Pwani University College

A Constituent College of Kenyatta University

UNIVERSITY EXAMINATIONS 2010/2011 ACADEMIC YEAR

1ST YEAR 2ND SEMESTER EXAMINATION FOR THE DEGREE OF

BACHELOR OF EDUCATION AND BACHELOR OF EDUCATION (SCIENCE)

COURSE CODE/TITLE: SMA 160: PROBABILITY AND STATISTICS I

END OF SEMESTER II DURATION: 3 HRS

DAY/TIME:MONDAY 8.00AM – 11.00AM DATE 28.03.2011

INSTRUCTIONS

1. Answer question ONE (Compulsory) and any Three questions in Section B
2. Marks are indicated in brackets ( )

Question One

a. Define probability stating the rules which must be satisfied. **(4marks)**

b. Explain the term skewness and by use of diagrams, differentiate between positive skewness and negative skewness. **(4marks)**

c. The events A and B are such that p(A/B) = 0.4, p (B/A) = 0.25, p(A η B) = 0.12.

i) Calculate the value of P (B)

ii) Give a reason why A and B are not independent

iii) Calculate the value of P(A n B'). **(6marks)**

d. The closing prices of 40 common stocks are as follows:

29.63	34.00	43.25	8.75	37.88
9.25	16.50	38.00	53.38	16.63
10.00	25.02	18.00	8.00	28.50
32.25	29.63	79.38	11.38	38.88
8.63	7.63	30.38	35.25	19.38
1.25	48.38	18.00	9.38	9.25
24.25	21.63	18.50	33.63	31.13
11.50	52.00	14.00	9.00	33.50

i) Group the above data into classes starting with 0- 9.99 as the first class and 70 – 79.99 as the last one hence construct the relative frequency distribution.

ii) Construct cumulative frequency and

iii) Cumulative relative frequency. **(5marks)**

e. The following table give the heights and weights of 12 male stude4nts chosen at random from the first year students at Pwani University College:

Height (x cms);	168	150	174	144	158	168	177	156
Weights (ykgs);	77	75	90	67	78	84	89	80
	150	161	156	163				
	66	73	69	76				

i) Obtain the two least squares regression lines connecting height and weight.

ii) What is the coefficient of correlation between the two variables

iii) Estimate the weight of a student whose height is known to be 151cms; 180cms. **(14marks)**

f. In a certain small town, 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

a) Both wife and husband will attend clinic
b) The wife will attend the clinic given that the husband does.
c) One of the two persons will attend a clinic. **(7marks)**

SECTION B. **(40MARKS)**

Question Two

In a bolt factory machine A, B and C manufacturers respectively 25% , 35% and 40% of the total output. It is known that their output 5, 4, and 2 percent respectively are defective bolts.
A bolt is drawn at random from the product and is found to be defective what is the probability that it was manufactured by:

i) Machine A
ii) Machine B
iii) Machine C **(10marks)**

Question Three

The following results give the scores obtained by eight candidates in two examination papers. Compute the co-efficient of rank correlation between the scores in the two papers. Comment on your results.

	Candidates							
Paper	1	2	3	4	5	6	7	8
I	30	40	56	24	60	70	40	80
II	50	40	60	40	30	20	40	70

(10marks)

Question Four

a) Let X be a discrete random variable with distribution

X	0	1	2
P(x)	3/8	¼	2/3

Find

i) P(x = 0 or x = 1) **(2marks)**

ii) Find the mean and variance of X **(4marks)**

b) Define the following terms as used in probability
   i) Sample space
   ii) An event
   iii) Mutually exclusive events
   iv) Independent event. **(4marks)**

Question Five

Electric fuses normally rates as 30 amperes (30A), are tested by passing a gradually increasing electric current through them and recording the current, X amperes, at which they blow. The results of this test on a sample of 125 such fuses are shown in the following table.

Current (x A)	**No of fuses**
$25 \leq x < 28$	6
$28 \leq x < 29$	12
$29 \leq x < 30$	27
$30 \leq x < 31$	30
$31 \leq x < 32$	18
$32 \leq x < 33$	14
$33 \leq x < 34$	9
$34 \leq x < 35$	4
$35 \leq x < 40$	5

a. Draw a histogram to represent these data. **(3marks)**

b. For this sample calculate
   i) The modal current
   ii) The mean current using appropriate assumed mean
   iii) The standard deviation of current
   iv) Pearson's first coefficient of skewness. **(7marks)**