

2015

M.Sc.

2nd Semester Examination

REMOTE SENSING AND GIS

PAPER—RSG-201

Full Marks : 40

Time : 2 Hours

The figures in the right-hand margin indicate full marks.

Candidates are required to give their answers in their own words as far as practicable.

Illustrate the answers wherever necessary.

Use Separate answer book for each Group.

Group-A

(DIP – Introduction, Preprocessing and Enhancement)

[Marks : 20]

Answer any *two* questions.

2×10

1. (i) Define spatial, spectral, radiometric, and temporal resolution.
- (ii) What are the different resolutions of IRS-P6 (ResourceSat-1) LISS-III, ETM+.

(Turn Over)

- (iii) Satellite imagery must be rectified and restored in many different ways. Explain line dropout and striping and what you can do about them.
- (iv) Following DN values of different bands of Landsat were observed over a dark project — Explain the phenomenon and name different procedures to rectify the effect :

Band 1	Band 2	Band 3	Band 4
54	35	25	8

2+3+3+2

2. (i) There are many different ways to enhance satellite imagery. Explain linear and histogram equalization contrast stretching.
- (ii) Filters can be used to enhance satellite imagery. When using a low frequency convolution filter what effect does kernel size have on smoothing?
- (iii) Explain median, derivative and Laplacian filters indicating uses and their application areas.

3+2+5

3. (i) Ratio transformations of the remotely sensed data can be applied to provide unique information and enhance spectral-reflectance between surface materials. Discuss significant information content of TM band ratios of TM4/TM3, TM5/TM4 and TM5/TM7.
- (ii) Explain PCA transformation basics with illustrations.
- (iii) Describe main benefits and application of PCA transformation.

3+4+3

4. Write short note on :

$2\frac{1}{2} \times 4$

- (i) Linear contrast stretch.
- (ii) What are NDVI and NDWI with special reference to Landsat TM imagery ?
- (iii) Histogram equalization.
- (iv) Image Fusion.

Group-B

(Information Extraction)

[Marks : 20]

Answer any *two* questions.

2×10

1. (a) What is ground truthing?
- (b) What are the characteristics of a good G.C.P. of an image ?
- (c) Discuss very briefly about the procedure of ground truth collection. 3+4+3
2. (a) Define supervised and unsupervised classification.
- (b) Compare between supervised and unsupervised classification techniques. 5+5
3. (a) What is a mixed pixel? How do mixed pixels affect the interpretation of an image ?
- (b) Discuss any one of the advanced classification techniques. 5+5

4. Given the following confusion error matrix : 10

<i>Class Code</i>	<i>Class Name</i>	<i>Reference Totals</i>	<i>Classified Totals</i>	<i>Number of Correct accuracy</i>
10	Water body	4	4	3
30	Vegetation	13	14	13
40	Seasonal follow land	12	10	10
70	Build up	6	4	3

Estimate the following quantities :

- The overall accuracy of the classified outcome (%).
- The producer's accuracy for the three classes (%).
- The user's accuracy for the three classes (%).