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10TE754

Seventh Semester B.E. Degree Examination, June/July 2016
Image Processing

Time: 3 hrs. Max. Marks:100

Note: ***Answer any FIVE full questions, selecting atleast TWO questions from each part.***

PART – A

1 a. With neat block diagram, explain the fundamental steps in Digital Image Processing. **(12 Marks)**

b. With neat block diagram, explain the image formation in an eye. **(08 Marks)**

2 a. With neat diagrams, explain how a continuous Image can be converted into a digital image. **(12 Marks)**

b. Explain Image acquisition using single sensor. **(08 Marks)**

3 a. Starting from two dimensional discrete Fourier transform expression, 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 and $U = \begin{pmatrix} 1 & 2 \\ 3 & 4 \end{pmatrix}$ is an image, find Unitary transformed Image and basis imager of unitary matrix 'A'. **(09 Marks)**

4 a. Define Discrete cosine transform. List any five properties of discrete cosine transform. **(08 Marks)**

b. Define Hadamard transform. Generate 4 × 4 hadamard matrix. Indicate sequency. **(08 Marks)**

c. List any four properties of Hadamard transform. **(04 Marks)**

PART – B

5 a. Explain how image negatives and log transformation techniques are used in image enhancement. **(12 Marks)**

b. Explain what is histogram processing. How histogram of an image can be used to classify the images? **(08 Marks)**

6 a. Explain with neat block diagram, frequency domain filtering operation. **(10 Marks)**

b. Explain any two filtering techniques used in image smoothing. **(10 Marks)**

7 a. Explain with neat block diagram, image degradation / restoration process. **(06 Marks)**

b. What is Order Statistics filter? Explain median filter, min and max filter and midpoint filter. **(08 Marks)**

c. Explain the following with neat PDF plots and mathematical models :
i) Gaussian noise ii) Exponential noise. **(06 Marks)**

8 a. Explain with neat sketches, HSI colour model. **(08 Marks)**

b. Explain Colour Slicing technique. **(07 Marks)**

c. Define the following : i) Radiance ii) Luminance and iii) Brightness. **(05 Marks)**

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