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15MT754

**Seventh Semester B.E. Degree Examination, June/July 2023**
## 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. Explain the fundamental steps in digital image processing.                    (08 Marks)
   b. Describe the components of an image processing system.                        (08 Marks)

**OR**

2  a. With neat diagram explain the different elements in human eye.                 (08 Marks)
   b. Illustrate the brightness adaption and discrimination with examples.          (08 Marks)

### Module-2

3  a. Explain the image acquisition using single sensor and sensor arrays.          (08 Marks)
   b. Explain the process of image sampling and quantization.                       (08 Marks)

**OR**

4  a. Explain the following with respect to pixels:
      i) Neighbors of pixels     ii) Adjacency      iii) Regions      iv) Boundaries.  (08 Marks)
   b. Let V = {0, 1} and compute the shortest 4, 8 and m path between p and q.

```
           3  1  2  1  (a)
           2  2  0  2
           1  2  1  1
      (p)  1  0  1  2
```
                                                                                    (08 Marks)

### Module-3

5  a. Explain the two dimensional discrete Fourier transform and its properties.    (08 Marks)
   b. Explain the discrete cosine transform and its properties.                     (08 Marks)

**OR**

6  a. Generate Haar transform for N = 8.                                            (08 Marks)
   b. Explain Hadamard transform and its properties.                                (08 Marks)

### Module-4

7  a. Explain any two image enhancement techniques in spatial domain.               (08 Marks)
   b. Explain the process of image histogram equalization.                          (08 Marks)

**OR**

8  a. Explain the smoothing and sharpening frequency domain filters.                (08 Marks)
   b. Explain homomorphic filtering in frequency domain.                            (08 Marks)

### Module-5

9  a. Illustrate the different noise models with probability density function.      (08 Marks)
   b. Explain Weiner filtering.                                                      (08 Marks)

**OR**

10 a. Explain the HSI color model based on triangle and circular color planes.      (08 Marks)
   b. Explain the pseudo color image processing.                                    (08 Marks)

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