



**NAMIBIA UNIVERSITY
OF SCIENCE AND TECHNOLOGY**

FACULTY OF ENGINEERING AND THE BUILT ENVIRONMENT

DEPARTMENT OF LAND AND SPATIAL SCIENCES

QUALIFICATION: BACHELOR OF NATURAL RESOURCE MANAGEMENT (NATURE CONSERVATION), BACHELOR OF GEOINFORMATION TECHNOLOGY, BACHELOR OF LAND ADMINISTRATION, BACHELOR OF PROPERTY STUDIES HONOURS, BACHELOR OF REGIONAL AND RURAL DEVELOPMENT, BACHELOR OF URBAN AND REGIONAL PLANNING, DIPLOMA IN PROPERTY STUDIES	
QUALIFICATION CODE: 07BNRS, 07BGEI, 07BLAM, 08BOPS, 07BORR, 07BURP, 06DIPS	QUALIFICATION LEVEL: 07BNRS - 7, 07BGEI - 7, 07BLAM - 7, 08BOPS - 8, 07BORR - 7, 07BURP - 7, 06DIPS - 6
COURSE: INTRODUCTION TO GEOSPATIAL DATA	COURSE CODE: IGD411S
SESSION: JUNE 2025	PAPER: THEORY
DURATION: 2 HOURS	MARKS: 80

FIRST OPPORTUNITY EXAMINATION QUESTION PAPER

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THIS QUESTION PAPER CONSISTS OF 6 PAGES (Including this front page)

INSTRUCTIONS

1. Answer ALL the questions.
2. Write clearly and neatly.
3. Number the answers clearly.
4. Answers to calculations must be rounded off to three decimal places, excluding answers to co-ordinate conversions.

PERMISSIBLE MATERIALS

1. Examination paper.
2. Examination script.
3. Calculator and other drawing equipment.

Question 1

Select only the letter considered to be the correct answer.

(10)

- 1.1. A spatial point is a concept used to define an exact location in space. It has ...
 - a. volume
 - b. area
 - c. length
 - d. none of the above

- 1.2. Lines of latitude give direction ...
 - a. East – West
 - b. North – South
 - c. South only
 - d. none of the above

- 1.3. Meridians are lines of longitude that are ...
 - a. equally spaced
 - b. furthest apart at the poles and converge at the equator
 - c. furthest apart at the equator and converge at the poles
 - d. none of the above

- 1.4. Magnetic declination is the difference between ...
 - a. true north and magnetic north
 - b. grid north and magnetic north
 - c. true north and grid north
 - d. none of the above

- 1.5. TIN stands for ...
 - a. Triangulated Interval Network
 - b. Triangular Inverse Network
 - c. Triangulated Irregular Network
 - d. none of the above

- 1.6. We want to map Namibia using the concept of map series. This allows for ...
 - a. having a larger scale, allowing more detail to be shown
 - b. having a larger scale, allowing less detail to be shown
 - c. having a smaller scale, allowing more detail to be shown
 - d. none of the above

- 1.7. The process of studying and gathering the information required in identifying the various cultural and natural features on an aerial photograph is called ...
 - a. photo inferring
 - b. photo sensing

- c. photo interpretation
d. none of the above
- 1.8. Remote Sensing is the science of acquiring information about the earth's surface ...
- a. by being in contact with it
b. without being in contact with it
c. by both being in contact with it and without being in contact with it
d. none of the above
- 1.9. GPS receiver compares signals from at least ... GPS satellites and computes distance to them.
- a. 2
b. 4
c. 6
d. None of the above
- 1.10. Two different types of GPS positioning modes are:
- a. absolute positioning and stand-alone positioning
b. differential GPS and Relative GPS
c. absolute positioning and autonomous positioning
d. none of the above

[10]

Question 2

- 2.1. Match each word with the correct description/statement using the appropriate letter and number. (5)

WORD	DESCRIPTION / STATEMENT
A. Geospatial Data	1. When the earth is visualised "as is" by using images
B. Raster	2. The irregular ellipsoidal shape of the earth
C. Generalisation	3. Spatial Data that is referenced to the earth
D. Geoid	4. The most convenient mathematical model for measuring locations
E. Ellipsoid	5. Reduces the amount of details in a map.

- 2.2. There are two types of maps; a. maps that show as much of the landscape elevations, roads, towns etc as possible and b. maps designed to depict a specific theme/topic. Name them respectively. (2)
- 2.3. Mention: (3)
- a. A co-ordinate system that uses lines of latitude and longitude to determine locations
- b. A co-ordinate system that makes use of a flat, two dimensional representation of the earth to determine co-ordinates.

