

# Government College of Engineering, Aurangabad

(An Autonomous Institute of Government of Maharashtra)

## B.E. (ECT) Examination

End semester Examination November 2016

### ET-405: Digital Image Processing

Time: Three Hours

123 NOV 2016

Max. Marks: 60

"Verify the course code and check whether you have got the correct question paper"

N.B.:-

1. Attempt all questions
2. Figures to the right indicates full marks
3. Assume suitable data if necessary and state it clearly
4. Use of non-programmable calculator is allowed

Q1 Attempt any two of the following

12

- A Write a note on applications of Digital Image Processing.
- B Enlist the steps for filtering in frequency domain and write down some basic filters and their properties.
- C Define City Block, Chessboard and Euclidean distance. A  $4 \times 4$  sub image is given below. Compute  $D_e, D_4, D_8, D_m$  distances between  $p$  and  $q$  for  $V = \{2,4\}$

		$p$	
4	2	2	3
4	3	2	1
1	2	2	0
2	3	1	0
	$q$		

Q2 Attempt any two of the following

12

- A Explain fundamental steps in Digital Image Processing.
- B Explain following Gray level transformations:  
Image negatives, log transformation, power law transformation, contrast stretching, gray level slicing and bit plane slicing.
- C What is the difference between image enhancement and image restoration? Discuss inverse filtering & Wiener filtering.

Q3 Attempt any two of the following

12

- A Define Compression Ratio, data redundancy. Explain the data compression through variable length coding.
- B Draw the block diagram of general compression system model, source encoder and source decoder model and explain.
- C Write a note on Image Compression Standards.

Q4 Attempt any two of the following

12

- A Explain opening and closing operations. Discuss one application each.
- B What is structuring element? Discuss its significance considering dilation and erosion operation.
- C The input image and structuring element are given below. Find the eroded version of input image.

1 1 1 1 1 1 1

0 0 1 1 0 0 1

0 0 1 1 0 0 1

0 0 0 0 0 0 1

0 0 0 0 0 0 1

0 0 1 1 0 0 1

0 0 1 1 0 0 1

1 1 1 1 1 1 1

structuring element is 0 0

1 1

Q5 Attempt any two of the following

12

- A Explain the point detection, line detection, edge detection using various masks.
- B Explain threshold based segmentation.
- C Explain the process of region splitting and merging for segmentation.