



**PAMIBIA UNIVERSITY**  
OF SCIENCE AND TECHNOLOGY

**FACULTY OF HEALTH, NATURAL RESOURCES AND APPLIED SCIENCES**

**DEPARTMENT OF AGRICULTURE AND NATURAL RESOURCES SCIENCES**

<b>QUALIFICATION:</b> Bachelor of Agriculture	
<b>QUALIFICATION CODE:</b> 07BAGA	<b>LEVEL:</b> 6
<b>COURSE CODE:</b> GRS621S	<b>COURSE NAME:</b> Applications of GIS and Remote Sensing in Agriculture
<b>DATE:</b> November 2022	<b>PAPER:</b> THEORY
<b>DURATION:</b> 3 Hours	<b>MARKS:</b> 85

<b>FIRST OPPORTUNITY EXAMINATION QUESTION PAPER</b>	
<b>EXAMINER(S)</b>	Prof. Vera De Cauwer
<b>MODERATOR:</b>	Dr Jonathan Kamwi

<b>INSTRUCTIONS</b>
<ol style="list-style-type: none"><li>1. Write clearly and neatly.</li><li>2. Number your answers clearly.</li><li>3. Make sure your student number appears on the answering script.</li><li>4. Include the formulas used for each calculation.</li></ol>

**PERMISSIBLE MATERIALS**

1. Calculator

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

**Question 1** [6]

- a) Explain what a GIS is.
- b) What can you do with a GIS?

**Question 2** [12]

Convert the following coordinates to decimal format.

1. 20° 18.9' S, 15° 54.8' E
2. S 25° 25.1251', E 19 ° 19.2581'
3. 18° 59' 55" S, 23° 4' 22" W

**Question 3** [6]

You start a new project in QGIS and you add roads.kml and regions.shp to the project. The file extension "shp" stands for ..... Next to regions.shp, two other files are needed to open regions: .....and ..... The files roads and regions are two ..... of your GIS project. Both files contain data in ..... format.

**Question 4** [4]

What is the difference between geographical and projected coordinates?

**Question 5** [18]

Indicate if following statements are True or False. If false, correct the statement.

1. A GPS collects geospatial data.
2. Visible light contains less energy than radio waves.
3. A vector line consists of minimum two vertices.
4. Vector data are made out of pixels.
5. Satellite images record the light absorbed by objects.
6. Chlorophyll absorbs green light.
7. Longitude varies from 0° at Greenwich to 180° east or west.
8. UTM (Universal Transverse Mercator) is a projected coordinate system.
9. A GPS receiver allows to determine the exact location for any spot on earth.
10. Topographic maps always show contour lines.
11. Coordinates of latitude are represented on the X-axis of a map.
12. Electromagnetic radiation travels at the speed of sound (343 m/s).
13. Humans emit infrared radiation.

**Question 6** [9]

How can you obtain GIS data for your study area?

**Question 7**

[3]

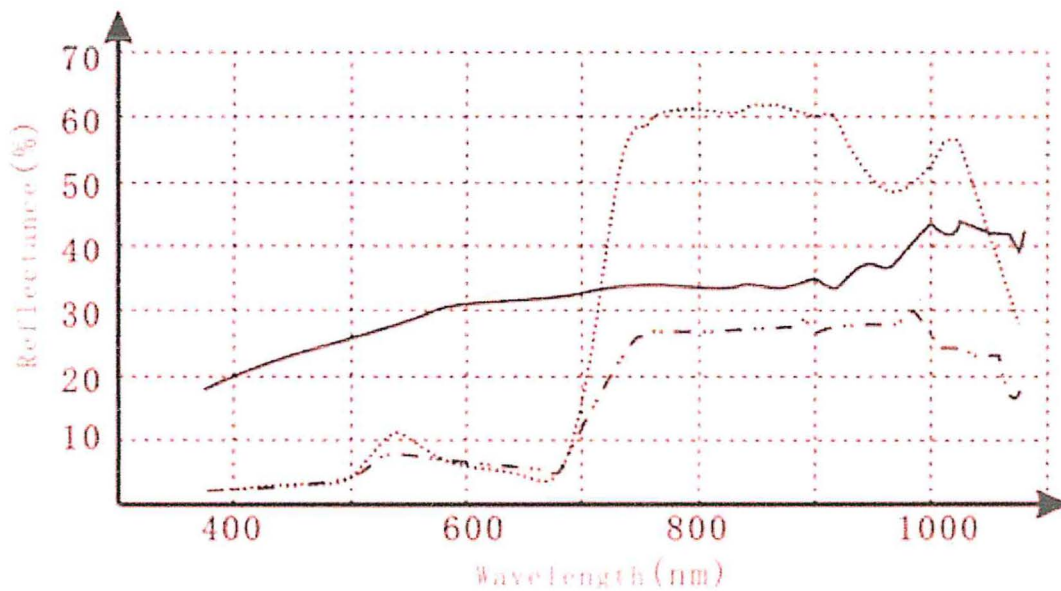
- a) What is the difference between accuracy and precision of a distance measurement in a GIS?
- b) If we measure a distance of 1205.1 m: what is the precision?

**Question 8**

[7]

The figure underneath shows three different lines, each from a different land cover type.

- 1. What do you call the graph represented in the figure ?
- 2. Which of the three lines (full, ... dots, -.- dash-dot) in the graph represent(s) vegetation? Explain why.



**Question 9**

[6]

What is a GIS metadata file? Give four types of information that can be stored in such a file.

**Question 10**

[4]

What is precision agriculture? What kind of data do you need for precision agriculture?

**Question 11****[7]**

Underneath is an attribute table of a GIS layer.

1. How many features does the GIS layer contain?
2. List the attributes of the GIS layer.
3. What is "ID" referring to? Explain what ID stands for.
4. Does this attribute table contain any geospatial information? Explain very briefly.

ID	Species	DBH	Height
6	Acacia erioloba	35	8.2
2	Boscia albitrunca	12	3.3
3	Ziziphus mucronata	18	3.8
9	Acacia erioloba	29	5.3
8	Combretum apiculatum	15	4.0
1	Acacia erioloba	28	6.1

**Question 12****[3]**

- a) What are the advantages of an active microwave sensor?
- b) What wavelengths have microwaves?