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15EC72

## Seventh Semester B.E. Degree Examination, Feb./Mar. 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. What is digital image processing? With the help of neat block diagram. Explain the components of a general purpose image processing system. (10 Marks)
- b. Explain image formation in an eye. (06 Marks)

OR

- 2 a. Explain the process of image sampling and Quantization in the digital image formation. (08 Marks)
- b. Explain spatial resolution and gray level resolution. (04 Marks)
- c. Let p and q be two pixels at co-ordinates (10, 15) and (15, 25) respectively. Find out which distance measure give the minimum distance between pixels. (04 Marks)

### Module-2

- 3 a. Explain the smoothing of images in Frequency domain using:  
i) Ideal lowpass filter  
ii) Butterworth lowpass filter. (08 Marks)
- b. Explain Log transformation and Gamma transformation functions for image enhancement in the spatial domain. (08 Marks)

OR

- 4 a. Define 2-D forward and inverse discrete Fourier transform and mention its properties. (08 Marks)
- b. With the help of a block diagram, explain homomorphic filtering approach in the image enhancement. (08 Marks)

### Module-3

- 5 a. Explain any four noise probability density functions. (08 Marks)
- b. What is order statistic filters? Explain any three of them. (08 Marks)

OR

- 6 a. What are the three methods of estimating the degradation function? Explain any two of them. (08 Marks)
- b. Explain Weiner filtering and constrained least squares filtering in image restoration system. (08 Marks)

Important Note : 1. On completing your answers, compulsorily draw diagonal cross lines on the remaining blank pages.  
2. Any revealing of identification, appeal to evaluator and/or equations written eg.  $42+8=50$ , will be treated as malpractice.

**Module-4**

- 7 a. With the help of neat diagram, explain RGB color model, and write the equations to convert RGB to CMY. (08 Marks)
- b. What do you mean by Pseudo color image processing? And also explain Intensity to color transformations. (08 Marks)

OR

- 8 a. Explain the following :  
i) Erosin  
ii) Dialation  
iii) Opening and closing  
iv) Hit-or miss Transform. (08 Marks)
- b. Explain boundary extraction algorithm using morphological operator. (08 Marks)

**Module-5**

- 9 a. What is image segmentation? Explain First-order derivatives used in edge detection. (08 Marks)
- b. Explain the region based approach of segmentation. (08 Marks)

OR

- 10 a. Briefly explain any two types of boundary descriptors. (08 Marks)
- b. Briefly explain any two types of regional descriptors. (08 Marks)

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