CBCS SCHEME

USN | | | | | | | | | |

15EC72

Seventh Semester B.E. Degree Examination, July/August 2022
Digital Image Processing

Time: 3 hrs. Max. Marks: 80

Note: Answer any FIVE full questions, choosing ONE full question from each module.

Module-1

1 a. With a neat block diagram, explain the fundamental steps involved in digital image processing. **(10 Marks)**

b. Let p and q be the pixels at coordinates (10, 12) and (15, 20) respectively. Find which distance measure gives the minimum distance between the pixels. **(06 Marks)**

OR

2 a. Explain in brief how an image can be sensed and acquired using multiple arrays. **(10 Marks)**

b. Consider the two image subsets S_1 and S_2, shown in Fig.Q2(b), for V = {1}, determine whether two subsets are (i) 4-adjacent (ii) 8-adjacent (iii) m-adjacent.

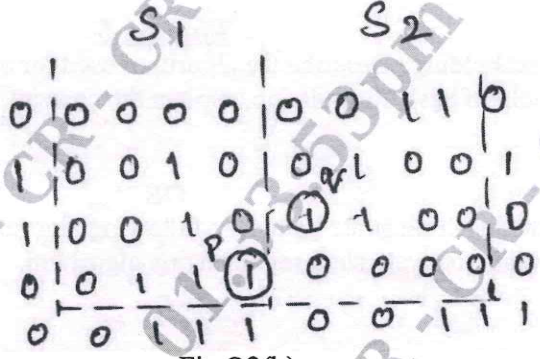

Fig.Q2(b) **(06 Marks)**

Module-2

3 a. Explain the basic gray level transformation functions with necessary graphs. **(08 Marks)**

b. The histogram of 3-bit image of 64 × 64 pixels is shown in Fig.Q3(b). Construct the histogram of original image and equalized histogram.

r_k	0	1	2	3	4	5	6	7
n_k	790	1023	850	656	329	245	122	81

Fig.Q3(b) **(08 Marks)**

OR

4 a. Using the second derivative develop a Laplacian mask for image sharpening. **(08 Marks)**

b. Explain the homomorphic filtering approach for image enhancement. **(08 Marks)**

Module-3

5 a. With a neat diagram, explain a model of the image degradation/restoration process. **(04 Marks)**

b. Explain common noise probability density functions in image processing. **(04 Marks)**

c. Explain the ordered statistic filters used for image restoration. **(08 Marks)**

OR

6 a. Explain the following methods to estimate the degradation function used in image restoration:
   (i) Estimation by image observation
   (ii) Estimation by experiment **(08 Marks)**

b. Explain the inverse filtering and Weiner filtering image restoration. **(08 Marks)**

Module-4

7 a. Explain the procedure in converting colors from RGB to HSI. **(08 Marks)**

b. Name the different techniques of wavelet coding and explain in brief any one techniques of wavelet coding of an image. **(08 Marks)**

OR

8 a. Explain the different methods of pseudocolor image processing. **(08 Marks)**

b. Explain the following basic morphological algorithms:
   (i) Convex hull
   (ii) Thinning
   (iii) Pruning
   (iv) Skeleton **(08 Marks)**

Module-5

9 a. What is thresholding? Describe the algorithm used for basic global thresholding. **(08 Marks)**

b. With the help of basic formulation, explain the concept of region splitting and merging. **(08 Marks)**

OR

10 a. With a neat sketch illustrate boundary-following algorithm and explain. **(08 Marks)**

b. Briefly explain the watershed segmentation algorithm. **(08 Marks)**

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