

7. Write short note on the following : 15

- (a) Factors affecting image resolution.
- (b) Ethical considerations involved in image and video processing tasks.

Roll No. ....

Total Pages : 04

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B. Tech. (ECE) (Sixth Semester)

Digital Image and Video Processing (ECEL-606)

Time : 3 Hours]

[Maximum Marks : 75

**Note :** It is compulsory to answer all the questions (1.5 marks each) of Part A in short. Answer any *four* questions from Part B in detail. Different sub-parts of a question are to be attempted adjacent to each other.

**Part A**

1. (a) Explain the difference between analog and digital images. 1.5
- (b) List the basic elements required to represent a digital image. 1.5
- (c) Recall the fundamental steps involved in histogram equalization. 1.5
- (d) How RGB color model is different from HSI color model ? 1.5
- (e) Write the formula of DFT and Inverse DFT for a 2-D image of size  $64 \times 64$ . 1.5

- (f) Describe the process of image deblurring. 1.5
- (g) What do you mean by image segmentation ? Explain it with examples. 1.5
- (h) Compare lossy and lossless compression techniques in digital image processing. 1.5
- (i) What is the basic concept behind image restoration ? 1.5
- (j) Write the Kernel of Hadamard transform for image enhancement. 1.5

### Part B

- 2. (a) Illustrate the block diagram of Digital Image Processing, accompanied by thorough elucidation of each component. 7.5
- (b) What is spatial domain filtering ? Explain the difference between low-pass and high-pass filters. How are linear and non-linear filters applied in image processing ? 7.5
- 3. (a) Critically analyze the role of feature extraction in image analysis tasks. 7.5
- (b) Explain the concept of mask processing operation for boundary detection with the help of suitable example. 7.5

- 4. (a) Define image restoration. How does it differ from image enhancement ? Discuss the role of regularization techniques in image restoration. 7.5
- (b) What are the key considerations for motion analysis in video processing ? Describe *two* common techniques for motion analysis. 7.5
- 5. (a) What is color image smoothing ? Explain how smoothing will be done by neighborhood averaging and also write its algorithm. 7.5
- (b) Explain the concept of color image processing. Briefly discuss the various color models used to represent color images. 7.5
- 6. (a) Devise a strategy to optimize the performance of a digital image compression algorithm while maintaining image quality. 7.5
- (b) What is the need of compression ? Explain JPEG compression in detail. Analyze the trade-offs between compression ratio and image quality in JPEG compression. 7.5