Exam No: _____

GANPAT UNIVERSITY

M.TECH. SEM- I (EC) REGULAR EXAMINATION NOV-DEC 2015

3EC105 : Image and Video Processing

MAX. TIME: 3 HRS] [MAX. MARKS: 60

Instructions: (1) This Question paper has two sections. Attempt each section in separate answer book.
(2) Figures on right indicate marks.
(3) Be precise and to the point in answering the descriptive questions.

SECTION: I

Q.1 (a) Write a short note on different image acquisition modalities using examples. 5

(b) Explain with the help of experimental arrangement the image acquisition using circular sensor strip. 5

OR

Q.1 (a) Write a short note on components of digital image processing. 5

(b) What do you mean by sampling and quantization of a digital image? Explain in brief sampling and quantization methods. 5

Q.2 (a) Define following terms with respect to image processing. 5
(1) Brightness (2) Contrast (3) Dynamic Range (4) Resolution (5) Saturation.

(b) Justify the statement "Median filter is an effective tool to minimize salt-and-paper noise" through simple illustration. 5

OR

Q.2 (a) Explain: 4 adjacency, 8 adjacency & m adjacency with suitable example. 5

(b) Explain bit plane slicing with the help of example and list out its advantages. 5

Q.3 (a) Consider the following image A of size 4 x 4. Filter the image A using Robert cross-gradient operator and Sobel operator. 5

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

(b) Perform histogram equalization on following image data. 5

Gray level	0	1	2	3	4	5	6	7
No. of Pixels	790	1023	850	656	329	245	122	81

SECTION: II

Q.4 (a) What are the pros and cons of using component versus composite formats? 5

(b) For the following colors in the digital RGB coordinate, determine their values in the YCbCr coordinate. 5
(a) (255, 255,255) (b) (0,255,0) (c) (255,255,0) (d) (0,255,255)

OR

Q.4 (a) What is Gamma correction? Explain in detail with illustrations. 5

(b) For the following colors in the digital RGB coordinate, determine their values in the YIQ and YUV coordinates, respectively. 5
(a) (1, 1, 1) (b) (0, 1, 0) (c) (1, 1, 0) (d) (0, 1, 1)

Q.5 (a) Explain with the help of block diagram the general framework of video coding system. 5

(b) Categorize the video coding schemes and tabulate different parameters. 5

OR

Q.5 Encode and decode the following sequence using arithmetic coding. Use the occurrence frequency of each symbol in the sequence as the estimate of the probability of the symbol. 10

Source sequence : a c b a a b a c a c b a

What is the bit rate of the coded sequence? Compare the result to Vector Huffman coding.

Q.6 (a) Explain frequency domain filtering technique for the image sharpening. 5

(b) Write a shot not on homomorphic filtering & discuss its advantage compare to the other frequency domain filtering techniques. 5

----------END OF PAPER----------