M.Tech Evening Date:- 25/05/2015

Seat No._____

GANPAT UNIVERSITY

M. Tech Sem. II Computer Engineering

Regular Examination April - June 2015

3CE201: Digital Image Processing

Max Time: 3 Hours] **[Max Marks: 60**

Instructions: 1. Figu res to the right indicate full marks of the question.
2. All questions are compulsory.
3. Each section should be written in a separate answer book.

SECTION: I

Q:1 (a) Perform Histogram specification on following 5x5 4 bit image segment. [10]

3	3	2	1	2
4	6	9	1	2
6	7	5	4	3
5	8	7	9	2
3	4	5	7	9

Original image

3	2	2	4	4
6	7	11	3	5
8	10	2	2	1
6	9	15	12	1
2	5	7	8	13

Specified image

OR

Q:1 (a) Explain Gaussian and Uniform Noise [4]

(b) Discuss Log and Power law transformation [6]

Q:2 (a) Find the Fourier transform of the given data [7]
X= {4, 8, 12, 16} also obtain inverse Fourier transform of the answer.

(b) Define Ringing effect and its remedy [3]

OR

Q:2 (a) Derive the Fourier transform of sampled functions [6]

(b) Explain the basic steps for applying filters in frequency domain. [4]

Q:3 (a) Discuss Laplacian filter in spatial domain and also explain High-boost filtering [6]

(b) Elaborate the Image sampling and quantization [4]

SECTION: II

Q:4 (a) Discuss basic globalthresholding for segmentation and also list out the factors which affects the thresholding [7]

(b) Prove the followings [3]

(i) Prove that A ○ B is a subset of A

(ii) A is subset of A • B

OR

Q:4 (a) List out various applications of X-Ray, Infrared, Microwave band images [3]

(b) Discuss the image degradation / restoration process model. [4]

(c) Explain Contrast stretching [3]

Q:5 (a) Discuss various high pass filters in frequency domain. [7]

(b) Prove that opening and closing are dual of each other [3]

OR

Q:5 (a) Explain Region filling morphological process with an example [5]

(b) Discuss Marr-Hildrath edge detection process and also show its usage. [5]

Q:6 (a) Perform A ○ B and A • B on the following image segment. [7]

$$A=\begin{matrix}0&0&0&0&0&0\\0&0&1&1&0&0\\0&0&1&1&1&0\\0&1&1&1&0&0\\0&0&1&1&0&0\\0&0&1&0&0&0\end{matrix} \qquad B=\begin{matrix}1\\1\\1\end{matrix}$$

(b) Briefly explain Convex Hull [3]

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