

(2½ Hours)

[Total Marks: 75]

- N. B.: (1) **All** questions are **compulsory**.
 (2) Make **suitable assumptions** wherever necessary and **state the assumptions** made.
 (3) Answers to the **same question** must be **written together**.
 (4) Numbers to the **right** indicate **marks**.
 (5) Draw **neat labeled diagrams** wherever **necessary**.
 (6) Use of **Non-programmable** calculators is **allowed**.

1. Attempt any three of the following:

15

- Write a short note on GIScience, GISystem and GIS application.
- What is a Spatial Data and Spatial Analysis? Explain using suitable example.
- Define Model. Explain how models help in representing real world in GIS.
- Represent the given three valued raster using quad tree.

F- Forest Land

I-Industrial Area

R- Residential Area

I	I	I	I	R	R	I	F
I	I	I	I	R	R	F	I
F	F	I	I	R	R	R	R
F	F	F	F	R	R	R	R
F	F	F	F	F	F	I	I
F	F	F	F	F	F	F	F
F	F	F	F	R	R	R	R
F	F	F	F	R	R	R	R

- Explain the mathematical properties of geometric space used in spatial data using suitable diagram.
- Define spatiotemporal data model. Explain the concept of representing time in GIS.

2. Attempt any three of the following:

15

- Define GIS. Explain its range of capabilities to handle georeferenced data.
- Explain the GIS Architecture and functionality using suitable diagram.
- Differentiate between Vector and Raster data representation.
- What are the reasons for using DBMS in GIS? Explain any five
- Write a short note on the Relational Data Model
- Explain the process of linking GIS and DBMS.

3. Attempt any three of the following:

15

- Explain the reference surface for mapping the Earth's surface.
- Explain the 2D geographic coordinate system.
- How Map projections are classified? Explain.
- Explain the working of GPS.
- Write a short note on vectorization.
- What is Interpolation? Explain interpolation of continuous Data.

[Contd...]

4. Attempt any three of the following:**15**

- What are Neighborhood functions in GIS? Explain any four.
- Write a short note on vector overlay operation.
- Explain the two main techniques of determining Automatic classification.
- Perform the raster overlay operation to project Ground Water Level Raster in 2025
 $R2 = \text{con}(R1 > 5, R1 - 5, 0)$

R1 – Ground Water Level Raster in 2023

7	8	5	4	3	3
6	4	12	5	4	4
7	10	12	8	7	4
4	8	9	8	7	4
1	1	0	3	0	0
1	0	0	7	0	0

- Write a short note on Network Analysis.
- How Error Propagates in GIS? Explain using suitable diagram.

5. Attempt any three of the following:**15**

- Explain using suitable diagram the Visualization strategy.
- Define the following terms:
 - Symbology
 - Cartography
 - Map Legend
 - Pixel
 - Voxel
- Explain the statement “How do I say what to whom, and is it effective?” with reference to map in GIS.
- List and explain Bertin’s six categories of Visual Variables.
- How to map time series? Explain using suitable example.
- Write a short note on map dissemination.