KIRIRI WOMENS' UNIVERSITY OF SCIENCE AND TECHNOLOGY
UNIVERSITY EXAMINATIONS, 2024/2025 ACADEMIC YEAR
FIRST YEAR, FIRST SEMESTER EXAMINATION
FOR THE DEGREE OF BACHELOR OF SCIENCE IN COMPUTER SCIENCE

KMA 2102 INTRODUCTION TO PROBABILITY AND STATISTICS

Date: 12ᵀᴴ AUGUST, 2024
Time: 2:30 PM – 4:30 PM

INSTRUCTIONS TO CANDIDATES
ANSWER QUESTION ONE (COMPULSORY) AND ANY OTHER TWO QUESTIONS

QUESTION ONE: COMPULSORY (30 MARKS)

a) With the help of appropriate examples, distinguish between
   i. Descriptive statistics and inferential statistics **(2 Marks)**
   ii. Quantitative variable and Qualitative variable **(2 Marks)**

b) Consider the following data and construct a stem and leaf display **(3 Marks)**

20 14 21 29 43 17 15 26 8 14 29 23 16 46 28
11 26 35 26 28 30 22 23 7 32 19 22 18 27 9

c) A box contains 8 white balls and 3 red balls. If two balls are drawn at random. Find the probability that;
   i. Both are white **(2 Marks)**
   ii. Both are red **(2 Marks)**
   iii. One is of each other **(2 Marks)**

d) Consider the data below and present it in a component bar chart **(4 Marks)**

Item	Person's A expenditure	Person's B expenditure
Transport	10	30
Food	125	100
Clothing	150	120
Education	25	200

e) Given the following data in a frequency distribution below

Value	10	11	12	13	15
Freq	2	2	4	3	1

 Harmonic mean. **(3 Marks)**

f) Consider the data below

Class interval	20-39	40-59	60-79	80-99	100-119	120-139	140-159
f	3	8	10	5	4	4	6

Calculate;
   i. Mean **(1 Mark)**
   ii. Mode **(2 Marks)**
   iii. Median **(2 Marks)**
   iv. Q_1 and Q_3 **(3 Marks)**
   v. 45th percentile **(2 Marks)**

QUESTION TWO: (20 MARKS)

a) In a recent survey, 100 people were asked if they thought that the next Kenyan president should be a woman. The results of the survey are given below.

Gender	Yes	No	Total
Male	32	18	50
Female	8	42	50
Total	40	60	100

Find these probabilities:
   i. The respondent answered YES given that the respondent was a female **(4 Marks)**
   ii. The respondent was male, given that the respondent said NO. **(4 Marks)**

b) Consider the following data Class

Class interval	90-99	100-109	110-119	120-129	130-139	140-149	150-159	160-169	170-179
frequency	5	8	22	27	17	9	5	5	2

Compute,
   i. The mean absolute deviation **(4 Marks)**
   ii. Quartile deviation **(4 Marks)**
   iii. The seventh decile **(2 Marks)**
   iv. The 85th percentile **(2 Marks)**

QUESTION THREE: (20 MARKS)

a) Consider the data below

Income(x)	26.8	27.1	25.5	28.4	30.8	36.4	30.4	29.8	35.1	32.5
Alcohol(y)	8.7	8.4	8.8	7.6	8.9	10	9.7	8.9	11.1	10.9

   i. Determine regression line relating income and alcohol consumption **(5 Marks)**
   ii. Obtain Pearson's product moment correlation coefficient and make appropriate comment **(6 Marks)**

b) Consider the data below

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34   38   30   31   37   43   38   37   32   40
41   34   37   36   32   38   41   35   37   38
35   37   32   40   39   31   33   37   37   43
34   35   39   41   37   38   38   41   43   30
32   36   32   35   38   34   38   37   34   36
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Required;
   i. Create a grouped frequency table starting with (30-31) class **(3 Marks)**
   ii. Draw histogram and frequency polygon on the same axis **(3 Marks)**
   iii. Draw a stem and leaf display **(3 Marks)**

QUESTION FOUR: (20 MARKS)

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

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

Compute;

   i. The Bowley's coefficients of Skewness and interpret the results. **(3 Marks)**

   ii. The Karl Pearson's coefficient of Skewness and interpret the results. **(3 Marks)**

b) Assume a factory has 2 machines A and B. 30% of output produced by A and the rest by B. 5% of goods produced by A were of defection and only 1% produced by B were defective. If a defective item is selected at random. What is the probability that is produced by machine A.? **(6 Marks)**

c) A box contains 3 red, 4 white and 5 blue disks. Two disks are selected at random from the box. Find probability that all two disks are of different colour if the selection is without replacement. **(2 Marks)**

d) Consider the number of hour's ten students sitting for an exam

Hours	8	5	11	13	10	5	18	16	2	8
Marks	56	44	79	72	70	54	94	85	33	65

Calculate spearman's rank correlation **(6 Marks)**

QUESTION FIVE: (20 MARKS)

a) The table below represents each quantity purchased (X) and price per unit (Y) in a wholesale shop

Quantity	150	169	175	180	200
Price	20	17	16	14	12

   i. Obtain a simple regression equation relating price to quantity purchased. **(7 Marks)**

   ii. Estimate the price paid by an individual who bought is 140 units. **(2 Marks)**

   iii. Determine the Pearson's product moment correlation coefficient between quantity purchased and price per unit, hence comment on the result. **(5 Marks)**

b) A horse was subject to the test of how many minutes it takes to reach a point from the starting point. The horse was made to carry luggage of various weights on 10 trials. The data collected are presented below in the table

Weight (in Kgs)	11	23	16	32	12	28	29	19	23	20
Time taken (in mins)	13	22	16	47	13	39	43	21	24	22

Compute the Spearman's rank correlation coefficient and comment on interpret it. **(6 Marks)**