Time: 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

a. How do professionals from different fields use GIS for working with positional data?

b. Write short notes on El Niño event.

c. Explain the concepts of models and modelling?

d. Define geographic objects and explain the four parameters that characterize them.

e. Explain the mathematical properties of geometric space used in spatial data using suitable diagram.

f. Explain the concept of the temporal dimension with a suitable example.

2. **Attempt _any three_ of the following:**   15

a. Software technology has developed somewhat slower and often cannot fully utilize the possibilities offered by the exponentially growing hardware capabilities. Justify.

b. List the functional Components of GIS. Explain any two of them in detail.

c. Differentiate between vector data and raster data.

d. Explain the various reasons for using DBMS in GIS.

e. Write the different techniques and methods involved in spatial data capture and preparation.

f. Write short note on Spatial database functionality.

3. **Attempt _any three_ of the following:**   15

a. What are the different classifications of Map Projections? Explain any two.

b. Compare 2D Cartesian coordinate system and 2D Polar coordinate system.

c. Explain Coordinate transformation and Datum transformation.

d. What clean-up operations are performed to ensure the quality of vector data? Explain.

e. What is trend surface fitting? Explain.

f. Explain the following terms: i) Positional Accuracy, ii) Attribute Accuracy,
iii) Temporal Accuracy, iv) Lineage, v) Completeness

4. **Attempt _any three_ of the following:** 15

a. List the four classifications of analytical functions of GIS. Explain anyone.

b. Explain vector overlay operations using suitable diagram.

c. Perform the Raster Overlay operation to find C= CON((A='F') AND (B=7), 9,0)

A

F	F	F		
F	F			
	F	F		F
		F	F	F
			F	F

| B

7	7	7	7	4
7	7	7	7	4
4	4	4	4	4
6	6	4	4	4
6	6	6	6	6

d. Explain the two main techniques of determining Automatic Classification?

e. Write a short note on network analysis?

f. Explain the five characteristics of GIS based application models?

5. **Attempt _any three_ of the following:** 15

a. Explain the visualization process in GIS.

b. What do you mean by "How do I Say What to Whom and is it effective?" in GIS? Explain.

c. List and explain Bertin's six categories of Visual Variables.

d. How to map qualitative data? Explain.

e. How to distinguish between three temporal cartographic techniques? Explain.

f. Write a short note on Map Dissemination.

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