Scott Christian
UNIVERSITY

SCHOOL OF EDUCATION

BACHELOR OF EDUCATION (ARTS /ECED)

END OF SEMESTER EXAMINATION

SEPTEMBER-DECEMBER 2022 SEMESTER.

COURSE CODE: MAT 123

COURSE TITLE: Probability and statistics 1

Time:

Sept-Dec. 2022

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INSTRUCTIONS:

Answer question ONE (Compulsory) and any other TWO questions

SECTION A

QUESTION 1 (30 marks)

a) Define each of the following terminologies used in statistics giving an example in each case

    i) Discrete variables   (2 marks)

    ii) Continuous variables   (2 marks)

b) From a school farm the profits in dollars from the sale of its various products were recorded in a note book for a number of days as: 18, 12, 9, 11, 12, 11, 6, 18, 19, 11, 12, 9, 3, 11, 8, 9, 11, 9, 8, and 12. Construct a frequency distribution table hence or otherwise compute the Mean   (6 Marks)

c) Highlight any four functions of statistics.   (4 Marks)

d) A sampling study is more effective than a census. Discuss, giving examples.   (6 Marks)

e) Highlight any four characteristics of a normal distribution curve.   (4 Marks)

f) Three machines A, B and C produces 50%, 30% and 20% respectively of the total number of items in a factory. The percentages of defective outputs of these machines are 3%, 4% and 5% respectively. If an item is selected at random:-

    i) Find the probability that it is defective   (3 marks)

    ii) What is the probability that the item in (i) above was produced by machine A?

                                                              (3 marks)

SECTION B

QUESTION 2 (15 marks)

a) The following figures relate to the size of capital of 285 companies:

Capital. Ksh (in Millions.)	1-5	6-10	11-15	16-20	21-25	26-30	31-35
No. of companies	20	27	29	38	48	53	70

Estimate:

        i) Mean   (2 marks)

        ii) Median   (3 marks)

        iii) Mode   (2 marks)

a) Compute the Bowley's coefficients of skewness and interpret the results.   (8 marks)

QUESTION 3 (15 marks)

a) The data given below are obtained from student records. (Grade Point Average (x) and Graduate Record exam score (y).

Subject	1	2	3	4	5	6	7	8	9	10
x	8.3	8.6	9.2	9.8	8.0	7.8	9.4	9.0	7.2	8.6
y	2300	2250	2380	2400	2000	2100	2360	2350	2000	2260

Calculate the rank correlation coefficient 'R' for the data. (7 marks)

b) The data below show the marks scored by a group of students in a statistics exam.

Marks Obtained	0-10	10-20	20-30	30-40	40-50	50-60	60-70
No. of Students	6	12	22	24	16	12	8

Find the moment coefficient of Skewness α_3 and kurtosis α_4 for the data. (8 marks)

QUESTION 4 (15 marks)

a) Sampling is a statistical process of selecting a representative sample and is divided into two main categories. State and explain these two categories. (4 marks)

b) The heights of a certain species of plants are normally distributed with a mean $\mu = 20\ cm$ and Standard deviation $\sigma = 4\ cm$. Find the probability that on a randomly selected plant will have a height:

    (i)   Between than 10cm and 30 cm (3 Marks)

    (ii)   Between 22 cm and 28 cm (4 Marks)

    (iii) Less than 18 cm. (4 Marks)

QUESTION 5 (15 marks)

a) Define the following terminologies

    (i)   Sample space (2 marks)

    (ii)   Nominal variables (2 marks)

    (iii) Ordinal variables (2 marks)

b) Two cards are drawn from a pack, without replacement. What is the probability that both are greater than 2 and less than 8? (3 marks)

c) A girl lists the number of male and female children her parent and her parent's brothers and sisters have. Her results were as tabulated below

	Males	Females
Her parents	2	5
Her mother's sisters	6	8
Her mother's brothers	4	8
Her father's sisters	5	8
Her father's brothers	7	7
Totals	24	36

(i)   Find the probability that, if the girl has children of her own, the 1st born will be a girl.   (3 marks)

(ii) If the girl eventually has 10 children, how many are likely to be males?

(3 marks)

END