

8E4092

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B. Tech. VIII Sem. (Main/Back) Exam., April, 2015

Electronics & Communication

8EC4.1 Image Processing & Pattern Recognition

Common for 8EC4.1, 8EI4.3, 8AI4.1, 8BM4.3 & EX4.2

Time: 3 Hours

Maximum Marks: 80

Min. Passing Marks: 20

Instructions to Candidates:

Attempt any five questions, selecting one question from each unit. All questions carry equal marks. Schematic diagrams must be shown wherever necessary. Any data you feel missing suitably be assumed and stated clearly.

Units of quantities used/calculated must be stated clearly.

Use of following supporting material is permitted during examination.

1. NIL _____

2. NIL _____

UNIT – I

- Q.1 (a) State visible and infrared bands (in terms of wavelength) along with their respective characteristics and uses in context to multispectral imaging. [8]
- (b) Discuss mechanism by which creating and readout of an image is done by CCD. [8]

OR

- Q.1 (a) Compare CCD and CMOS image sensors in tabulated form by taking important parameters one by one. [8]
- (b) Discuss various types of scanning mechanisms for converting analog images into digital images. [8]

UNIT – II

- Q.2 (a) Discuss the concept of Aliasing in digital images. [8]
(b) How do you differentiate spatial resolution with gray level resolution? [8]

OR

- Q.2 (a) Discuss Bilinear interpolation in context to its role in image resizing. [8]
(b) Discuss Moire pattern by taking suitable example. [8]

UNIT – III

- Q.3 (a) Discuss Gaussian, uniform and salt-and-pepper noise in context to digital images, Draw the Histograms of these noises. [6+3=9]
(b) A 4×4 image is defined as

$$\begin{bmatrix} 1 & 2 & 3 & 2 \\ 4 & 2 & 5 & 1 \\ 1 & 2 & 6 & 3 \\ 2 & 4 & 6 & 7 \end{bmatrix}$$

Calculate the output after filtering of given image using a 3×3 neighbourhood averaging, assume the image is padded with zero along the edges. [7]

OR

- Q.3 (a) Compute the median value of the marked pixels as shown in fig using a 3×3 mask. [5+5=10]

$$\begin{bmatrix} 18 & 22 & 33 & 25 & 32 & 20 \\ 30 & 20 & 20 & 16 & 20 & 29 \\ 25 & 17 & 27 & 31 & 28 & 24 \end{bmatrix}$$

- (b) Discuss Adaptive median filter in context to image filtering. [6]

UNIT – IV

- Q.4 (a) Compare Lossless and Lossy image compression by giving suitable example. [10]
- (b) How do you differentiate source coding with channel coding? State the objective of these two coding. [6]

OR

- Q.4 (a) Discuss one lossy image compression standard in detail. [8]
- (b) Give relationship between RGB and HSI Color space formats. [8]

UNIT – V

- Q.5 Discuss pattern matching in detail in context to digital images. [16]

OR

- Q.5 Discuss finger print recognition system by mentioning key methods for classification. [16]