Total number of printed pages:3

PG/1st/PCSE118

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. Suppose that a 3-bit image (L=8) of size 4 × 4 pixels (MN = 16) has the intensity distribution shown in 8

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 4x5=20
   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