Reg. No.										

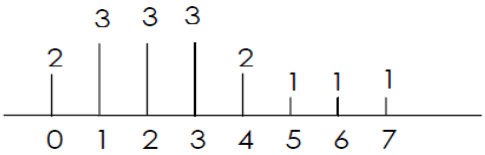
MANIPAL INSTITUTE OF TECHNOLOGY
Manipal University

SEVENTH SEMESTER B.TECH (E & C) DEGREE
END SEMESTER EXAMINATION - NOV/DEC 2016
SUBJECT: DIGITAL IMAGE PROCESSING (ECE - 437)

TIME: 3 HOURS **MAX. MARKS: 50**

Instructions to candidates
- Answer **ANY FIVE** full questions.
- Missing data may be suitably assumed.

1A. Illustrate the concept of histogram specification for the following sub-image with 4X4 matrix of a 3 bit image and the specified histogram as shown below



0	0	0	4
1	1	1	5
1	2	2	7
2	2	2	7

1B. Calculate the frequency response of the following averaging filter

$$h(m,n)=\frac{1}{9}\begin{matrix}0&0&0&0&0\\0&1&1&1&0\\0&1&1&1&0\\0&1&1&1&0\\0&0&0&0&0\end{matrix}$$

1C. Determine the 2D Fourier transform of the following expression.

$$f(x,y)=\sin 4\pi x+\cos 6\pi y$$

(5+3+2)

2A. Assuming continuous intensity values suppose that an image has the intensity PDF $p(r)=\frac{2r}{(L-1)^2}$ for r between 0 to L-1 and $p(r)$= 0 for other values for r. Calculate the transformation function that will produce an image whose intensity PDF is $p(z)=\frac{3z^2}{(L-1)^3}$ for all z and $p(z)$=0 for other values of z.

2B. Write a note on neighbours of a pixel and explain the different types of connectivity.

2C. Draw the JPEG decoder block diagram.

(5+3+2)

3A. Discuss the morphological Hit or Miss transformation for a binary image.

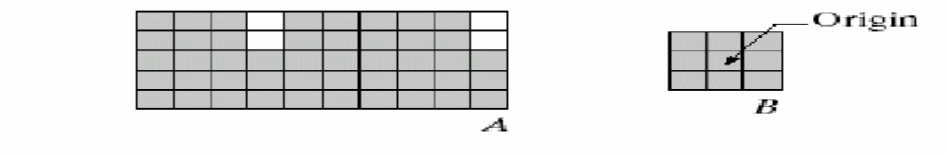
3B. Draw the block diagram of transform coding and explain.

3C. Define derivative filter.

(5+3+2)

4A. Write a neat block diagram Explain H.264 Encoder.

4B. Illustrate the morphological method to extract the extract the boundary of the following object. (A;Object B: Structuring element).



4C. Mention Roberts and Prewitt Operator.

(5+3+2)

5A. Define thresholding and explain the various methods of thresholding in detail.

5B. Define

1. Coding redundancy
2. Inter-pixel redundancy
3. Compression ratio

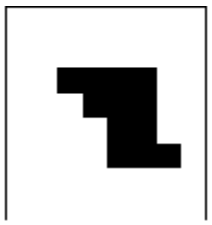
5C. Give the properties of second derivatives around an edge.

(5+3+2)

6A. Describe the functions of the elements of the digital image processing system with a diagram.

6B. List the different types of boundary descriptors. Give the brief explanation about them.

6C. Segment the given shape using split and merge technique.



(5+3+2)