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10EC763

Seventh Semester B.E. Degree Examination, June/July 2018
Image Processing

Time: 3 hrs.

Max. Marks:100

**Note: Answer FIVE full questions, selecting
at least TWO questions from each part.**

PART – A

- 1 a. With neat block diagram, explain the components of general purpose Image processing system. (12 Marks)
- b. Explain with neat diagram, the structure of human eye. (08 Marks)
- 2 a. Explain image acquisition using sensor arrays. (08 Marks)
- b. Explain with neat diagrams the basic concepts of image sampling and quantization. (12 Marks)
- 3 a. Starting from two dimensional discrete Fourier transform expressions deduce two dimensional unitary discrete Fourier transforms. (06 Marks)
- b. List any five properties of unitary discrete Fourier transforms. (05 Marks)
- c. If $A = \frac{1}{\sqrt{2}} \begin{pmatrix} 1 & 1 \\ 1 & -1 \end{pmatrix}$ is unitary matrix, $U = \begin{pmatrix} 1 & 2 \\ 3 & 4 \end{pmatrix}$ an image, determine the unitary transformed Image and find the basis image of 'A'. (09 Marks)
- 4 a. Define discrete sine transform? List any five properties of it. (08 Marks)
- b. Define Hadamard transform. Generate 4×4 hadamard matrix. (08 Marks)
- c. List any four properties of hadamard transforms. (04 Marks)

PART – B

- 5 a. Explain contrast stretching and bit plane slicing piecewise linear transformation techniques. (10 Marks)
- b. Explain histogram equalization technique. (10 Marks)
- 6 a. List the frequency domain filtering steps with relevant mathematical expressions and Block diagram. (10 Marks)
- b. Explain any two filtering techniques used in image smoothing. (10 Marks)
- 7 a. What is image Restoration? Explain with neat block diagram image degradation restoration process. (06 Marks)
- b. Explain the following with neat plots and mathematical models : i) Uniform noise ii) Impulse noise. (06 Marks)
- c. Explain with relevant mathematical models Band reject filters and Band pass filters used in periodic noise reduction. (08 Marks)
- 8 a. Explain RGB colour model (08 Marks)
- b. Explain intensity slicing with reference to pseudo colour image processing. (07 Marks)
- c. Explain the terms with reference to colour image processing hue, saturation and intensity. (05 Marks)

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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.