



**NAMIBIA UNIVERSITY  
OF SCIENCE AND TECHNOLOGY**

FACULTY OF HEALTH, NATURAL RESOURCES AND APPLIED SCIENCES  
SCHOOL OF NATURAL AND APPLIED SCIENCES  
DEPARTMENT OF MATHEMATICS, STATISTICS AND ACTUARIAL SCIENCE

<b>QUALIFICATION:</b>	BACHELOR OF PROPERTY STUDIES/NATIONAL DIPLOMA IN PROPERTY STUDIES/GEOMATICS	
<b>QUALIFICATION CODE:</b>	27DPRS, 27DLMR, 27DLAD, 27BPRS	<b>LEVEL:</b> 5
<b>COURSE CODE:</b>	MSS511S	<b>COURSE NAME:</b> MATHEMATICS AND STATISTICS FOR SPATIAL SCIENCES
<b>SESSION:</b>	JUNE 2023	<b>PAPER:</b> THEORY
<b>DURATION:</b>	3 HOURS	<b>MARKS</b> 100

<b>FIRST OPPORTUNITY EXAMINATION QUESTION PAPER</b>	
<b>EXAMINER</b>	Dr. Jacob Ong'ala
<b>MODERATOR</b>	Mr. Andrew Roux

<b>INSTRUCTION</b>
<ol style="list-style-type: none"><li>1. Answer all the questions</li><li>2. Show clearly all the steps in the calculations</li><li>3. All written work must be done in blue and black ink</li><li>4. You may refer to your notes or any other materials</li></ol>

**PERMISSIBLE MATERIALS**  
Non-programmable calculator without cover  
**THIS QUESTION PAPER CONSISTS OF 5 PAGES** (including the front page)

SECTION A

QUESTION 1 - 13 MARKS

- (a) Solve for f  
 $\frac{1}{5}(2f - 3) + \frac{1}{6}(f - 4) + \frac{2}{15} = 0$  [3 mks]
- (b) Use completing the square method to solve the following quadratic equation  
 $0 = x^2 - 2x - 8$  [5 mks]
- (c) Solve the following systems of equation (You may use any method) [5 mks]  
 $2x - 3y = 10$   
 $3x - 4y = 8$

QUESTION 2 - 16 MARKS

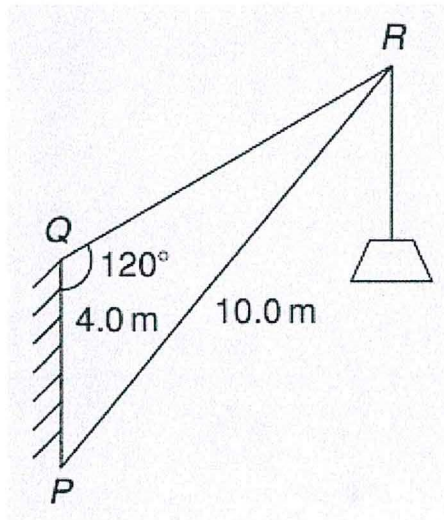
- (a) Evaluate the following expressions
- (i)  $\frac{3 + \sqrt{(5^2 - 3^2)} + 2^3}{1 + (4 \times 6) \div (3 \times 4)} + \frac{15 \div 3 + 2 \times 7 - 1}{3 \times \sqrt{4} + 8 - 3^2 + 1}$  [5 mks]
- (ii)  $2\frac{1}{2} - \left(\frac{2}{5} + \frac{3}{4}\right) \left(\frac{5}{8} \times \frac{2}{3}\right)$  [3 mks]
- (b) Simplify the following expressions completely
- (i)  $[(s + 2t) - (s + 3t)] - [(2s + 3t) - (-4s + 5t)]$  [3 mks]
- (ii)  $(a^2\sqrt{b}\sqrt{c^3})(\sqrt{a}\sqrt[3]{b^2}c^5)$  [3 mks]
- (c) A training college has 480 students of which 150 are girls. Express this as a fraction in its simplest form. [2 mks]

QUESTION 3 - 08 MARKS

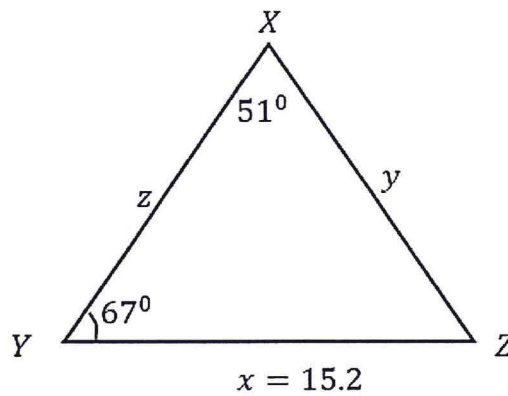
- (a) A box of resistors increase in price from \$N 45 to \$N 52. Calculate the percentage increase. [2 mks]
- (b) A wooden pole is 208 m long. If you divide it in the ratio of 7:19, what will be length of each piece. [3 mks]
- (c) If y is inversely proportional to x and y=15.3 when x=0.6. Determine
- (i) Coefficient of proportionality k [2 mks]
- (ii) The value of y when x=1.5 [1 mks]

**QUESTION 4 - 10 MARKS**

- (a) PR represents the inclined jib of a crane and is 10.0 m long. PQ is 4.0 m long. Determine the inclination of the jib to the vertical and the length of tie QR. [4 mks]



- (b) In a triangle below, determine;



- (i) angle Z [1 mks]  
(ii) side XZ [2 mks]  
(iii) side XY [1 mks]  
(iv) Area of triangle XYZ [2 mks]

**SECTION B**

**QUESTION 5 - 23 MARKS**

- (a) Indicate whether each of the following variables is quantitative or qualitative. State its measurement scale. (example of data is shown in the bracket) [5 mks]

	Variable	Qualitative/Quantitative	Measurement scale
a	Education level of university staff		
b	Name of patients admitted to a mental health clinic		
c	Weights of babies born in a hospital during a year		
d	Gender of babies born in a hospital during a year)		
e	Students ADM No (3749001,22003481)		

- (b) Using the data below, 15; 26; 13; 33; 22; 14; 27; 15; 32; 23; 5; 26; 25; 14; 34; 13; 15; 22; 15; 28; 10; 18; 21; 24; 20; 18; 34; 20
- (i) Draw a frequency table for the following data [10 mks]
- (ii) Draw a Histogram for the above data [8mks]

**QUESTION 6 - 13 MARKS**

Use the following set of data to answer the questions that follow;

13 14 9 17 21 10 15 22 19 13  
22 13 19 23 17 21 10 9 20 18

Calculate the following

- (a) Range [1 mks]
- (b) Mode [1 mks]
- (c) Median [1 mks]
- (d) Geometric Mean [2 mks]
- (e) Arithmetic mean [2 mks]
- (f) Variance [2 mks]
- (g) Standard Deviation [2 mks]
- (h) coefficient of variation. [2 mks]

**QUESTION 7 - 17 MARKS**

The Bradford Electric Illuminating Company is studying the relationship between kilowatthours (thousands) used and the number of rooms in a private single-family residence. A random sample of 10 homes yielded the following. Number of Kilowatt-Hours Number of Kilowatt-Hours Rooms (thousands) Rooms (thousands).

- (a) Find the correlation coefficient r [9mks]

No. rooms (X)	KWH(000) (Y)
12	9
9	7
14	10
6	5
10	8
8	6
10	8
10	10
5	4
7	7

(b) Fit a regression model for the data

[6mks]

(c) Use the regression model above to find Y when X=30.

[2mks]

- END -