



EN22201 GIS and Remote sensing (Compulsory)

Paper info.	Theory - Structured and Essay Total number of Questions: <u>4</u> Number of Pages: <u>④</u>	INSTRUCTIONS Answer THREE Questions only. Part A: Answer All questions Part B: Answer ONLY two questions Only non-programmable calculators are permitted. Mobile phones are NOT permitted.
Duration	1 ½ Hours	Date: July 7, 2026
Index No.		

Part A: Structured Type - Answer ALL Questions

1. (a).
(i). Identify the five major components of a typical GIS platform and give one example corresponding to each component. **(10 Marks)**

Component name	Example
1.	
2.	
3.	
4.	
5.	

- (ii). Differentiate between the Geoid and Ellipsoid models of the Earth. **(10 Marks)**

.....

.....

.....

.....

.....

.....

.....

- (iii). Define a Coordinate Reference System (CRS). **(5 Marks)**

.....

.....

.....

.....

.....

(iv). Compare Geographic Coordinate Systems and Projected Coordinate Systems.

(10 Marks)

Component name	Characteristics	Example
Geographic Coordinate Systems		
Projected Coordinate Systems		

(v). List three types of different methods of projections used in GIS.

(3 Marks)

- 1.....
- 2.....
- 3.....

(vi). Briefly describe the three types of re-classifications using examples.

(12 Marks)

.....

.....

.....

.....

.....

.....

.....

.....

(b).

(i). Draw a neat labeled diagram showing the four major components of the remote sensing process. (10 Marks)

(ii). State the function of each component in the remote sensing process. **(4 Marks)**

- 1)
- 2)
- 3)
- 4)

(iii). Differentiate between spatial resolution and spectral resolution in remote sensing. **(10 Marks)**

.....

.....

.....

.....

.....

.....

.....

(iv). Fill in the following table for the raster data formats used in digital image processing **(6 Marks)**

	Rater Data Format	Description
1	BSQ	
2	BIL	
3	BIP	

(v). Compare Natural Color Composite and False Color Composite using suitable examples. **(10 Marks)**

.....

.....

.....

.....

.....

.....

.....

(vi). Explain how the human visual system functions as a remote sensing system. **(10 Marks)**

.....

.....

.....

.....

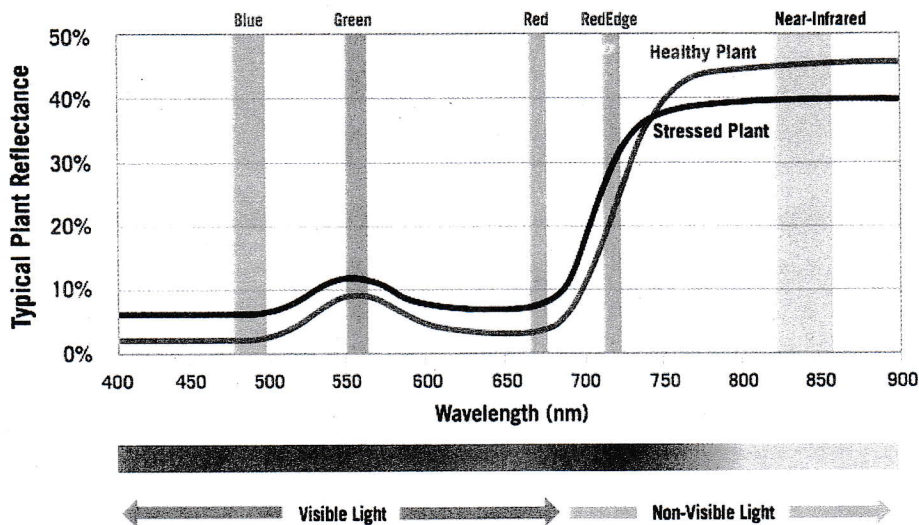
.....

Part B – Essay Type - Answer ONLY TWO questions

1.
 - (a). Describe the **four types of geographic feature abstractions** used in GIS, and explain the dimensionality and applications of each. **(20 Marks)**
 - (b). Compare the vector and raster data models in GIS. Discuss their characteristics, advantages, limitations, and suitable applications, using appropriate illustrations. **(20 Marks)**
 - (c). Describe the **three main categories of GIS operations**. Explain how each category contributes to solving real-world spatial problems, using one suitable example for each. **(30 Marks)**
 - (d). A GIS analyst is conducting a land suitability assessment. Explain how any **three vector overlay operations** can be used to perform the analysis. Support your answer with suitable illustrations. **(30 Marks)**

2.
 - (a). List **four** factors that affect successful image interpretation giving suitable examples. **(10 Marks)**
 - (b). Briefly explain the following types of image preprocessing using suitable illustrations. **(30 Marks)**
 - (i). Radiometric correction
 - (ii). Geometric correction
 - (iii). Atmospheric correction
 - (c). Compare supervised and unsupervised image classification techniques in remote sensing. Explain the principles, major steps, advantages, limitations, and applications of each method. **(20 Marks)**
 - (d). Describe the **four** major elements of visual image interpretation and explain how they can be applied to identify different features in a satellite image. Use suitable examples and diagrams in your answer. **(40 Marks)**

3.
 - (a). Illustrate passive remote sensing and active remote sensing with suitable diagrams and examples. Explain the working principle of each system. **(20 Marks)**
 - (b). Using the provided spectral reflectance curve, compare the spectral characteristics of healthy and stressed vegetation and discuss their applications in vegetation health assessment using remote sensing. **(40 Marks)**



- (c). A researcher intends to monitor changes in vegetation cover in the Matara District from 2015 to 2025 using Landsat satellite imagery. Describe the methodology you would follow, including data acquisition, image preprocessing, NDVI generation, vegetation change detection, and interpretation of the results. **(40 Marks)**