

Code No: 157BF

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

B. Tech IV Year I Semester Examinations, February/March - 2022

DIGITAL IMAGE PROCESSING

(Electronics and Communication Engineering)

Time: 3 Hours

Max. Marks: 75

Answer Any Five Questions
All Questions carry equal marks

- 1.a) Explain the different fundamental steps in image processing with examples.
b) What is quantization in image processing? Why is it needed? What are the effects of it? [8+7]
- 2.a) How the Discrete Cosine Transform is used to process the digital image? Write its Kernel function.
b) Determine the KL transform for the following image segment. [7+8]
- $$\begin{bmatrix} 0001 \\ 0010 \\ 0011 \end{bmatrix}$$
- 3.a) What is Histogram? Explain Histogram equalization with example.
b) What is threshold and how to choose threshold value? [7+8]
- 4.a) How median filter is used to remove noise in an image?
b) Explain how high pass filter is used to sharpen the image. [8+7]
- 5.a) Draw the degradation model and explain how this degradation occurs in an image.
b) Write about image restoration? Write some examples. [8+7]
- 6.a) Design a Wiener filter for image restoration and discuss its merits and demerits.
b) What is meant by an interactive restoration? [7+8]
- 7.a) Explain a region growing method to segment an image and what are the drawbacks of this method.
b) What is meant by hit or miss transformation? How it is used for segmentation of an image? [7+8]
- 8.a) Draw the compression model and explain the function of each block.
b) Determine the Huffman code for the following image segment and find compression ratio with reference to binary code? [8+7]

$$\begin{bmatrix} 2 & 1 & 4 & 5 & 5 & 4 \\ 2 & 3 & 4 & 1 & 2 & 3 \\ 2 & 3 & 3 & 4 & 5 & 5 \\ 2 & 1 & 2 & 3 & 4 & 5 \end{bmatrix}$$