



**NAMIBIA UNIVERSITY  
OF SCIENCE AND TECHNOLOGY  
FACULTY OF HEALTH AND APPLIED SCIENCES**

**DEPARTMENT OF HEALTH SCIENCES**

<b>QUALIFICATION:</b> BACHELOR OF MEDICAL LABORATORY SCIENCES, BACHELOR OF ENVIRONMENTAL HEALTH SCIENCES, BACHELOR OF SCIENCE IN HEALTH INFORMATION SYSTEMS MANAGEMENT, BACHELOR OF HUMAN NUTRITION	
<b>QUALIFICATION CODE:</b> 08BMLS; 08BOHS; 07BHIS; 08BOHN	<b>LEVEL:</b> 5
<b>COURSE CODE:</b> HSS511S	<b>COURSE NAME:</b> HEALTH SCIENCE STATISTICS
<b>SESSION:</b> JUNE 2019	<b>PAPER:</b> THEORY
<b>DURATION:</b> 3 HOURS	<b>MARKS:</b> 95

<b>FIRST OPPORTUNITY EXAMINATION QUESTION PAPER</b>	
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<b>MODERATOR:</b>	Dr LARAI AKU-AKAI

<b>INSTRUCTIONS</b>
<ol style="list-style-type: none"><li>1. Answer ALL the questions in the booklet provided.</li><li>2. Show clearly all the steps used in the calculations.</li><li>3. All written work must be done in blue or black ink and sketches must be done in pencil.</li></ol>

**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 [35 MARKS]

1.1. Solve the following quadratic equation by using the quadratic formulae:

1.1.1  $\frac{1}{x} + \frac{2}{x} = \frac{x+5}{2}$  [6]

1.2. Simplify the following algebraic expressions:

1.2.1  $6a^2 + ab - 2b^2 + 2a - b$  [2]

1.2.2.  $\frac{3x^2 - 9x}{x^2 - 4x + 3}$  [2]

1.2.3.  $\frac{x^2 - 4x - 21}{x^2 - 5x - 14}$  [2]

1.3. Solve the following equations:

1.3.1.  $(x+3)(x-1) = x^2 + 5$  [2]

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

1.4. Graph the equation  $4x - 6y = 12$  using the x and y-intercepts.

1.4.1 Find the x and y-intercepts. [2]

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]

$2x + 6y = 12$  and  $y = -\frac{1}{3}x + 5$

1.6. Find the equation in slope-intercept form of the line that contains (1, 8) and is

perpendicular to  $y = \frac{3}{4}x + 1$  [3]

1.7. Determine if the lines,  $y = \frac{4}{3}x - 5$  and  $4y + 3x = 9$ , are perpendicular: [3]

1.8. [6]

If  $\sin A = \frac{3}{4}$ , calculate  $\cos A$  and  $\tan A$ .

### QUESTION 2 [40 MARKS]

2.1 Define the following terms:

2.1.1 Population [1]

- 2.1.2 A random variable [1]
- 2.1.3 Sample statistic [1]
- 2.1.4 Population parameter [1]
- 2.1.5 Random Sample [2]

2.2. Provide 3 methods which can be used to represent qualitative data graphically. [3]

2.3. Use the following inpatient age data below and complete Table 1 below: [3]

16	09	17	25	35	33	23	25	28	22
20	35	45	66	50	27	19	03	44	25

**Table 1: Frequency distribution**

Age group	Frequency	Relative Frequency	% Frequency
0-10			
10-20			
20-30			
30-40			
40-50			
50-60			
60-70			

2.4 Use the inpatient age data in Question 2.3 above and graph paper

- 2.4.1 Create a stem and leave plot. [3]
- 2.4.2 Draw a histogram [3]
- 2.4.3 Draw a frequency polygon on the same axis as (Question 2.4.2) above [3]
- 2.4.4 Draw a cumulative frequency curve (OGIVE) for the data on a graph paper. [3]

2.5. A sample of ten (10) outpatients at Katutura Central Hospital, suffering from cancer, were asked how many times they attended chemotherapy treatment ( $X_i$ ) and the responses are as indicated below:

Patient	1	2	3	4	5	6	7	8	9	10
Number of times attending chemotherapy	2	3	5	1	4	3	2	4	3	5

- 2.5.1 Find the average number of times a patient with cancer attends chemotherapy. [2]
- 2.5.2 Find the median value [2]
- 2.5.3 Find the mode [1]
- 2.5.4 Find the range [2]
- 2.5.5 Find the Variance [3]
- 2.5.6 Find the Standard deviation. [2]

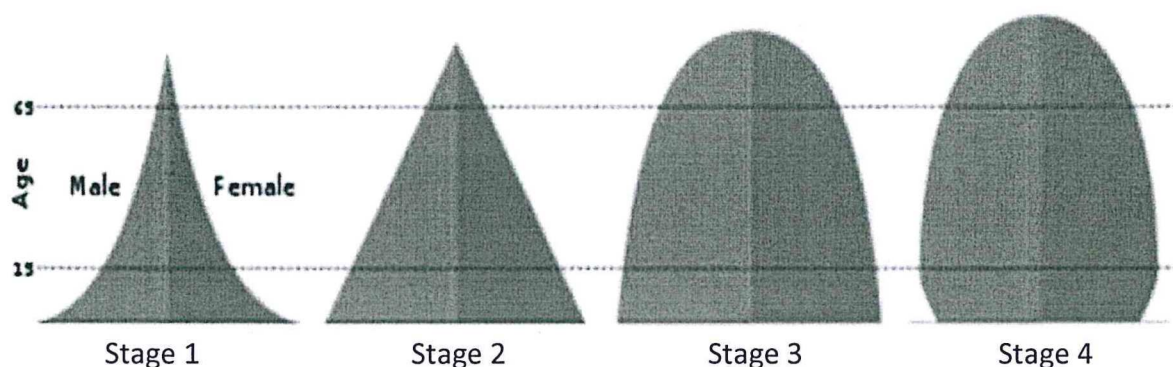
2.6. Suppose two samples of inpatient females yield the following data:

	Sampe1	Sample2
Age	25-year-olds	11year-olds
Mean weight	65 kg	40 kg
Standard deviation	6kg	6kg

2.6.1 Which of the two samples are more variable. [4]

**QUESTION 3 [20 MARKS]**

3.1. Describe each type of age-sex pyramid at each stage below: [4]



3.2. State four main sources of demographic data. [4]

3.3. You are presented with data on Fertility in Table 2 below.

**Table 2: Data on Fertility**

Age group	nLx	All women	Children born	Female children
15-19	496531	10960	1708	804
20-24	495902	9360	1996	940
25-29	495168	8015	1608	756
30-34	494213	5840	960	452
35-39	492760	4960	672	316
40-44	490447	3580	292	136
45-49	486613	3470	84	40

Using the data in Table 2 above:

3.3.1 Estimate the General fertility rate and provide interpretation [4]

3.3.2 Estimate the Total Fertility rate and provide interpretation [4]

3.4 Name and briefly describe the two most commonly used life tables. [4]

\*\*\*\*\*END OF PAPER\*\*\*\*\*

TOTAL MARKS: 100 95