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**Question Paper Code: 55P35**

M.E. DEGREE EXAMINATION, NOV 2017

Elective

Computer Science and Engineering

15PCS513 - IMAGE PROCESSING AND ANALYSIS

(Regulation 2015)

Duration: Three hours

Maximum: 100 Marks

Answer ALL Questions

PART A - (5 x 1 = 5 Marks)

- Quantitatively, spatial resolution cannot be represented as
  - line pairs
  - pixels
  - dots
  - none of these
- Sampled frequency less than nyquist rate is called
  - under sampling
  - over sampling
  - critical sampling
  - nyquist sampling
- For finding horizontal lines we use mask of values
  - $[-1 \ -1 \ -1; 2 \ 2 \ 2; -1 \ -1 \ -1]$
  - $[2 \ -1 \ -1; -1 \ 2 \ -1; -1 \ -1 \ 2]$
  - $[-1 \ 2 \ -1; -1 \ 2 \ -1; -1 \ 2 \ -1]$
  - $[-1 \ -1 \ 2; -1 \ 2 \ -1; 2 \ -1 \ -1]$
- Sets in morphology are referred to as image's
  - Pixels
  - frames
  - objects
  - coordinates
- Mathematical morphology is a
  - set theory
  - logic diagram
  - graph
  - map

PART - B (5 x 3 = 15 Marks)

- For an image  $I$  with  $M=N=8$ ,  $k=4$ , find the number of bits required to store  $I$ .

7. If all pixels in the images are shuffled , will there be any changes in the histogram of the image? Justify your answer?
8. How is a sensed data converted into a digital format?
9. Give the Robert mask to detect the horizontal and vertical edge in an image.
10. List the types of color models.

PART - C (5 x 16 = 80 Marks)

11. (a) Explain the different elements of image processing system using suitable diagram. (16)

Or

- (b) Assume that you are employed in a Medical Imaging Centre. Discuss the modalities of images to be captured relevant to different organs and internal functions. (16)

12. (a) Discuss Discrete Fourier Transform in detail. (16)

Or

- (b) Explain wavelet decomposition of images in detail. (16)

13. (a) Explain different thresholding methods in detail. (16)

Or

- (b) Explain the steps involved in canny edge detection with neat diagrams. (16)

14. (a) Apply Ade's eigen filter approach for texture analysis on the following image segment. Construct the covariance matrix and find the number of unique spatial orientations. (16)

1	2	3
6	5	4
9	8	7

Or

(b) Discuss the role of gray scale co-occurrence matrices in texture analysis. (16)

15. (a) Perform Huffman coding on the following description of data. (16)

Symbol	Probability
$a_1$	.05
$a_2$	0.3
$a_3$	0.4
$a_4$	0.1
$a_5$	0.15

Or

(b) Apply arithmetic coding on the string  $abcda$ . Show the encoding sequence with neat diagrams. (16)

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