NAMIBIA UNIVERSITY
OF SCIENCE AND TECHNOLOGY

FACULTY OF HEALTH AND APPLIED SCIENCES

DEPARTMENT OF HEALTH SCIENCES

QUALIFICATION: BACHELOR OF MEDICAL LABORATORY SCIENCES, BACHELOR OF ENVIRONMENTAL HEALTH SCIENCES, BACHELOR OF SCIENCE IN HEALTH INFORMATION SYSTEMS MANAGEMENT, BACHELOR OF HUMAN NUTRITION	
QUALIFICATION CODE: 08BMLS; 08BOHS; 07BHIS; 08BOHN	**LEVEL:** 5
COURSE CODE: HSS511S	**COURSE NAME:** HEALTH SCIENCE STATISTICS
SESSION: JULY 2019	**PAPER:** THEORY
DURATION: 3 HOURS	**MARKS:** 100

SUPPLEMENTARY/SECOND OPPORTUNITY EXAMINATION QUESTION PAPER	
EXAMINER	Mr. J. J. SWARTZ
MODERATOR:	Dr LARAI AKU-AKAI

INSTRUCTIONS
1. Answer ALL the questions in the booklet provided.
2. Show clearly all the steps used in the calculations.
3. All written work must be done in blue or black ink and sketches must be done in pencil.

PERMISSIBLE MATERIALS
1. Non-programmable calculator without a cover.
2. Graph paper

THIS QUESTION PAPER CONSISTS OF 4 PAGES (Including this front page)

QUESTION 1 [40 MARKS]

1.1. Solve the following quadratic equation by completing the squares:

    1.1.1 $x^2 + 5x + 6 = 0$ [5]

1.2. Simplify the following algebraic expressions:

    1.2.1 $20x^2y^3 - 8xp^2 - 6p^2 + 15xy^3$ [2]

    1.2.2 $\dfrac{2}{x+1} + \dfrac{x}{2x-3}$ [2]

    1.2.3. $\dfrac{6x^2 - 2x}{12x^2 - 4x}$ [2]

1.3. Solve the following equations:

    1.3.1 $\dfrac{x+4}{4} = \dfrac{2x-1}{3}$ [2]

    1.3.2. $x^2 + 4 = (x+1)(x+3)$ [2]

1.4 Create a graph with the equation $-2x + 3y = 12$ using the x and y-intercepts.

    1.4.1 Find the x and y-intercepts.   [4]

    1.4.2 Use the graph paper and plot the x and y-intercepts. Draw a line through them connecting them with a straight edge.   [2]

1.5 Determine if the two lines are parallel   [3]

$6x + 8y = -24$ and $y = \dfrac{3}{4}x - 3$

1.6 Write an equation in point-slope form for the line that contains (5, 1) and is **parallel** to $y = \dfrac{3}{5}x - 4$ [3]

1.7 Determine if the lines are perpendicular: $y = \dfrac{2}{3}x + 1$ *and* $3y + 2x = 4$ [3]

1.8 In $\triangle$ ABC right angled at B, AB = 24 cm, BC = 7 cm. Determine:

    1.8.1 Sin A and Cos A   [5]

    1.8.2 Sin C and Cos C   [5]

QUESTION 2 [38 MARKS]

2.1 Define the following terms:

    2.1.1 Health Statistics   [2]

    2.1.2 A random variable   [1]

    2.1.3 Sampling unit   [1]

2.1.4 Population parameter [1]

2.1.5 Random Sample [2]

2.2. Differentiate between descriptive statistics and inferential statistics [2]

2.3. The following are the arterial activates partial thromboplastin time for 20 patients.

| 21 | 28 | 33 | 55 | 22 | 29 | 24 | 30 | 38 | 27 | 22 | 43 | 41 | 45 | 24 | 50 | 30 | 32 | 39 | 44 |

Use the graph paper provided.

2.3.1 Draw a stem and leaf diagram for this data and comment. [3]

2.3.2 Using classes 20-24, 25-29, 30-34, ..., 55-59 construct a frequency distribution table for the data. [3]

2.3.3 Use a graph paper to draw a histogram for the data [3]

2.3.4 Draw a frequency polygon on the same axis as (1.3.3) above [3]

2.3.5 Draw a cumulative frequency curve (OGIVE) for the data on a graph paper. [3]

2.4. Use the arterial activates partial thromboplastin time for 20 patients in **Question 2.3** to find the

2.4.1 Mean time for the patients [2]

2.4.2 Median time for the patients [2]

2.4.3 Variance and standard deviation [3]

2.4.4 Q1, Q2, and Q3 and hence IQR for the data [4]

2.4.5 Create a Box-Plot for the data and comment on the plot [3]

QUESTION 3 [22 MARKS]

3.1. Table 1 below present data on Mid-year population and Number of deaths by age group of three countries.

Table 1: Population size of three hypothetical populations

	Country A	Country B	Country C
Mid-year population by age group			
0-4 years old	500	1500	500
5-39 years old	4000	4000	5000
40+ years old	1500	500	500
Number of deaths by age group			
0-4 years old	50	120	40
5-39 years old	20	40	50
40+ years old	60	40	40

Using the data in Table 1:

3.1.1 What are the crude death rates for each country? [4]

3.2. The table below presents Number of births to women of Namibia in urban and rural areas in the 12 months before the census, obtained from the 2001 Population and Housing Census of Namibia (Source: CBS, 2001 Population and Housing Census).

Age of Mother	Number of Women			Number of Births		
	Urban	Rural	Total	Urban	Rural	Total
15 - 19	30482	72509	102991	1277	3901	5278
20 - 24	36109	51993	88102	3827	8137	11964
25 - 29	36319	40160	76479	4389	6667	11056
30 - 34	28461	32943	61404	3217	5212	8429
35 - 39	22550	28783	51333	1793	3499	5292
40 - 44	16186	23694	39880	613	1770	2383
45 - 49	10961	19846	30807	120	561	681
Total	181068	269928	450996	15336	29747	45083

3.2.1 Calculate the Crude Birth Rate (CBR) for the total population of Namibia. Use the midyear population, P = 1 830 330 [2]

3.2.2 Calculate the General Fertility Rate (GFR) [3]

3.2.3 Calculate the age-specific fertility (ASFR) rates for each age cohort [7]

3.2.4 Calculate the Total Fertility Rate (TFR) for the total population of Namibia [3]

3.2.5 Calculate the Child Women Ratio (CWR) for the total population of Namibia. Use the midyear population, P = 1 830 330 with child (0 – 4) years population of 98 460. [3]

****************************END OF PAPER****************************
TOTAL MARKS: 100