Full Marks – 35   Time – 2 hrs

Answer Question No. 1 and any three from the rest.

1. Write short notes on any two of the following: (4+4=8)

 a) Buffering

 b) Ordinal scale

 c) Feature Geometry of different entities

 d) Universal Transverse Mercator Projection

2.   (5+4=9)

   a) Briefly describe the spectral reflectance of vegetation and soil.

   b) Explain zero-sum kernel with example.

3.   (5+4=9)

   a) Discuss the spatial interpolation technique of image-to-map rectification.

   b) Sample point locations and brightness values at sample point locations are given below. Calculate the weighted brightness value for the point (1.5, 3.7) by i) Nearest Neighbour and ii) Bilinear Interpolation technique.

Sample point location	1,3	2,3	3,3	4,3	1,4	2,4	3,4	4,4
Brightness value	16	20	18	17	14	18	19	20

4.   (9)

   An analyst is interested in classifying two soil types. The following are the training field statistics:

Vegetation Type	Mean Spectral Value	Standard Deviation
Soil Type A	48	10
Soil Type B	42	20
Soil Type C	25	10

   Classify the following image in different classes based on the above statistics following Maximum Likelihood Technique.

21	24	31	42	55
22	27	34	45	53
29	28	36	35	36
33	37	47	51	43

5.   (4+5=9)

   a) Enumerate briefly any one method of supervised classification technique.

   b) Following statistics are obtained for two classes of trees in a forest area.

Class	Band 1 Mean	Band 2 Mean	Band 1 Standard deviation	Band 2 Standard Deviation
Type A	100.75	80.23	5	10
Type B	71.98	63.02	6	15

Using these statistics, classify the following image using parallelepiped classification technique (band 1 and band 2 values are shown as pair within a pixel).

75	62	100
70	85	78
70	80	67
62	75	77
100	120	105
80	75	85
105	73	70
90	78	75

6.   (4+5=9)

a) Discuss briefly about convolution filtering.

b) Consider an image that is composed of 64 rows and 64 columns with the range of brightness values that each pixel can assume limited to nine values. The frequency of brightness values in each range is given in the following table:

Range	0	1	2	3	4	5	6	7	8
Brightness Values	750	990	720	450	346	300	270	180	90

Draw the final histogram after applying non-linear contrast enhancement technique.

7.   (5+4=9)

a) Differentiate between raster data structure and vector data structure.

b) Describe the technique of polygon-on-polygon overlay.