

Exam	Model set		
Level	BE	Full Marks	60
Programme	BGE	Pass Marks	24
Year/Part	III/II	Time	3 hrs.

Model Set

Subject: *Advanced GIS and Remote Sensing (ENGE 351)*

Candidates are required to give their answers in their own words as far as practicable.

*Attempt **All** questions.*

The figure in the margin indicates Full Marks. Assume Suitable data if necessary.

- During a flood, field teams need to record flooded locations, identify nearby shelters, and guide affected people to safe areas. Explain how Mobile GIS and LBS could be integrated to support these activities in real time. [Chapter 1+8]
[6]
- What is spatial interpolation? Explain why interpolation is required when measurements are available only at discrete locations. [Chapter 2]
[6]
- Explain fuzzy membership functions. How does fuzzy modeling differ from Boolean classification? [Chapter 3]
[4]
- A decision-maker constructs the following 3×3 pairwise comparison matrix evaluating three criteria ($C_1 = \text{Slope}$, $C_2 = \text{LULC}$, $C_3 = \text{Distance to River}$): [6]

$$A = \begin{bmatrix} 1 & 3 & 5 \\ 1/3 & 1 & 3 \\ 1/5 & 1/3 & 1 \end{bmatrix}$$
 - Calculate the normalized column matrix, determine the priority weight vector (w), and compute $\lambda_{\max}$ to check whether the matrix meets Saaty's consistency requirement. [Chapter 3]
- What is network topology? Explain how an OD cost matrix can be used to construct an accessibility index for departmental stores. [Chapter 4] [2+6]
- Distinguish between Panchromatic (PAN), Multispectral (MS), and Hyperspectral (HS) imaging systems. [Chapter 5] [6]
- What is Multi-Resolution Analysis (MRA). Explain its importance in feature extraction. [Chapter 5] [6]
- What is a "mixed pixel," and what are the two primary physical reasons it occurs in hyperspectral remote sensing images? [Chapter 6] [6]
- Explain the physical and operational advantages of Object-Based Image Analysis (OBIA) over traditional pixel-based classification. [Chapter 7] [6]
- Explain how the environmental CA models simulate proximity-driven wildfire spread? [Chapter 7+8] [6]