



MAASAI MARA UNIVERSITY

REGULAR UNIVERSITY EXAMINATIONS 2023/2024 ACADEMIC YEAR FIRST YEAR FIRST SEMESTER

**SCHOOL OF NATURAL RESOURCE, ENVIROMENTAL
STUDIES AND AGRICULTURE.**

**COURSE CODE: EPM 8112
COURSE TITLE: STATISTICS FOR ENVIROMENTAL
PLANNERS**

DATE: 30TH JANUARY 2024

TIME: 11.00AM -1.00PM

INSTRUCTIONS TO CANDIDATES

- **Answer Any Three Questions**

This paper consists of 4 printed pages. Please turn over.

EPM 8112 STATISTICS FOR ENVIROMENTAL PLANNERS

INSTRUCTIONS

You are required to answer any three questions.

Question One (20Marks)

- a. Explain the terms (4mks)
 - i) Statistics
 - ii) Probability
 - iii) Quantitative data
 - iv) Hypothesis
- b. List the various methods of data collection (2mks)
- c. The probability that a student A will fail a test is 0.47, probability that student B will fail the same test is 0.33, and probability that both students A and B will fail is 0.2.
What is the probability that at least one of these students will fail exams?. (2mks)
- d. The following data provides the number of goals scored in a tournament. Use the data to compute the variance. (4mks)

No. of goals	1	2	3	4	5	6
No. of matches (frequency)	4	3	3	1	2	2

- e. Given that the CAT marks is normally distributed with mean 20 and standard deviation 4, estimate the proportion of student with marks below 23. (4mks)
- f. In a school, 20% of the students are members of environmental club. Suppose 7 students are picked at random, find the probability that exactly 3 are environmentalist. (4mks)

Question Two (20 Marks)

- a) State and explain the source of non-sampling errors (6mks)
- b) The following are examination marks for 30 students in a class.

82 72 75 85 79 73 88 65
77 67 60 68 74 66 82 78
74 81 75 71 65 79 73 93
75 63 78 79 76 61

Construct a frequency distribution table with class widths of 5 starting with 60 -64, ...

(4mks)

- c) The height, in centimeters, of 100 tree seedlings is shown in the table below.

Heights(cm)	10-19	20-29	30-39	40-49	50-59	60-69
No. of seedlings	9	16	19	26	20	10

Find the median height

(4mks)

- d) Suppose the following is a frequency distribution for masses of students

Masses	60-62	63-65	66-68	69-71	72-74
No. students	5	28	42	N	8
CF	5	33	75	K	100

You are required to calculate the value of N and K

(2mks)

- e) In medical records, it was found that the probability that a person would be carrying a certain genetic trait is 0.001. Determine using poisson distribution, the probability that out of 2000 individuals, exactly 3 would be having the genetic trait. (4mks)

Question Three (20 Marks)

a) State the properties of :

i. a good measure of central tendency (2mks)

ii. a normal curve (4mks)

b) A machine comprises of 3 transformers A, B and C. The machine may operate if at least two transformers are working. The probability of each transformer working is given as shown below;

$$P(A) = 0.7, \quad P(B) = 0.8, \quad P(C) = 0.9$$

A mechanical engineer went to inspect the working conditions of those transformers. Find the probabilities of having only one transformer operating (4mks)

c) Calculate the moment coefficient of kurtosis given that $\sigma = 12.055$ and

$$\frac{1}{N} \left(\sum_{i=1}^n f_i (x_i - \bar{x})^4 \right) = 66757.477$$

Comment on the 'peakedness' of the graph (4mks)

d) In an experiment on pea breeding, a researcher obtained the following frequency of seeds

Round and yellow	320
Wrinkled and yellow	100
Round and green	120
Wrinkled and green	60

Suppose theory provides that the frequency should be in the ratio 8:4:2:1. Compute the Chi-square statistic and examine the correspondence of the theory and the experiment using 5% confidence level. (6mks)

Question Four (20Marks)

- a) Define the following terms as used in sample survey theory;
- (i) Survey
 - (ii) Census
 - (iii) Sampling unit
 - (iv) Universe. (4mks)
- b) Suppose that the mean height of students at a satellite campus is 155cm and the standard deviation is 5cm. Find the probability that the student picked at random has a height
- i) Less than 158cm. (4mks)
 - ii) More than 160cm (4mks)
- c) Use the data below to compute:
- I. Pearson's first coefficient of Skewness. (4mks)
 - II. Moment coefficient of kurtosis (4mks)

No. of goals	1	2	3	4	5	6
No. of matches	4	3	2	1	2	1

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