THE MOMBASA POLYTECHNIC UNIVERSITY COLLEGE

(A Constituent College of Jkuat)

Faculty of Applied & Health Sciences

DEPARTMENT OF MATHEMATICS & PHYSICS

INSTITUTIONAL BASED PROGRAMME

UNIVERSITY EXAMINATIONS FOR DEGREE IN
BACHELOR OF ENGINEERING IN MECHANICAL/BUILDING & CIVIL ENGINEERING

SMA 2272: STATISTICS

SPECIAL/SUPPLEMENTARY EXAMINATION

SERIES: FEBRUARY/MARCH 2012
TIME: 2 HOURS

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

This paper consists of **FIVE** questions
Answer question **ONE (COMPULSORY**) and any other two questions
This paper consist of **THREE** printed pages

SECTION A (COMPULSORY)

QUESTION ONE (30 MARKS)

a) Define the following terms:
   (i) Statistics (2marks)
   (ii) Sample space (1marks)
   (iii) Mutually exclusive event (2marks)

b) Two students received standard score 0.8 and -0.4 respectively in a multiple choice examination. If their marks were 88 and 64 respectively, find the mean and s.d of the exam. (5marks)

c) Find the probability of getting 4 heads in 6 tosses of a fair coin (5marks)

d) A die is rolled 240 times and the observed and expected frequencies are as shown below:

Face	1	2	3	4	5	6

Observed frequency(o)	49	35	32	46	49	29
Expected frequency(e)	40	40	40	40	40	40

Determine the chi-square value for this data (4marks)

e) The mean lifetime of a sample of 100 life tubes produced by a company is found to be 1570 hours with s.d of 80 hours. Test the hypothesis that the mean lifetime of the tubes produced by the company is 1600 hours. (5mark)

f) The table below shows the distribution of marks obtained by 40 students. calculate the mean mark using an assumed mean of 13 (6 marks)

Marks(x)	10	11	12	13	14	15
Frequency(f)	6	7	8	11	5	3

SECTION B (ANSWER ANY TWO QUESTIONS FROM THIS SECTION)

QUESTION TWO (20MARKS)

a) The probability that a man will die within a year is 0.01125. Find the probability that of 12 such men at least 11 will reach their 51st birthday using Poisson (8 marks)

b) A number is chosen at random from the integers 1 to 10. Find the probability that the number is either a prime number or a multiple of 4. (6 marks)

c) The mode of 3,10,8,4,4,11,x,3,12 is 3.Find;
   (i) The value of x
   (ii) The median iii) the mean. (6 marks)

QUESTION THREE (20 MARKS)

For the following frequency distribution;

a) State the class width (1 mark)
b) State the lower and upper class boundaries of the class 45 – 49 (2 marks)
c) State the modal class (1 mark)
d) Calculate the;
   (i) Mean (4 marks)
   (ii) Standard deviation (4 marks)
   (iii) Medians and quartiles (7 marks)
   (iv) Semi-interquartile range (1 marks)

Height (cm)	40 – 44	45 – 49	50 – 54	55 – 59	60 – 64
Frequency	6	10	25	11	8

QUESTION FOUR (20 MARKS)

a) In an experiment to measure the stiffness of a spring the length of the spring under different loads was measured as follows:

X(loads)	3	5	6	9	10	12	15	20	22	28
Y(lengths)	10	12	15	18	20	22	27	30	32	34

Find the regression equation appropriate for predicting the

i) Length given the weight on the spring
ii) Weight given the length of the spring (16marks)

b) Find the Geometric mean of 45,32,37,46,39,36,41,48,36. (4marks)

QUESTION FIVE (20MARKS)

a) A coin is tossed three times. Write down the probability distribution of the number of heads. (6marks)

$$f(x)=\begin{cases}\frac{1}{5}x+k, & 0\le x\le 3\\ 0, & elsewhere\end{cases}$$

b) Let x be a random variable with p.d.f find;
(i) the value of k (4marks)
$P(1\le x\le 3)$
(ii) (4marks)

c) Find the area under the normal curve between x= --0.46 and x=2.21 (6marks)