KIRIRI WOMENS' UNIVERSITY OF SCIENCE AND TECHNOLOGY
UNIVERSITY EXAMINATION, 2020/2021 ACADEMIC YEAR
SECOND YEAR, FIRST SEMESTER EXAMINATION
FOR THE DEGREE OF BACHELOR OF SCINENCE IN
(BUSINESS ADMNISTRATION)

Date: 16th December, 2020
Time: 11.30am – 1.30pm

KBA 203 - STATISTICS FOR MANAGEMENT

INSTRUCTIONS TO CANDIDATES

ANSWER QUESTIONONE (COMPULSORY) AND ANYOTHER TWO QUESTIONS

QUESTION ONE (30 MARKS)

a)   Differentiate between the following terms as applied in Probability and Statistics

      i)   Qualitative variables and quantitative variables   (2 Marks)

      ii)   Compound events and conditional events   (2 Marks)

b)   Define Sampling as method of data collection and explain it relevance as a method of data
      analysis   (4 Marks)

c)   An insurance company researcher conducted a survey on the number of car thefts in a large   city
      for a period of 30 days last summer. The raw data are shown. 67 60 52 62 51 50 69 58 77 66
      53 57 75 56 55 67 73 79 59 68 65 72 57 51 63 69 75 65 53 78 66 55 45 66 82 62 62
      56 77 73 58
      Construct a frequency distribution for the data.   (5 Marks)

d) The data bellows shows the distance in kilometers travelled by 70 matatus in during a certain week.

Class	6340-6349	6350-6359	6360-6369	6370-6379	6380-6389
Frequency	12	13	17	15	13

Find

i)   Mean   (2 Marks)
ii) Standard Deviation   (3 Marks)
iii) 80th Percentile   (3 Marks)

e) If the weights of 7 ear-heads of sorghum are 89, 94, 102, 107, 108, 115 and 126 g. Find the arithmetic mean and standard deviation using a calculator hence determine the coefficient of variation of the ear-heads of sorghum   (5 Marks)

f) In a large restaurant, an average of 3 out of 5 customers asks for water with their meal. A random sample of 10 customers is selected, find the probability that;
i)   At most 8 customers will ask water with their meals   (2 Marks)

ii) Exactly 5 customers will ask water with their meals   (2 Marks)

QUESTION TWO (20 MARKS)

a) Giving examples in each discuss the two broad branches of probability   (5 Marks)

b) A manufacturer orders biomedical parts from three different suppliers. From past records the manufacturer the percentages of the defectives from each of the suppliers is 3%, 5% and 4% respectively. The current inventory of parts contains 5000 units from supplier 1, 3,500 units from supplier 2 and 2000 units from supplier 3. If a part is chosen from the inventory at random,

i)   What is the probability it is defective   (4 Marks)
ii) What is the probability that the defective part is from supplier 1   (3 Marks)

c) A discrete random variable Y has a probability mass function given by the table below

Y	0	1	2	3	4
P(Y=y)	c	2c	5c	10c	17c

Determine

i)   the value of constant c   (2 Marks)

ii) $P(1 \leq y < 4)$ (2 Marks)

iii) Standard deviation   (4 Marks)

a)   Two fair dice labeled 1 to 6 are tossed. Let A be the event the product of the number showing up
      is greater than 21 and let B be the event that the product is divisible by 6. Find
      i) $P(A \cup B)$ (3 Marks)
      ii) $P(A \cap B)$ (3 Marks)

b)   As a foreign language, 40% of the students took Spanish and 30% took French, while 60% took
      at least one of these languages. What percent of students took both Spanish and French?
                                                                                           (4 Marks)

c)   A probability distribution of the claim sizes X for an auto insurance policy is given in the table
      below

Claim Size	20	30	40	50	60	70	80
probability	0.05	q	p	2p	2q	0.1	q

      i)   If the average claim size is 52, find the values p and q and hence find the standard
              deviation of the claim size   (4 Marks)

      ii)   Determine the percentage of claim that are within one standard deviation of the mean
              claim size   (3 Marks)

      iii) $P(20 < x \leq 50)$ (3 Marks)

QUESTION FOUR (20 MARKS)

a)   The length of life of an instrument produced by a machine has a normal distribution with a mean
      of 12 months and standard deviation of 2 months. Find the probability that in a random sample of
      4 instrument produced by this machine, the average length of life
       i)   less than 10.5 months.   (3 Marks)

       ii)   between 11and 13 months   (4 Marks)

       iii)   greater than 15 months   (3 Marks)

b)   A factory produces a large output of bulbs every day of which 5 % of the day's production is
      faulty. If a sample of 12 bulbs is taken at random at the end of each day, what is the probability
      that:
      i)   Exactly two bulbs are faulty   (2 Marks)

      ii)   At least two bulbs are faulty   (3 Marks)

c)   The university policy department must write, on average, five tickets per day to keep department
      revenues at budgeted levels. Suppose the number of tickets written per day follows a Poisson
      distribution with a mean of 8.8 tickets per day. Find the probability that

      i)   Less than 2 tickets are written on a randomly selected day.   (3 Marks)

      ii)   Exactly 3 tickets are written in two days   (2 Marks)

      iii)   At most 8 tickets are written in two days   (3 Marks)

QUESTION FIVE (20 MARKS)

a) Differentiate between the following terms as used in testing hypothesis

   i)   Null hypothesis and alternative hypothesis   (2 Marks)

   ii)   Type I error and Type II error   (2 Marks)

b) Outline the steps followed when testing hypothesis   (5 Marks)

c) The following figures give the end of year profits of ten randomly selected Chemists in Nairobi County.

profit in millions	21.8	24.8	27.3	29.3	30.8	32.8	31.8	32.5	32.1	31.3

d) On the basis of this data, test whether the average profit is greater than 30M KSH at 5% level of significance.   (10 Marks)