

BB63

M. Tech. EXAMINATION, 2021

(Second Semester)

(B Scheme) (Re-appear)

(ECE)

MTEC506B

DIGITAL IMAGE PROCESSING

Time : 2½ Hours]

[Maximum Marks : 75

Before answering the question-paper candidates should ensure that they have been supplied to correct and complete question-paper. No complaint, in this regard, will be entertained after the examination.

Note : Attempt *Four* questions in all. All questions carry equal marks.

1. (a) Discuss in detail the components of image processing system.
(b) Explain the general approach for performing image processing in linear transform domain.
2. (a) Assuming continuous intensity values, suppose that an image has the intensity PDF $p_r(r) = 2r/(L-1)^2$ for $0 \leq r \leq (L-1)$ and $p_r(r) = 0$ for other values of r . Find the transformation function that will produce an image whose intensity PDF is $p_z(z) = 3z/(L-1)^3$ for $0 \leq z \leq (L-1)$ and $p_z(z) = 0$ for other values of z .
(b) What is the use of applying a Laplacian mask and an averaging mask to an image ? In which order these operations should be applied and why ?

3. (a) Explain image smoothing using frequency domain filters.
 (b) Discuss frequency domain formulation of unsharp masking and high-boost filtering image sharpening techniques.
4. (a) What are the fundamental requirements of multiresolution analysis ?
 (b) Discuss a general wavelet-based procedure for denoising an image.
5. (a) Explain a model of image degradation/restoration process.
 (b) Discuss most common PDFs found in image processing applications.
6. Explain three principal ways to estimate the degradation function for use in image restoration.
7. (a) What are the basic components of a lossless predictive coding system ? Explain.
 (b) Discuss the procedure to determine whether a particular image is a copy of a previously watermarked image with watermarks $\omega_1, \omega_2, \dots, \omega_k$ and DCT coefficients c_1, c_2, \dots, c_k .
8. (a) Write an algorithm to estimate automatically the threshold value for each image.
 (b) Discuss the segmentation techniques that are based on finding the regions directly.