- c. A co-ordinate system that define position by using direction/bearing and distance
- 2.4. Complete the sentence: (3)
- a. Referencing geodetic fo-ordinates to the wrong ... can result in position errors of hundreds of meters.
- b. Map projections are used to convert the i. ... earth to a ii. ... surface.
- 2.5. Calculate the straight-line distance from $56^{\circ} 20' 10''$ S to $47^{\circ} 29' 38''$ S. (3)
- [16]**
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Question 3

- 3.1. The farm Lazyboy located in the Omaheke region has the co-ordinates below. Calculate the area of the farm. (5)
- | | Y | X |
|---|----------|----------|
| A | + 322.10 | + 725.20 |
| B | + 320.50 | + 731.40 |
| C | + 262.30 | + 758.60 |
| D | + 236.70 | + 704.80 |
| E | + 294.90 | +677.00 |
- 3.2. Convert the following geographical coordinates into degrees, minutes and seconds. (6)
- a. $22^{\circ} 36' 49''$ S
- b. $17^{\circ} 9' 53''$ E
- 3.3. Calculate the scale if the length of the B1 road is 11 cm on the map and 15 km in reality. (4)
Round your scale off to the nearest 1000th place.
- [15]**
-

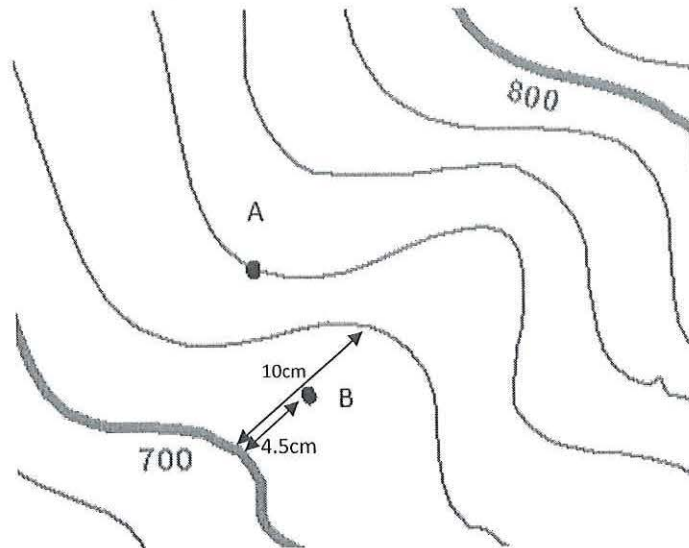
Question 4

- 4.1 Name six map elements. (6)
- 4.2 There are two methods of showing height, what is each called? (2)
- a. Mere height values at selected discrete points.

b. Imaginary lines that joins points of equal elevation.

4.3 Given a rise of 45 m and a run of 88 m, calculate your slope in a. degrees and b. percentage. (4)

4.4 Determine the heights of points A and B. (5)



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Question 5

5.1 When preparing for aerial photography, basic mission calculations are performed; list these calculations. (5)

5.2 What are the two characteristics of aerial photographs? (2)

5.3 Which of the two; satellite imagery or aerial photography can record reflected or emitted electromagnetic energy from the earth's surface? (1)

5.4 Calculate the scale of a photograph covering Rehoboth taken at a flying height of 2500 m using an aerial camera with a focal length of 135 mm. Round your scale off to the nearest 1000 place. (4)

[12]

Question 6

6.1 Name two GPS positioning modes. (2)

(3)

6.2 Name the three components that make up a GPS system.

6.3 What is the minimum number of satellites required to compute a reliable GPS position?

(1)

6.4 What does DOP stand for?

(1)

6.5 Below are two DOP values. indicate the Stronger DOP value.

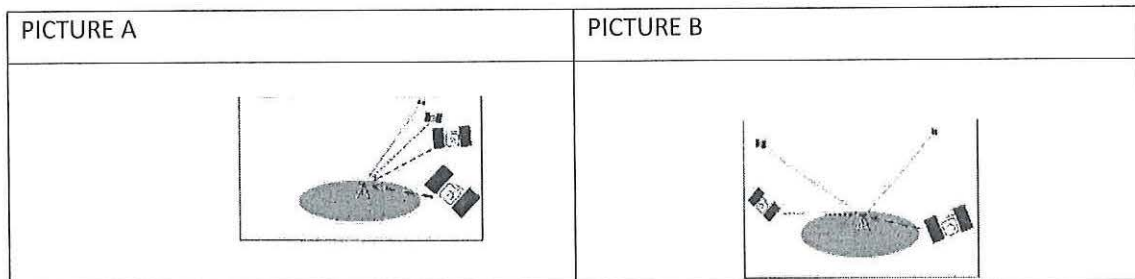
(1)

DOP value of 2

DOP value of 9

6.6 Study the pictures below and state which picture indicates good satellite geometry and which picture indicates bad satellite geometry.

(2)



[10]

