

Erving
Date: 07/12/2015

Student Exam No. _____

GANPAT UNIVERSITY
B. Tech. Semester: VII (E.C) Engineering
Regular CBCS Examination Nov – Dec 2015
2EC706: Digital Image Processing

Total Marks: 70

Time: 3 Hours

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

- 1 (A) What is Interpolation and intensity Resolution? Explain the basic relationships between pixels?
- (B) Define D4-, D8- and Dm- distance between two points p and q with coordinates (x,y) and (s,t) . For the image segment shown in **Figure 1**, compute the D4-, D8- and Dm-distances between pixels p and q for $V = \{1, 2\}$.

	3	1	2	1	(q)
	2	2	0	2	
	1	2	1	1	
(p)	1	0	1	2	

[Figure-1]

20	100	80	80
20	100	70	70
20	100	80	80
20	100	25	50

[Figure-2]

OR

- 1 (A) Apply Median filtering and Laplacian operator on the image segment shown in **Figure 2**.
- (B) Draw the Histogram for Dark and Low contrast image. Also explain the Convolution and Correlation using suitable example.
- 2 (A) Explain the bit plane slicing technique using suitable example.
- (B) Define Weber ratio and match band effect. Also Differentiate photopic and scotopic vision.
- (C) Apply Robert cross gradient technique on the image segment shown in **Figure 2**.

OR

- 2 (A) Explain the principle of contrast stretching using example.
- (B) Apply Sobel operator on the image segment shown in **Figure 2**.
- (C) What brightness adaptation? Also explain the Gray level slicing techniques.
- 3 (A)

Gray level (m)	0	1	2	3	4	5	6	7
Occurrence (nm)	790	1023	850	656	329	245	122	81

Apply the histogram equalization on this image. Also plot the equalized histogram of the output image.

- (B) Draw and explain the block diagram of components of a general purpose image processing system.

SECTION-II

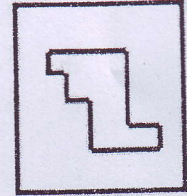
- 4 (A) Apply Discrete Fourier Transform on image segment shown in figure-3. 6

50	70	10	10	70
70	70	10	10	70
50	50	00	10	70
50	60	10	10	60
60	60	10	00	60

[Figure-3]

80	80	80	80	80
70	70	70	10	10
70	70	70	70	70
50	50	50	50	50
60	255	60	10	10

[Figure-4]



[Figure-5]

- (B) Explain the third level wavelet decomposition using necessary diagram. 6

OR

- 4 (A) Explain the Homomorphic filtering Technique using block diagram. 6
 (B) Determine the entropy, average length and efficiency for word "MUMMY" using Shannon -fano coding. 6

- 5 (A) Explain the technique of line detection using an example. 4
 (B) Segment the given arbitrary shape shown in figure-5. By the quadtree approach. 4
 (C) Explain the Lossless image compression. 3

OR

- 5 (A) Write a short note on Split and Merge technique of image segmentation. 4
 (B) Explain the RGB and CMY colour model. 4
 (C) Explain edge based segmentation techniques. 3
 6 (A) Determine the entropy, average length and efficiency for word "COMMITTEE" using Huffman coding. 6
 (B) Apply Block Truncation Coding (BTC) on image segment shown in figure-4. 6

END OF PAPER