(Time: $2\frac{1}{2}$ hours) **[Marks: 75]**

Please check whether you have got the right question paper.

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** calculator is **allowed**.

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

a. List and explain GIS operations related to data analysis.
b. Write a short note on rasterization.
c. Explain the universe transverse Mercator (UTM) grid system. Give suitable example.
d. Explain the following terms of object based data model and give suitable example.
i. Aggregation ii. Association

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

a. What is Root Mean Square error in geometric transformation. Explain the role of RMS error in Affine transformation.
b. Explain the map-to-map and image-to-map transformation.
c. List the common resampling methods and explain them.
d. Explain the bilinear interpolation resampling method with suitable example.

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

a. Explain different types of attribute table.
b. Explain file and hierarchical database with suitable example.
c. Explain
i. Dot map ii. Choropleth map
d. Explain relational database with suitable example.

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

a. Explain data exploration.
b. Explain spatial data query with suitable example.
c. Explain with suitable example the query by cell value type of raster data query.

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d. What is the output of the following for a statement (slope = 2) AND (Aspect =1)

Aspect

3	2	1	1	1	2	2	2
2	3	3	3	3	3	1	1
1	2	3	3	2	1	1	3
2	2	3	1	1	1	2	2
2	2	2	1	1	1	1	1
3	2	2	1	2	1	2	3
3	2	3	3	3	2	2	3
2	2	2	1	3	1	3	3

Slope

1	2	2	2	1	1	1	2
2	3	1	1	2	2	1	1
1	2	3	3	2	1	1	3
2	2	3	1	1	1	2	2
2	2	2	1	1	3	3	1
3	1	2	1	1	1	2	3
3	1	3	3	1	2	2	3
1	1	1	2	3	2	3	3

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

a. Explain Buffering.

b. List and explain various overlay operations based on feature type.

c. Explain the following map manipulation operations with example.
i. Dissolve ii. Append

d. Explain the reclassification local operation of raster.

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

a. List and explain the types of spatial interpolation.

b. Explain the Density Estimation local method.

c. What is Kriging? Explain.

d. Define following
i. Anisotrophy ii. Range iii. Nugget iv. Partial Sill v. Sill

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

a. Explain the different components of GIS.

b. Write a short note on metadata.

c. Explain normalization with suitable example.

d. Write a short note on feature selection by graphic data query.

e. Find the zonal mean for the input raster(a) using a zonal raster(b)

2	7	1	1
9	8	5	3
2	8	4	6
1	4	5	3

(a)

1	1	1	2
1	1	1	2
3	3	2	2
3	3	3	3

(b)

f. Describe how semivariance can be used to qualify the spatial dependence in a data asset.
