



**NAMIBIA UNIVERSITY
OF SCIENCE AND TECHNOLOGY**

FACULTY OF ENGINEERING AND THE BUILT ENVIRONMENT

DEPARTMENT OF LAND AND SPATIAL SCIENCES

QUALIFICATIONS: DIPLOMA IN GEOMATICS, BACHELOR OF GEOMATICS, BACHELOR OF GEOINFORMATION TECHNOLOGY	
QUALIFICATION CODES: 06DGEO, 07BGEO, 07BGEI	LEVEL: 5
COURSE CODE: RES511S	COURSE NAME: REMOTE SENSING 1
SESSION: JULY 2024	PAPER: THEORY
DURATION: 3 HOURS	MARKS: 100

SECOND OPPORTUNITY/SUPPLEMENTARY EXAMINATION QUESTION PAPER	
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MODERATOR:	Ms Celeste Espach

INSTRUCTIONS
<ol style="list-style-type: none">1. Write your student number on each answer sheet used.2. Answer ALL the questions.3. Read each question carefully before attempting to answer.4. Write clearly and neatly.

PERMISSIBLE MATERIALS
<ol style="list-style-type: none">1. Non-Programmable Calculator.2. Pen.3. Pencil.4. Eraser and ruler.

This paper consists of three (3) pages (including this cover page).

Question 1

Answer the multiple-choice questions listed below. Please select the ONE most relevant response to the following questions. Indicate the correct answer on the answer sheet.

- 1.1. The principle that is utilised in obtaining Multispectral Images. (2)
- A. Rainbow Principle
 - B. Spectral Band
 - C. Dispersion of Light
 - D. Spectral Band
- 1.2. When was the term Remote Sensing used for the first time? (2)
- A. Early 1980s
 - B. Early 1950s
 - C. Early 1970s
 - D. Early 1960s
- 1.3. In an EM field, which field is placed horizontally? (2)
- A. Gamma rays
 - B. Sonar field
 - C. Magnetic field
 - D. Electric field
- 1.4. What is the mode of collection of images by scanners called? (2)
- A. Satellite images
 - B. Electromagnetic images
 - C. Bit-by-bit
 - D. Sensing

- 1.5. There is an artificially generated colour image in which blue, green and red colours are assigned to the wavelength regions to which they do not belong in nature. It is called. (2)
- A. Sensor
 - B. Electro Magnetic Spectrum
 - C. False Colour Composite
 - D. Spectral Band

[10]

Question 2

Which of the following statements about Remote sensing is true or false? Indicate True or False on the answer sheet. If the answer is false provide the correct answer.

- 2.1. Pixels with weak spectral responses receive high digital numbers (DN). (2)
- 2.2. Minimum Mapping Unit (MMU) refers to the smallest area or unit that can be accurately mapped in a particular mapping project or context. (2)
- 2.3. EM radiation travelling through the atmosphere is subjected to absorption and scattering. (2)
- 2.4. Multispectral imaging captures images in hundreds or even thousands of narrow contiguous spectral bands (2)
- 2.5. Random or spike noise is very easy to identify and correct. (2)

[10]

Question 3

3.1. Figure 1 depicts the components of remote sensing. Using the image below answer the following questions based on it.

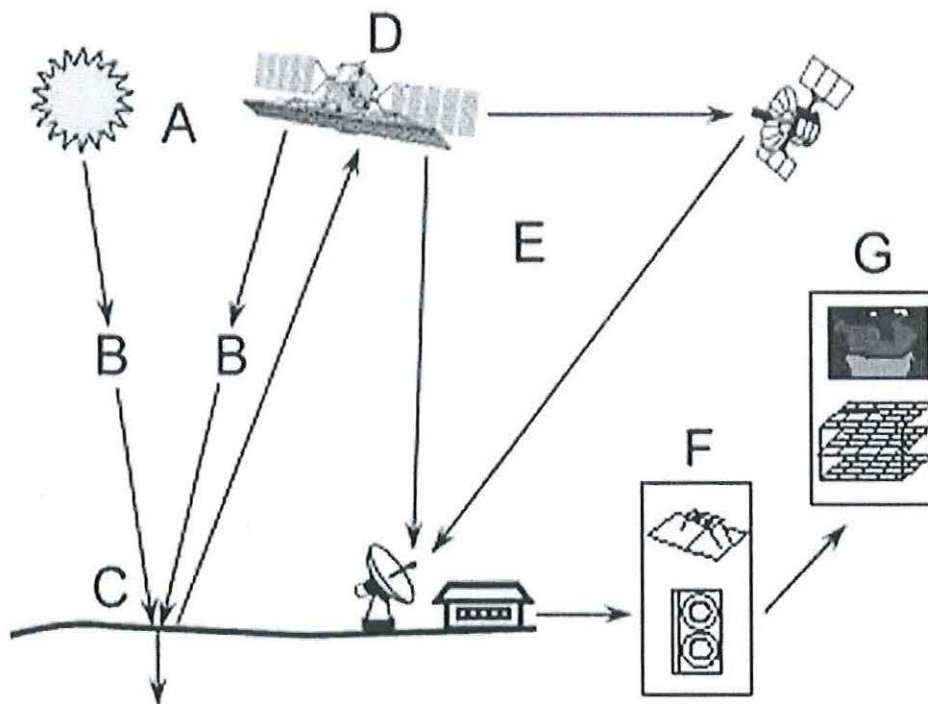


Figure 1

- a) Provide the correct labels, in your own words, for A-G in Figure 1 for the remote sensing process. (7)

