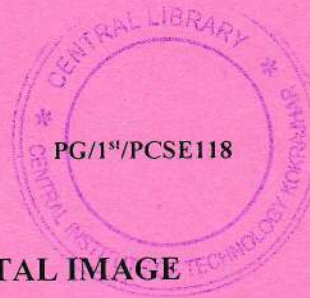


Total number of printed pages:3



2021

REMOTE SENSING AND DIGITAL IMAGE PROCESSING

Full Marks: 100

Time: Three hours

The figures in the margin indicate full marks for the questions.

Answer any five questions.

1. a) What is pixel? How to represent the digital images? 2+2=4
- b) How to overcome the disadvantages of visual image representation? 3
- c) What is the use of FCC in Multi Spectral data? 3
- d) What is a Map? What types of information is provided using the Maps? 2+4=6
- e) What is the difference between Raster and Vector data? 4

2. a) What is image registration? Write down its model equation? 3+3=6
- b) What is histogram equalization? Write down the two different conditions. 3+3=6
- c) Perform the histogram equalization transformation function and calculate the PDF $p_r(r_k)$ for each s_k . 8
Suppose that a 3-bit image ($L=8$) of size 4×4 pixels ($MN = 16$) has the intensity distribution shown in

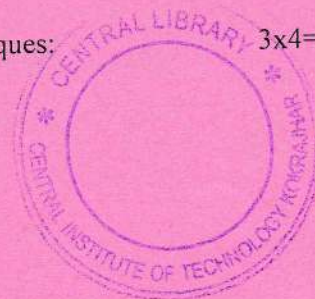
following table.

r_k (k^{th} intensity value)	0	1	2	3	4	5	6	7
n_k (no. of pixels in an image with intensity r_k)	4	3	3	1	2	4	2	2

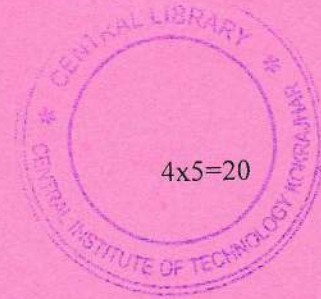
3. a) Calculate the euclidean distance and city block distance for the pixels a and b with coordinates (12,8), (20,30) and shown in the matrix form. 4
- b) Describe the different types of adjacencies between two pixels 'p' & 'q'. 5
- c) Write down the path and boundary relationship among the pixels 5
- d) Explain image sampling and quantization with a diagram. 6

4. a) Explain the Unsupervised and Supervised classification with flowcharts. 3+3=6
- b) Explain the problem of mixed pixel with an example. 4
- c) How to resolve the issue of mixed pixel? 2
- d) Explain the LMM and FCM soft classification methods in details? 8

5. a) What is the need of image fusion? What are the uses of image fusion? 3+5=8
- b) Explain the following fusion techniques: 3x4=12
 - i) Band substitution
 - ii) Multiplicative technique



iii) Brovey transform



6. Write short notes on any four of the following

- a) ASD SpectroRadiometer
- b) Back Propagation Neural Network
- c) SVM
- d) Fuzzy Error Matrix
- e) SRTM and LiDAR

- 7. a) What is DEM? What are the uses of DEM? 2+2=4
- b) What are the types of DEM? 4
- c) How to generate the DEM data? 6
- d) Differentiate the DEM, DTM and DSM. 6