



KENYATTA UNIVERSITY
UNIVERSITY EXAMINATIONS 2009/2010
FIRST SEMESTER EXAMINATION FOR THE DEGREE OF
BACHELOR OF SCIENCE

SMA 160: PROBABILITY AND STATISTICS I

DATE: Wednesday 10th February 2010

TIME: 8.00a.m – 10.00a.m

INSTRUCTIONS: Attempt Question ONE and any other TWO questions

Question ONE (30 Marks)

a) Define the following terms

- i) Raw data
- ii) Skewness
- iii) Mutually exhaustive
- iv) Mutual exclusive event
- v) Independent events.

[10marks]

b) The following data shows the marks of 59 students in statistics

Marks	0-10	10-20	20-30	30-40	40-50	50-60	60-70
No. of students	4	8	11	15	12	6	3

i) Draw a frequency curve

[3marks]

ii) Obtain the arithmetic mean

[3marks]

- iii) Calculate the mode [3marks]
- iv) Calculate the median [3marks]
- v) Calculate the variance [3marks]
- c) A bag contains 3 red balls, 5 white balls, and 7 blue balls. What is the probability that a ball drawn at random will be.
 - i) Red [1mark]
 - ii) Red or white [2marks]
 - iii) Neither red nor blue [2marks]

Question ONE (20 Marks)

- a) Given below is the distribution of 140 candidates obtaining marks x or higher in a certain examination (all marks are given in the whole numbers)

X	10	20	30	40	50	60	70	80	90	100
c.f.	140	133	118	100	75	45	25	9	2	0

Calculate the

- i) Mean
 - ii) Median
 - iii) Mode of this distribution. [14marks]
- b) The following table shows the distribution of 100 families according to their expenditure per week. Some frequencies are missing.
Calculate the missing frequencies if the median and mode are given as 25 and 24 respectively.

Expenditure	0-10	10-20	20-30	30-40	40-50
No. of Families	14	f_1	27	F_2	15

[6marks]

Question Three (20marks)

- a) i) Define the r^{th} moment about a point A [2marks]
ii) Define the r^{th} moment about the mean [3marks]
iii) The first four moments of a distribution about the value 4 of a variable are -1.5, 17, -30 and 108. Obtain the first three moments about the mean. [6marks]
- b) A study was made of the amount of converted sugar in a certain process at various temperatures. The data is as follows.

Temperature	1.0	1.1	1.2	1.3	1.4
Converted to sugar	8.1	7.8	8.5	9.8	9.5

- i) Find the least squared linear regression equation that could be used to predict the amount of converted sugar given the temperature. [7marks]
- ii) Obtain the sugar converted at temperature of 1.5. [3marks]

Question Four (20 marks)

- a) One red die and one blue die are placed in a bag. One die is selected at random and rolled. It's colour and number on the uppermost face is noted.
- i) Write down the sample space. [4marks]
ii) Are all the events equally likely [2marks]
iii) What are the probabilities of the following event?
- Red with any number [2marks]
- Any colour with an even number [3marks]
- Red with an odd number or blue with an odd number [3marks]
- Neither red with an even number nor blue with an odd number [5marks]

Question five (20 marks)

In the University of Adam, 60% of the students are science students and 40% are arts students. Of the arts students 65% are female of science students 20% are female. Some students live in the halls of residence during the week. Of the male science students, 30% live in the halls and of the male art students 30% live in halls. The corresponding figures for female students is 50%.

Find the probability that a student chosen at random is

- i) A female science student. [3marks]
- ii) A female student. [2marks]
- iii) A science student given that the student is female. [5marks]
- iv) Male and lives in the halls given the student is a science student. [5marks]
- v) Science student given that the student is male and lives in the halls. [5marks]