(3 Hours) **[Total Marks: 100]**

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**.

1. Attempt *any two* of the following: **10**

a. What is vector data representation? Explain it with suitable example.
b. Explain Dot map and Choropleth map in detail.
c. Explain the applications of GIS related to Natural Resource Management.
d. State the topology rules associated with Geospatial Data.

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

a. What is Geographically referenced data? Explain.
b. Write a short note on Map projection.
c. What is rasterization? Write steps of rasterization.
d. Explain Plane coordinate system in spatial data.
e. What is projected and planer coordinate system in spatial data.
f. Explain fundamental observations in GIS.

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

a. Explain the concept of metadata in detail.
b. What are the various guidelines for digitization in GIS?
c. Explain the role of RMS error and its interpretation
d. What is visual hierarchy in map design? How is the hierarchy related to the map purpose?
e. What are the common errors in GIS databases? Explain the process of data cleaning.
f. Write a short note on Typography and its type variations.

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

a. What are the functions of DBMS supporting GIS applications?
b. How map comparison can be used for data exploration?
c. Write a short note on data exploration.
d. Explain geographic visualization in detail.
e. Explain various types of relationships in database tables.
f. Write a short note on map design.

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

a Define following :
(i) Nugget (ii) Range (iii)Sill (iv) Partial Sill (v) Anisotrophy
b Explain attribute data query in detail.
c Explain the following terms:
1. Data Classification
2.Spatial Aggregation
d Explain the following map manipulation operations with example :
(i) Dissolve (ii) Clip
e What are the different types of graphs used for data exploration?
f Write a short note on spatial data query.

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

a. Explain buffering and how it is helpful in vector analysis.
b. What is overlay? How are slivers related with overlays?
c. Write a short note on distance measure operations in vector data analysis.
d. Explain neighborhood operation in raster analysis with an example.
e. Explain physical distance and cost distance in detail.
f. Write a short note on zonal operations in Raster data analysis.

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

a. Write a short note on density estimation.
b. Explain kriging methods in spatial interpolation.
c. Explain quad tree with suitable example.
d. Define the local methods. Explain the types of local methods in spatial interpolation
e. Explain trend surface model with suitable example.
f. Explain global methods in spatial interpolation.

****