Bengal Engineering and Science University, Shibpur
M.E.(Civil) 1ˢᵗ Semester Examination, December, 2011
Remote Sensing (CE-930)

Full Marks: 70

Time: 3hrs.

Answer Question No. 1 and any four from the rest

1. Write short notes on any two of the following: (10)
   - i)   Image reduction & Image magnification
   - ii) Raster data structure & Vector data structure
   - iii) Nominal scale & Interval scale

2.   (7+4+4=15)

   a) List the different types of non-linear contrast enhancement techniques and explain any one of them.

   b) Differentiate between low pass & high pass filtering.

   c) Calculate the output value of the central pixel if i) Sobel filter and ii) Prewitt filter is applied?

110	120	115
105	100	120
90	95	125

3.   (7+8=15)
   a) Describe the sequential clustering of unsupervised classification technique.
   b) Following statistics are obtained for two types of landuse classes in an area.

Class	Band 1 Mean	Band 2 Mean
Type A	65	70
Type B	55	60

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

35	60	70
50	72	75
40	65	73
55	70	78
50	45	55
53	58	65
75	68	76
80	75	80

4.   (7+8=15)

   a) Discuss the different intensity interpolation techniques of rectification.

   b) The following transformation model was developed while rectifying an IRS-LISS III image.
   $x' = 0.5+1.2x+2.8y$ and $y' = 2.5+0.7x+0.8y$, where x, y are the output coordinates and x', y' are the input values. The relation between the output coordinates and the original coordinates are as given below:

x,y	22,13	22,14	23,13	23,14	23,15	24,12	24,13	24,14	25,11	25,12
Xorig, yorig	62,29	67,30	64,28	65,29	71,30	65,28	68,29	68,32	60,30	65,29

   Calculate the average Root Mean Square error and the expected positional accuracy of the rectified image.

5.   (7+8=15)

a) Explain the concept of supervised classification and discuss the parallelepiped classification technique of supervised classification.

b) The following are the training field spectral statistics of two types of vegetation in an area.

Vegetation Type	Mean Brightness Value	Standard Deviation
Type 1	35	8
Type 2	25	8

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

10	15	20	31	35
13	15	25	30	38
16	17	24	40	35
31	29	33	31	36
40	39	37	32	34

6.   (8+7=15)

a) What is spatial modeling? Discuss with an example.

b) Explain the objectives of buffering and discuss about different types of buffering.