

MANIPAL INSTITUTE OF TECHNOLOGY Manipal University



SIXTH SEMESTER B.TECH (PME) DEGREE END SEMESTER EXAMINATION MAY / JUNE 2016 SUBJECT: VIDEO PROCESSING (PME - 314)

TIME: 3 HOURS MAX. MARKS: 50

Instructions to candidates

- Answer **ANY FIVE** full questions.
- Missing data may be suitably assumed.
- 1A. An image strip is given. Obtain the first and second derivative. Explain the significance of both.

6	6	6	6	5	4	3	2	1	1	1	1	1	1	6	6	6	6	
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- 1B. Explain the process involved in conversion of an Analog image to Digital. How much memory is required to store an MxN image with 16 grey levels.
- 1C. Describe contrast and dynamic range of an image.

(5+3+2)

2A. An image matrix, I is given below. Equalise the Histogram of I and then scale it to [1 - 20].

	г3	2	4	ן5
I —	7	7	8	2
1 —	3	1	2	3
	L5	4	6	7J

- 2B. Define Histogram. Plot the Histogram of the original image and the equalised image given in Q2A
- 2C. Explain the difference between Histogram equalisation and Histogram matching.

(5+3+2)

- 3A. For the RGB coordinates (255,255,0) determine the YCbCr values.
- 3B. Draw the spectrum of NTSC composite signal and explain the salient features.
- 3C. What is the Trichromatic theory of Colour Mixture?

(5+3+2)

- ^{4A.} Compute graphically, the 2D convolution of $x = \begin{bmatrix} 4 & 5 & 6 \\ 1 & 2 & 3 \end{bmatrix}$ and $h = \begin{bmatrix} 1 & 1 \\ 1 & 1 \end{bmatrix}$. Obtain the output matrix.
- 4B. What is Temporal Frequency of a Video Signal? Explain the parameters on which it depends.
- 4C. List the difference between the terms Optical flow and Motion estimation.

(5+3+2)

- 5A. With the help of a neat block diagram explain the operation of a video camera.
- 5B. Explain briefly Stereo Imaging.
- 5C. An image is represented by I= $sin(10\pi x + 20\pi y)$. What should be the sampling frequency so that it can be reconstructed properly?

(5+3+2)

- 6A. Find the Huffman code for the symbols in the matrix $A = \begin{bmatrix} 1 & 2 & 5 & 7 \\ 2 & 3 & 7 & 5 \\ 7 & 2 & 1 & 3 \\ 6 & 4 & 7 & 1 \end{bmatrix}$
- 6B. With the help of a neat block diagram explain the video coding system.
- 6C. Explain the following terms: a) Lossless coding b) Prefix code.

(5+3+2)