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BT–7/D-23 **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 : 3×5=15
   (a) Sampling & quantization.
   (b) Relationship between pixels.
   (c) Color model.

2. Draw the block diagram of fundamental steps in digital image processing. Explain each block in detail. 15

UNIT–II

3. Given the following kernel and image : 15

$$w = \begin{bmatrix} 1 & 2 & 1 \\ 2 & 4 & 2 \\ 1 & 2 & 1 \end{bmatrix} \quad \text{and} \quad f = \begin{bmatrix} 1 & 1 & 1 & 1 & 1 \\ 1 & 1 & 1 & 1 & 1 \\ 1 & 1 & 1 & 1 & 1 \\ 1 & 1 & 1 & 1 & 1 \\ 1 & 1 & 1 & 1 & 1 \end{bmatrix}$$

Compute the convolution of the two.

4. What is image enhancement? Explain atleast three techniques each in spatial and frequency domain for image smoothing and sharpening. 15

UNIT–III

5. What do you understand by error free image compression? Describe image compression standards in detail. 15

6. State the difference between edge detection and boundary detection. Explain some edge detection techniques in detail. 15

UNIT–IV

7. Explain 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