



A Constituent College of Kenyatta University

**UNIVERSITY EXAMINATIONS 2011/2012 ACADEMIC YEAR**

**1<sup>ST</sup> YEAR SEMESTER EXAMINATION FOR THE DEGREE OF  
BACHELOR OF SCIENCE AND BACHELOR OF EDUCATION  
(SCIENCE).**

**COURSE CODE/TITLE: SMA 160: INTRODUCTION TO PROBABILITY  
AND STATISTICS**

**END OF SEMESTER II**

**DURATION: 3 HRS**

**DAY/TIME: FRIDAY 1.00PM – 4.30PM DATE 27.07.2012 (NL1)**

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*INSTRUCTIONS*

*Answer question **ONE** (compulsory) in **Section A** and any other **TWO** questions  
in **SECTION B**.*

**SECTION A (COMPULSORY)**

**QUESTION ONE (40 Marks)**

- Distinguish between positive and negative correlation by giving an example in each case. (4 marks)
- Find the variance and standard deviation of the following set of numbers. 12,6,7,9,15,13,18,11. (5 marks)
- The table below gives the distribution of monthly income in K£ of 500 workers in a factory.

Monthly Income (K£)	Number of workers
Below 100	10
100-<150	25
150-<200	145

200-<250	220
250-<300	70
300 and above	30

- (i). Obtain the limits of income of the central 50 percent of the observed workers. (5 marks)
- (ii). Calculate Bowley's coefficient of skewness and give your comment on this. (5 marks)
- d. In Kilifi county, the probability that a woman attends a family planning clinic is 0.4 and the probability that her husband attends the clinic is 0.1. The probability that a husband attend a clinic given that the wife does is 0.08. Calculate the probability that
- (i). Both wife and husband will attend the clinic (2 marks)
- (ii). The wife will attend the clinic given that the husband does. (2 marks)
- (iii). One of the two persons will attend a clinic. (2 marks)
- e. The following table gives the heights and weights of 12 male students chosen at random from the first year students at Pwani University College-:

Height (x cm)	168	150	174	144	158	168	177	156	150	161	156	163
Weight (y Kgs)	77	75	90	67	78	84	89	80	66	73	69	76

- (i). Obtain the two least squares regression lines connecting height and weight. (8 marks)
- (ii). Calculate the coefficient of correlation between the two variables. (3 marks)
- (iii). Estimate the weight of a student whose height is known to be 151 cm. (2 marks)
- (iv). Estimate the height of a student whose weight is known to be 100 kgs. (2 marks)

## SECTION B

### QUESTION TWO (15 MARKS)

- (a). A Non Governmental organisation employs 30 casual workers. The individual rate of Pay per day for each employee is given below in Ksh.

100    100    110    110    130    100    100    100    110    110

100    120    140    100    120    130    100    110    110    110

110    100    100    130    100    100    100    130    140    140

- (i). Draw a cumulative frequency distribution table for the above data (3 marks)
- (ii). Calculate the mean per day. (4 marks)
- (b). In Nairobi the traffic police uses a modern electronic device to test whether a driver who commits a traffic offence has taken alcohol or not. The device

is known to be 90% reliable if the driver has taken alcohol and 95% reliable if he or she has not. This means that, 10% of those who have taken alcohol are not detected by the device and 5% of those who have not taken alcohol are erroneously declared drunk by the device. If a driver who commits a traffic offence comes from a community of which only 5% have ever tasted alcohol and the device declares him drunk, what is the probability that he has not taken alcohol? (5 marks)

(c). The table below shows foreign exchange earnings in million dollars from exports of various horticultural products in Kenya in the year 1983. Present this information in a pie diagram. (3 marks)

Coffee	Sisal	Tea	Beef	Pyrethrum
25	11	18	5	13

### QUESTION THREE (15 marks)

(a) In the following bivariate frequency table, X represents the average monthly salary and Y represents the average monthly expenditure on entertainment of randomly selected families in Kisumu .

Calculate the coefficient of correlation and comment on the results. (10 marks)

Xsh	YSh	0-40	40-80	80-120	120-160	160-200
400-600		5	2	0	8	0
600-800		4	7	6	0	7
800-1000		5	3	0	4	3
1000-1200		2	7	4	0	5
1200-1400		4	1	5	8	10

(b). Calculate the coefficient of rank correlation for the following data of marks obtained in two tests given to a candidate applying for a job to be a county social worker in Kwale County.

5 marks)

Written test (X)	82	79	77	76	73	67	61	53	43	40
Oral test (Y)	76	73	81	67	58	75	42	72	27	47

### QUESTION FOUR (15 marks)

(a). The frequency distribution given below shows the weekly wages of workers in a sisal farm in Vipingo Estate in the year 1986 .

Wage (Ksh)	Number of workers
50-69	4
70-89	8
90-109	12
110-129	20
130-149	6
150-169	7
170-189	3

- (i). Calculate the first four moments about the point 119.5. (8 marks)
- (ii). Convert the results into moments about the mean. (4 marks)
- (iii). Compute the values of  $\beta_1$  and  $\beta_2$  and comment on their values. (3 marks)