

Bengal Engineering and Science University, Shibpur
B.E. (Civil) 7th Semester Examination, December, 2012
Sub: Introduction to Remote Sensing and GIS (CE - 704)

Full Marks – 35

Time – 2 hrs

Answer question no. 1 and any three from the rest. Figures in the margin indicate full marks

1. Write short notes on any two of the following:

(5)

- (a) Raster Data Model
- (b) Buffering
- (c) Interval scale
- (d) Ordinal Scale

2.

(4 + 6 = 10)

- a) Briefly discuss about high-pass filtering.
- b) Subset of an image is given below.

40	45	100	105	75	65
37	50	92	110	85	90
40	57	85	108	100	80
85	77	76	102	104	70
90	80	84	85	82	84
48	85	80	85	80	82

For the pixels in the first two rows

Apply $\pm 2\sigma$ stretching and determine the new image.

3.

(10)

In a particular classification process using Maximum Likelihood Classifier, two classes are selected and the following statistics are derived.

Crop Type	Mean Spectral Value	Standard Deviation
Paddy	25	12
Wheat	40	10

Classify the following image (If two likelihood values are equal, take any class)

22	25	24	31	37	39
26	24	28	40	20	41
30	25	26	32	37	42
29	35	33	34	45	36
32	33	38	45	48	43

4.

(4 + 6 = 10)

- a) Describe the parallelepiped classification algorithm of supervised classification technique.
- b) An analyst classifies an image in the following classes. One thousand random points are then established and used for classification accuracy assessment.

Class	Forest	Water	Settlement	Agriculture
Forest	69	11	56	15
Water	4	121	14	5
Settlement	6	71	468	6
Agriculture	9	0	0	145

Determine the error and accuracy for each of the classes and overall accuracy.

5.

(4+6=10)

a) Differentiate between image-to-map rectification and image-to-image registration.

b) In a certain geometric transformation, following relationship is obtained between the original image co-ordinates (x', y') and output image coordinates:

$$x' = 0.72 + 1.37x + 2.88y \quad \text{and} \quad y' = 1.26 + 2.74x + 4.95y$$

Estimate the resulting brightness value of the pixel (17, 10) of the output image, using any two methods of intensity interpolation. Following brightness values of some pixels in the original image are available [BV(x, y)]: 23(52, 97), 31(52, 98), 29(53, 97), 37(53, 98).

6.

(5+5=10)

a) Explain feature geometry in GIS and its representation in different types of model.

b) What is spatial modeling? Explain with an example.