PVP 19

Code:19EC4602B

III B.Tech - II Semester – Regular Examinations – JUNE 2022

DIGITAL IMAGE PROCESSING
(ELECTRONICS AND COMMUNICATION ENGINEERING)

Duration: 3 hours Max. Marks: 70

Note: 1. This question paper contains two Parts A and B.
2. Part-A contains 5 short answer questions. Each Question carries 2 Marks.
3. Part-B contains 5 essay questions with an internal choice from each unit. Each question carries 12 marks.
4. All parts of Question paper must be answered in one place.

PART – A

1. a) Define the following terms: (i) Resolution (ii) Pixel
   b) Summerize the applications of sharpening filter.
   c) What is the need for Compression?
   d) What are the applications of image segmentation?
   e) Differentiate Pseudo color image processing and full color image processing.

PART – B

UNIT – I

2. a) What is digital image? Explain the fundamental steps of digital image processing. 7 M
   b) Explain the concept of sampling and quantization of an image. 5 M

OR

3. Define 2D DFT of an image and state the following properties 12 M

i) Translation ii) Rotation iii) Periodocity
iv) convolution

UNIT – II

4. a) What is meant by histogram equalization of an image? Explain how histogram equalization can be performed on a given gray scale image, with necessary mathematical details. 6 M

b) Explain the different spatial filtering techniques used in images. Distinguish them with appropriate masks. 6 M

OR

5. a) Explain the basic steps for image filtering in frequency domain with the help of a neat block diagram. 6 M

b) Analyze how image enhancement is achieved using Butterworth low pass filter in frequency domain. 6 M

UNIT-III

6. a) With necessary example, explain briefly about Bit plane coding. 8 M

b) Explain the process of coding redundancy. 4 M

OR

7. a) Identify the elements of compression model and explain them. 6 M

b) Apply Huffman coding on the image having the pixel distribution given below to reduce the redundancy. 6 M

a	A1	A2	A3	A4	A5	A6
P(a)	0.15	0.4	0.06	0.2	0.05	0.14

UNIT – IV

8. a) Analyze the process of edge linking. 6 M

   b) Conclude that the differentiation operators are capable of detecting points, lines, and edge features that are characterized by intensity discontinuities. 6 M

OR

9. a) Explain the methods of thresholding for image segmentation. 6 M

   b) Discuss the process of region splitting and merging for region based segmentation. 6 M

UNIT – V

10. a) Explain the process of generating RGB image. 6 M

    b) Write the formula used for converting RGB to HSI. Using these formulae find the value of HIS for the given RGB=(0.683, 0.1608, 0.1922) 6 M

OR

11. a) Explain about Pseudo color image processing. 6 M

    b) Write a short notes on CMY and CMYK color models. 6 M