KISII UNIVERSITY

UNIVERSITY EXAMINATIONS

FIRST YEAR EXAMINATION FOR THE AWARD OF
THE DEGREE OF BACHELOR OF SCIENCE IN MATHEMATICS
SECOND SEMESTER 2021/2022
(FEBRUARY-JUNE, 2022)

MATH 141: INTRODUCTORY TO STATISTICS

STREAM: Y1 S2 **TIME: 2 HOURS**

DAY: THURSDAY, 9:00 AM – 11:00 AM **DATE: 19/05/2022**

INSTRUCTIONS:

1. ***Do not write anything on this question paper.***
2. ***Answer Question ONE (compulsory) and any other TWO* Questions.**

QUESTION ONE (Compulsory) (30 MARKS)

a. Define the following terms as used in statistics (8 marks)
   i. Mutually exclusive events
   ii. Independent events
   iii. Dependent events
   iv. Correlation

b. A husband and a wife appearsappear in an interview for two vacancies inthe same post. The probability of a husband'sselection is$\frac{1}{7}$ and that of a wife's selection is $\frac{1}{5}$. What is the probability that:
   i. Both of them will be selected (3 marks)
   ii. Only one of them will be selected (3 marks)
   iii. And none of them will be selected (3 marks)

c. A study was conducted to find whether there is any relationship between the weight and blood pressure of an individual. The following set of data was arrived at from the clinical study.

Weight (x) 78, 86, 82, 82, 80, 86, 84, 89, 71

Blood pressure (y) 140, 160, 134, 144, 180, 176, 174, 178, 128, 132

i. Find the regression that will enable us to predict blood pressure y using the weight x (9 marks)

ii. Predict the amount of blood pressure for an individual with weight 73kgs (4 marks)

QUESTION TWO (20MARKS)

The data below represents 100 people who attended the Valentine excursion at Uhuru Park

Ages	10-20	20-30	30-40	40-50	50-60	60-70
Number of people	5	15	X	30	15	10

a. Find the value of x (1 mark)
b. Calculate the mean number of people who attended the excursion (4 marks)
c. Find the median number of people who were present in that excursion (4 marks)
d. Find the standard deviation for data above (8 marks)
e. Find the upper quartile given the data above (3 marks)

QUESTION THREE (20MARKS)

a. Differentiate between covariance and correlation (2 marks)

The data below represents the relationship between the consumption factor (x) and the income factor (y)

Consumption (x)	12	13	10	9	20	7	4	22	15	23
Income (y)	50	54	48	47	70	20	15	40	35	37

b. Calculate the correlation coefficient for the given data above (15 marks)
c. Based on the correlation coefficient obtained above, interpret your result (3 marks)

QUESTION FOUR (20MARKS)

The data below relates to the populations in thousands of two towns A and B, between the year 1978 and 1986.

Year	A	B
1978	25	200
1979	31	196
1980	36	194
1981	44	190
1982	48	189

Year	A	B
1983	53	185
1984	60	184
1985	62	181
1986	67	180

a. Compute the population trend line for each town (3 marks)
b. Estimate when the two towns will have equal population (3 marks)
c. State the estimated population size at that time (3 marks)

i. Let A be an event that a randomly selected us adult is obese, B be the event that a randomly selected us adult has high blood pressure and P (A) = $\frac{1}{5}$, p (B/A) = $\frac{1}{3}$ and P (B/A^c) = $\frac{1}{7}$ suppose that I am a doctor seeingthe chart of a patient and the only information contained thereis that the patient has high blood pressure. Assuming thispatient is randomly selected from the US adult population,

a) Find the probability that the patient is obese and does not have high blood pressure. (4 marks)
b) Find the probability that a randomly selected US adult is not obese and does not have high blood pressure (4marks)
c) Find the probability that a randomly selected US adult is not obese and has high blood pressure. (4marks)