- b) For each of the labelled points provide in one or two sentences a brief explanation about how each of these points contributes to the remote sensing process. (14)

- 3.2. What is the electromagnetic spectrum? (6)

- 3.3. The remote sensing process involves several steps. Briefly discuss data pre-processing and image analysis. (6)

3.4. There are several advantages and disadvantages of Remote sensing. Discuss the advantages of versatility and the disadvantages of limited spatial resolution, respectively. (4)

3.5. Provide three common phenomena studied at the surface of the sea. (3)

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Question 4

4.1. Discuss the characteristics of Mie scattering. (5)

4.2. Identify and briefly discuss the different types of reflections shown in Figure 2. (4)

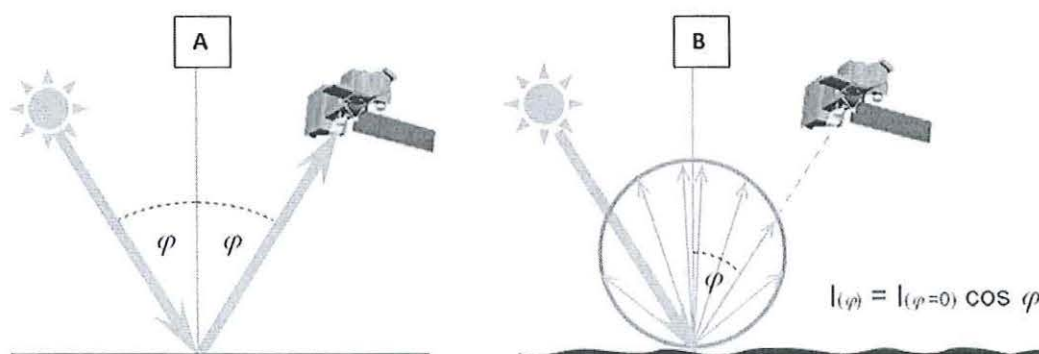


Figure 2

4.3. Explain what active sensors are. Provide two examples of an active sensor. (4)

4.4. Identify and briefly discuss the working principle of this scanning system shown in Figure 3. (7)

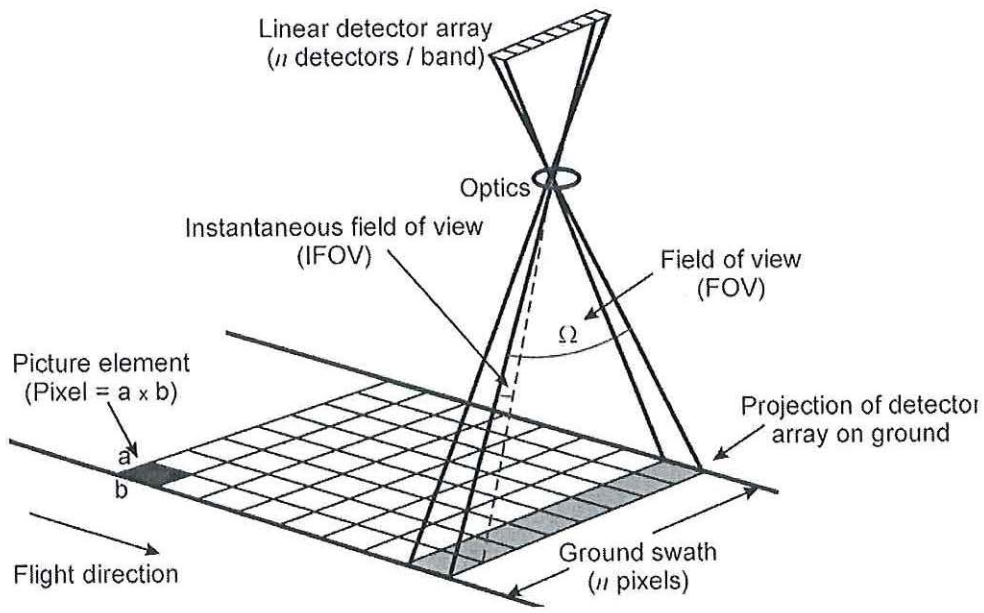


Figure 3

4.5. What is the relationship between pixel size and spatial resolution? (5)

4.6. Assume an aerial photo with a scale of 1: 18,000 needs to be scanned in such a way that the ground resolution of the pixel will be equal to 70 cm. What would be the scanning resolution in dots per inch (dpi)? (*nm rounded to two decimal places*). (15)

[40]

