00 – 11.99	12.00 – 12.99	13.00 – 13.99
Frequency	20	30	50	14

e) The pass mark in exam is 40. Previous exam the mark is normally distributed with a mean of $(\mu) = 48$ and $\delta = 15$ (standard deviation). If 100 candidates sit for the exam. Find the no of those that will pass. **(4 marks)**