FACULTY OF HEALTH, NATURAL RESOURCES AND APPLIED SCIENCES

SCHOOL OF NATURAL AND APPLIED SCIENCES

DEPARTMENT OF MATHEMATICS, STATISTICS AND ACTUARIAL SCIENCE

QUALIFICATIONS : B. Business Admin, B. Marketing, B. Human Resource Management, B. Public Management and B. Logistics and Supply Chain Management	
QUALIFICATION CODES: 21BBAD / 07BMAR / 07BHR / 24BPN / 07BLSM	**LEVEL:** 6
COURSE: BASIC BUSINESS STATISTICS 1A	**COURSE CODE**: BBS111S
DATE: JULY 2023	**SESSION:** 1
DURATION: 3 HOURS	**MARKS:** 100

SUPPLEMENTARY/SECOND OPPORTUNITY EXAMINATION QUESTION PAPER	
EXAMINER(S)	MR E. MWAHI, MR S. KASHIHALWA, MR J. AMUNYELA, DR. J. MWANYEKANGE, MR A. ROUX, MS. N. PONHOYOMWENE
MODERATOR:	MR J. SWARTZ

THIS QUESTION PAPER CONSISTS OF 6 PAGES

(Including this front page)

INSTRUCTIONS

1. Answer all the questions and number your solutions correctly.
2. **Question 1** of this question paper entails multiple choice questions with options A to D. Write down the letter corresponding to the best option for each question.
3. For **Question 2, 3, 4 & 5** you are required to show clearly all the steps used in the calculations.
4. All written work MUST be done in blue or black ink.

PERMISSIBLE MATERIALS
1. Non-Programmable Calculator

ATTACHMENTS

1. None

Write down the letter corresponding to the best answer for each question.

1.1 Which one of the following variables is not categorical?   [2]
    A. Age of a person.
    B. Gender of a person
    C. Choice on a test item
    D. Marital status of a person

1.2 Which one of these statistics is unaffected by outliers?   [2]
    A. Mean   B. Interquartile range
    C. Standard deviation   D. Range

1.3 The following histogram shows the distribution of the difference between the actual and "ideal" weights for 119 female students. Notice that percent is given on the vertical axis. Ideal weights are responses to the question "What is your ideal weight"? The difference = actual –ideal.

Difference = Actual - Ideal
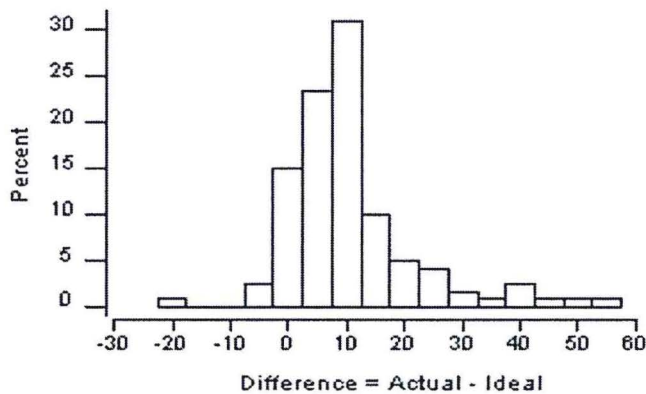
    1.3.1   What is the approximate shape of the distribution?   [2]
            A. Nearly symmetric.   B. Skewed to the left.
            C. Skewed to the right.   D. Bimodal

    1.3.2   The median of the distribution is approximately?   [2]
            A. –10 pounds.   B. 10 pounds.
            C. 30 pounds.   D. 50 pounds

    1.3.3   Most of the women in this sample felt that their actual weight was?   [2]
            A. about the same as their ideal weight.
            B. less than their ideal weight.
            C. greater than their ideal weight.
            D. no more than 2 pounds different from their ideal weight.

1.4   If P(A) = 0.10, P(B) = 0.40, and P (A and B) = 0, then A and B are: [2]

A. statistically dependent events   B. statistically independent events

C. mutually exclusive events   C. collectively exhaustive events

1.5   You calculate the probability of an event, and it turns out to be 0.7, you know
that   [2]

A. the event is certainly going to happen.

B. the event is probably not going to happen.

C. the probability of it not happening is 0.3.

D. you made a mistake.

1.6   A storeowner plans to have his annual "Going out of Business Sale". If each month
has an equal chance of being selected, find the probability that the sale will be in a
month that begins with letter J or A.   [2]

A. $\dfrac{5}{12}$ B. $\dfrac{1}{4}$

C. $\dfrac{1}{6}$ D. $\dfrac{5}{2}$

1.7   A test contains two multiple choice questions, each question having four possible
answers. If a student makes a random guess to answer each question, what is the
probability that both answers are correct.   [2]

