NAMIBIA UNIVERSITY
OF SCIENCE AND TECHNOLOGY

FACULTY OF HEALTH, NATURAL RESOURCES AND APPLIED SCIENCES
SCHOOL OF AGRICULTURE AND NATURAL RESOURCES SCIENCES
DEPARTMENT OF AGRICULTURAL SCIENCE AND AGRIBUSINESS

QUALIFICATIONS: BACHELOR OF SCIENCE IN AGRICULTURE	
QUALIFICATIONS CODE: 07BAGA	**LEVEL:** 7
COURSE CODE: GRS621S	**COURSE NAME:** APPLICATIONS OF GIS AND REMOTE SENSING IN AGRICULTURE
DATE: NOVEMBER 2024	**PAPER:** 1
DURATION: 3 HOURS	**MARKS:** 100

FIRST OPPORTUNITY EXAMINATION QUESTION PAPER	
EXAMINER:	DR. PRISCILLA HAINDONGO
MODERATOR:	PROF. JONATHAN KAMWI

INSTRUCTIONS

1. Answer all the questions.
2. Write neatly and clearly.
3. Mark all answers clearly with their respective question numbers.
4. All written work MUST be done in blue or black ink.
5. No books, notes and other additional aids are allowed.

PERMISSIBLE MATERIALS

1. Calculator
2. Examination paper
3. Examination script

THIS QUESTION PAPER CONSISTS OF 2 PAGES
(Excluding This Front Page)

SECTION A – Answer all Questions in this Section only.

1. Without detailed explanations, mention the main six elements of a GIS? [2]

2. What does EM stand for in Remote Sensing and why is it important for us to know? [2]

3. Provide one detailed example of GIS applications in Agriculture? [4]

4. Given that historical information remains relevant in GIS, discuss what contour lines are in a GIS context and explain why we need to consider them when implementing GIS projects. [4]

5. Bearing in mind that Remote Sensing is a source of valuable information on our earth's surface, describe the difference between High Resolution and Mid-Resolution Images? [4]

6. In Remote Sensing, why is it important for one to consider higher resolution images over low resolution when we map features like households, building structures, etc? [4]

7. You are allocated a new farm in Karas region, and you would like to know what are the nearest ATM's closer to a supermarket in the main town (i.e. Keetmanshoop), since you want to save time and avoid shopping for the whole day in town? [4]

8. In short, differentiate between GIS and GPS and indicate which one is a subject of another? Furthermore, indicate which one is more dependable for data collection? [5]

9. What does Vector and Raster data represent in a GIS, in your explanation provide Examples for each? [5]

10. By giving us detailed formulas, indicate the importance of Vegetation Indices and provide two different examples from each formula? [5]

11. Describe the following file formats in GIS? Shp, dbf, shx, prj. [8]

12. Given that vector data is much more reliable for map production in GIS, state examples of each 3 representatives OR mention how vector data is represented in GIS? [8]

SECTION B – Answer two Questions in this Section. One Question for [20] marks and another question for [25] marks.

1. Explain why spectral reflectance for a healthy leaf is different from that of a stressed leaf. Consider the amount of light being absorbed measured as wavelength in nm. [20]

2. The Department of Water Affairs together with land reform is allocating fertile land for crop farming next to Olushandja dam. Given that the water resources are now closer to you, how will you decide on what crops to plant, since during the rainy season, the area you are allocated become flooded? [20]

3. With detailed explanations, calculate the following coordinate conversions? [25]
   3.1 Ai-Ais Resort: -27 55.080 17 29.339
   3.2 Hardap Green Scheme: 24°37'14.9"S, 17°57'37.3"E
   3.3 Husab Mine: 22°36'44"S 15°0'51"E
   3.4 Ndonga Linena Green Scheme: 17° 55' 59.9"S, 19° 46'00.1"E
   3.5 Okaukuejo Resort: 19°11'S 15°56'E

4. The Ministry of Environment, Forestry and Tourism wants to set up a new Electrical game fence on the eastern part of your farm, closer to one of your camps where you have a windpipe and a dam where your livestock get water for drinking. Given the fact that wildlife can escape the fence when it's broken, how do you go about setting up restrictions that prevent such animals from entering your territory? [25]