Time: 3hrs   Max Marks: 100

Answer ALL Questions

Part – A (10 x 2 = 20 Marks)

1. What are the different types of satellite data products?
2. Draw a neat sketch of SPOT satellite and write short note on different types of satellite orbits
3. Calculate the Mean, Variance and correlation coefficient of the following sample data.

Sl.no	Pixel	Band1 (Green)	Band2 (Red)
1	(1,1)	130	57
2	(1,2)	165	35

4. What do you understand by the term "Topographic effects". Where is it used?
5. Write short note on "Spatial statistics"

6. What do you mean by image enhancements? Why is it necessary in image processing?
7. Write short note on spectral class, information class, test accuracy and training accuracy.
8. Classify the pixel a which has a brightness value of 40 in band 4 and 40 in band 5 using Minimum distance classifier for the following sample data.

Sl.no.	Class	Bands	Mean	Std.Dev.
1	Residential	Band 4	36.7	4.53
		Band 5	55.7	10.72
2	Commercial	Band 4	54.8	11.16
		Band 5	77.4	7.56

9. Write short note on linear mixing model. Where is it used?
10. Define Artificial Neural Network (ANN). List out different types of ANN

11.i Explain different type of formats using which the satellite images are stored in the media.   2
    ii Explain in detail different initial display alternatives and Scientific visualization methods used to visualize the satellite images.   14

12a.i Distinguish between absolute and relative radiometric corrections.   4

    ii Explain in detail how the absolute radiometric correction of atmospheric attenuation of the satellite image is carried out.   12

(OR)

(PTO)

12b i What do you mean by internal and external errors of remotely sensed data. List out different radiometric and geometric errors of remotely sensed data. 6

ii Explain in detail various steps involved in the geometric rectification of the satellite images 10

13a Explain the following in detail
   i Fourier transform and its uses 8
   ii Contrast manipulation technique for image enhancements 8

(OR)

13b i Explain the Principal Component Analysis(PCA) and scale space transform in detail and list out their uses. 10

ii What are the methods used to assess the condition of a crop? Explain them in detail. How will you predict the yield of a crop? 6

14a i Explain in detail how the satellite image is classified using Maximum Likelihood Classifier 6

ii Estimate the omission error, commission error, overall accuracy and Kappa coefficient for the following sample data 10

Reference data

Sl. no.	Classes	Vegetation	Wasteland	Sand	Water body	Forest
1	Vegetation	70	5	0	13	0
2	Wasteland	3	55	0	0	0
3	Sand	0	0	99	0	0
4	Water body	0	0	4	37	0
5	Forest	0	0	0	0	121

(OR)

14b Describe in detail different unsupervised classifiers used to classify the satellite image. 16

15a. i Describe in detail different methods used to detect and represent the boundary 8
   ii Explain the ADALINE Neural Network in detail and Prove that 8

$$w^* = R^{-1} P$$

Where
w^* = Weight vector
R = Correlation matrix
P = Vector

(OR)

15b. i Define Expert system. Explain in detail how knowledge based system is used to classify the satellite image 8

ii What is Fuzzy logic? Differentiate between Fuzzy set and crisp set. Explain in detail the role of Fuzzy logic in satellite image processing. 8