

BT-7/D-24

**47305**

## **DIGITAL IMAGE PROCESSING**

Paper-ECP-17A

Time Allowed : 3 Hours]

[Maximum Marks : 75

**Note** : Attempt **five** questions in all, selecting at least **one** question from each Unit. All questions carry equal marks.

### **UNIT-I**

1. Explain the following in detail:  $2 \times 7\frac{1}{2} = 15$ 
  - (a) Sampling & Quantization.
  - (b) Relationship between Pixels.
2. Explain the color models available for Image processing. Define Primary and Secondary Colors. Describe with an example how to convert one color model to another? 15

### **UNIT-II**

3. Find out the Equalized Histogram of a 3-bit image ( $k = 0, 1, \dots, 7$ ) of size  $64 \times 64$  pixels for the intensity distribution shown on next page: 15

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

4. What is Image enhancement ? Explain frequency domain image smoothing and sharpening operations in detail. 15

### UNIT-III

5. Consider the simple  $4 \times 8$ , 8-bit image: 15

21 21 21 95 169 243 243 243

21 21 21 95 169 243 243 243

21 21 21 95 169 243 243 243

21 21 21 95 169 243 243 243

- Compute the entropy of the image.
- Compress the image using Huffman coding.
- Compute the compression achieved and the effectiveness of the Huffman coding.

6. Explain the Morphological operations of digital images in detail. 15

#### UNIT-IV

7. Describe the Video formation and Video Frame classification in detail. 15

8. Explain the following in detail:

- (a) Motion estimation. 7
- (b) Patterns and Pattern classes. 8

