Seat No._____

GANPAT UNIVERSITY

B. Tech. Semester VII Electronics & Communication Engineering Examination, Nov-Dec 2010

EC 706 (B): DIGITAL IMAGE PROCESSING

Max. Time: 3 Hrs.] **[Max. Marks: 70**

Instructions:

1. Attempt all questions.
2. Answers to the two sections must be written in separate answer books.
3. Figures to the right indicate full marks.
4. Assume suitable data, if necessary.

SECTION-I

Q-1 **(A)** Explain with the help of experimental arrangement the image acquisition using circular sensor strip. **6**

(B) Explain with the help of block diagram the Components of a general-purpose image processing system. **6**

OR

Q-1 **(A)** List out different areas of application of image processing with their examples. **6**

(B) List and explain different file formats used for representing images. **6**

Q-2 **(A)** Consider the following image A of size 4 x 4. Filter the image A using Robert cross-gradient operator and Sobel operator. **6**

15	12	8	16
12	8	10	9
16	12	10	14
9	11	8	16

(B) Justify the statement "Median filter is an effective tool to minimize salt-and-paper noise" through simple illustration. **6**

OR

Q-2 **(A)** Perform the histogram equalization of the image given below. **6**

4	4	4	4	4
3	4	5	4	3
3	5	5	5	3
3	4	5	4	3
4	4	4	4	4

(B) Analyse 3x3 mean filter in the frequency domain and prove that it behaves like a low pass filter. **6**

Q-3 **(A)** Write a short note on image enhancement by point processing. **4**

(B) Explain with the help of PDF about Gaussian noise. **4**

(C) Write a short note on Salt and Pepper noise. **3**

SECTION-II

Q-4 (A) Write a shortnote on Laplacian Gradient operator with its mathematical derivation and examples of two different masks. 6

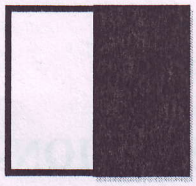
(B) Explain with the help of block diagram DPCM without Quantizer. 6

OR

Q-4 (A) Obtain the Huffman code for the word "**COMMITTEE**". Also determine its average length, Entropy and efficiency. 6

(B) Explain with the help of block diagram DPCM with Quantizer. 6

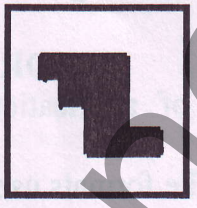
Q-5 (A) Apply the spilt and merge technique to segment the image shown below. 6



(B) Classify redundancy in images and explain in detail. 6

OR

Q-5 (A) Segment the given arbitrary shape shown below by the quadtree approach. 6



(B) Classify Shape representation techniques and explain in detail. 6

Q-6 (A) Explain edge based segmentation techniques. 3

(B) Draw and explain the block diagram of transform based image coding scheme. 3

(C) Given an image of size 5

x(m,n) =

2	4	6	8
10	11	16	15
9	3	1	7
12	14	13	5

Illustrate the code-book formation in a step-by-step procedure. Also show the reconstructed image at R=2.

END OF PAPER