



**NAMIBIA UNIVERSITY  
OF SCIENCE AND TECHNOLOGY**

**FACULTY OF NATURAL RESOURCES AND SPATIAL SCIENCES**

**DEPARTMENT OF GEO – SPATIAL SCIENCES AND TECHNOLOGY**

<b>QUALIFICATION:</b> BACHELOR OF GEOINFORMATION TECHNOLOGY, BACHELOR OF LAND ADMINISTRATION, BACHELOR OF PROPERTY STUDIES, BACHELOR OF GEOMATICS, BACHELOR OF REGIONAL AND RURAL DEVELOPMENT, BACHELOR OF TOWN AND REGIONAL PLANNING, DIPLOMA IN GEOMATICS, DIPLOMA IN PROPERTY STUDIES, DIPLOMA IN LAND ADMINISTRATION	
<b>QUALIFICATION CODE:</b> 07GITB, 07BLAD, 08BPRS, 07BGEM, 07BRAR, 07BTAR, 06DGEM, 06DPRS, 06DLAD	<b>LEVEL:</b> 4
<b>COURSE CODE:</b> IGD411S	<b>COURSE NAME:</b> INTRODUCTION TO GEOSPATIAL DATA
<b>SESSION:</b> JUNE 2019	<b>PAPER:</b> THEORY
<b>DURATION:</b> 2 HOURS	<b>MARKS:</b> 80

<b>FIRST OPPORTUNITY EXAMINATION QUESTION PAPER</b>	
<b>EXAMINER(S)</b>	<b>Ms. Desiré L. Husselmann</b>
<b>MODERATOR:</b>	<b>Mr. Sebastian Mukumbira</b>

<b>INSTRUCTIONS</b>
<ol style="list-style-type: none"><li>1. Answer ALL the questions.</li><li>2. Write clearly and neatly.</li><li>3. Number the answers clearly.</li><li>4. Answers to calculations must be rounded off to three decimal places, excluding answers to co-ordinate conversions</li></ol>

**PERMISSIBLE MATERIALS**

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

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

**Question 1**

Select only the letter considered to be the correct answer.

- 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 ...
- having a larger scale, allowing more detail to be shown
  - having a larger scale, allowing less detail to be shown
  - having a smaller scale, allowing more detail to be shown
  - 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 ...
- photo inferring
  - photo sensing
  - photo interpretation
  - none of the above
- 1.8. Remote Sensing is the science of acquiring information about the earth's surface ...
- by being in contact with it
  - without being in contact with it
  - by both being in contact with it and without being in contact with it
  - none of the above.
- 1.9. GPS receiver compares signals from at least ... GPS satellites and computes distance to them.
- 2
  - 4
  - 6
  - None of the above
- 1.10. Two different types of GPS positioning modes are:
- absolute positioning and stand-alone positioning
  - differential GPS and Relative GPS
  - absolute positioning and autonomous positioning
  - none of the above

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[10]

**Question 2**

- 2.1. Geospatial data has three main characteristics, what are they? (3)
- 2.2. The shape of the earth is continuously changing due to irregularities in mass distribution inside the earth. (2)
- a. What is the irregular shape of the earth called?
- b. Since this shape is not a suitable reference surface for the determination of locations, what mathematical reference frame is used today in computing positions on the earth?
- 2.3. Calculate the straight-line distance from 8° W to 19° W at 46° N. (4)
- 2.4. What is the result of referencing geodetic co-ordinates to the wrong datum? (1)

**[10]**

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**Question 3**

- 3.1. The co-ordinates below represent a parcel of land located in the Hardap region.

	Y	X
A	-7678	+146339
B	-7728	+146346
C	-7723	+146368
D	-7717	+146372

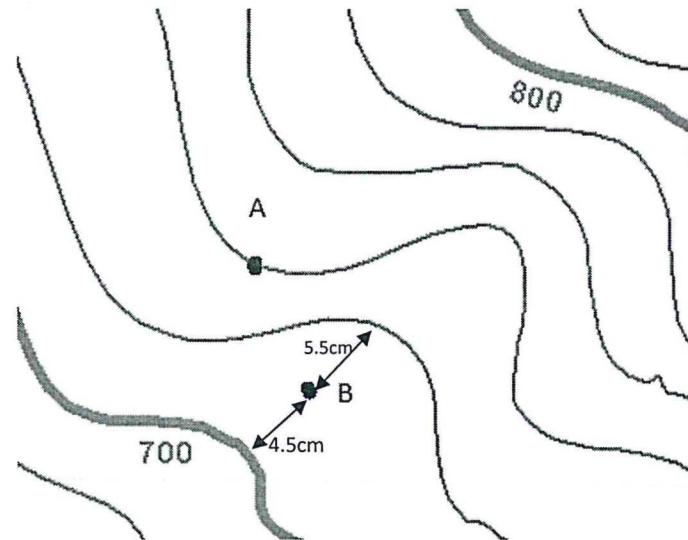
- a. Calculate the distance from B to C. (3)
- b. Calculate the area of the land parcel. (7)
- 3.2. On a map with an unknown scale, the distance between the botanical garden and museum is 8 cm and the corresponding distance on the ground is 5 km. Calculate the scale of the map. (3)

**[13]**

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**Question 4**

- 4.1. What is a map? (2)
- 4.2. Differentiate between contour line and contour interval. (2)
- 4.3. Determine the heights of points A and B. (5)



- 4.4. Indicate the slope having a rise value of 23 m and a run value of 68 m (a) as a percentage and (b) as an angle / in degrees. (2)
- 4.5. Map generalisation is the process of reducing the amount of details in a map as a consequence of reducing a map scale. It consist of six activities namely; simplification, selection, enlargement, merging, replacement and symbolisation. List four aspects that are based on map generalisation. (4)

**[15]**



**Question 5**

- 5.1. What is aerial photography? (2)
- 5.2. What is meant by the following statement: "vertical aerial photography is done in stereo". (2)
- 5.3. List the five basic mission calculations performed when preparing for aerial photography. (5)
- 5.4. Calculate the scale of a photograph covering Keetmanshoop taken at a flying height of 1500 m using an aerial camera with a focal length of 135 mm. Round your scale off to the nearest 1000<sup>th</sup> place. (3)
- 5.5. One of the problems associated with aerial photography is relief displacement. Relief displacement in aerial photography is not necessarily bad. Name two advantages of relief displacement in aerial photographs. (2)
- 5.6. What is an orthophotograph? (2)
- 5.7. What are the advantages of satellite imagery when compared to aerial photography? (3)

**[19]****Question 6**

- 6.1. Name and explain three GPS components. (6)
- 6.2. List six sources of GPS errors, excluding human error. (6)
- 6.3. Below are two DOP values. indicate the stronger DOP value. (1)
- DOP value of 2
- DOP value of 9

**[13]**