A. 0.25   B. 0.0625

C. 0.5   D. 0.75

1.8   If P (A) = 0.10, P (B) = 0.40 and P (A and B) = 0.03, then A and B are: [2]

A. Statistically dependent events   B. Statistically independent events
C. Non-mutually exclusive events   D. Mutually exclusive events

QUESTION 2 _____**[21 MARKS]**

2.1 For each of the following random variables, determine whether the variable is categorical or numerical. If the variable is numerical, determine whether it is discrete or continuous. [6]

    2.1.1 Amount of time spent shopping for clothing in the last month.

    2.1.2 Primary type of transportation used when shopping for clothing.

    2.1.3 Number of pairs of winter gloves owned.

    2.1.4 Most likely time-period during which shopping for clothing takes place.

2.2 One of the primary major measures of the quality of service provided by any organisation is the speed with which the organisation responds to customer complaints. The following data represents the number of days between the receipt of the complaint and the resolution of the complaint at OK furniture in Windhoek.

54	5	35	13	31	27	15	2	12	81	74	27	11
19	12	11	11	29	61	35	94	31	26	5	12	4
16	32	29	28	29	26	25	1	14	13	13	10	5
75												

    2.2.1 Place the data in an ordered array. [2]

    2.2.2 Set up a stem-and-leaf display for these data. [5]

    2.2.3 Comment on the shape of the distribution you observe in (2.2.2) [2]

    2.2.4 Using classes 0 - < 15, 15 - < 30, 30 - < 45 etc, construct a frequency distribution table for these data. [6]

QUESTION 3 _____**[19 marks]**

3.1 Bank Windhoek has developed an improved process of serving customers during the 12:00 to 13:00 peak lunch period. The waiting time in minutes of all customers during this hour is recorded over a period of one week. A random sample of 15 customers is selected and the results are as follows:

4.21	5.55	3.02	5.13	4.77	2.34	3.54	3.20	4.50	6.10	0.38	5.12
6.46	6.19	3.79									

    3.1.1 Compute the mean, median and mode for the data, interpret your results. [7]

3.1.2 Compute the variance and standard deviation for the data. [4]

3.2 Seventy-six motorists in Okakarara were asked to record for the month of February 2023, the amount of money they spent on petrol purchases. The following distribution table shows their purchases:

Petrol purchase (N$)	Number of motorists
0 - < 50	4
50 - < 100	11
100 - < 150	8
150 - < 200	16
200 - < 250	22
250 - < 300	15

3.2.1 Find the mean amount spent on petrol during February 2023 by these motorists [4]

3.2.2 Find the modal amount spent on petrol during February 2023 by these motorists [4]

QUESTION 4 [26 MARKS]

4.1 In a city, 65% of people drink coffee, 50% drink tea, and 25% both. A person is chosen at random from this city.

4.1.1 What is the probability that he/she drink at least one of coffee or tea? [2]

4.1.2 What is the probability that he/she drink neither coffee nor tea? [2]

4.2 According to first year student records at NUST, 40% of the students were in the top 10% of their high school class, and that 65% are foreigners, of whom 25% were in the top 10% of their high school class. What is the probability that a first-year student selected randomly from this university either was in the top 10% of his or her high school class or is a foreigner? [3]

4.3 Consider an experiment in which each of three cars exiting from a university main entrance turns right (R) or left (L). Assume that a car will turn right or left with equal probability of 1/2.

4.3.1 What is the sample space S? [2]

4.3.2 What is the probability that at least one car will turn left? [2]

4.3.3   What is the probability that at most one car will turn left?   [3]

4.3.4   What is the probability that exactly two cars will turn left?   [3]

4.4   Suppose a statistics class contains 70% male and 30% female students. It is known that in a test, 5% of males and 10% of females got an "A" grade.

    4.4.1   If one student from this class is randomly selected, what is the probability that. he/she has an "A" grade?   [3]

    4.4.2   If one student from this class is randomly selected and observed to have an "A" grade, what is the probability that this is a male student?   [4]

    4.4.3   If one student from this class is randomly selected, what is the probability that he/she does not have an "A" grade?   [2]

QUESTION 5   [14 MARKS]

5.1   The table below shows the probability distribution table of a discrete random variable X.

$X = x$	0	3	5	7	9
$P(x)$	0.05	0.35	0.25	k	0.25

    5.1.1   Show that $k = 0.1$ [2]

    5.1.2   Find $P(X \leq 5)$ [2]

    5.1.3   Find the expectation $E(X)$ and $Var(X)$ [3 , 5]

    5.1.4   Find $Var(3X - 4)$ [2]

~~END OF EXAMINATION PAPER~~