

Reg No.: _____

Name: _____

APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY
SEVENTH SEMESTER B.TECH DEGREE EXAMINATION, DECEMBER 2018

Course Code: EC370

Course Name: DIGITAL IMAGE PROCESSING

Max. Marks: 100

Duration: 3 Hours

PART A

Answer any two full questions, each carries 15 marks

Marks

- 1 a) Discuss the terms: (i) Brightness (ii) Hue (ii) Saturation and (iv) Contrast. (8)
- b) Find DFT of $\begin{bmatrix} 4 & 3 \\ 6 & 4 \end{bmatrix}$ (4)
- c) What are the drawbacks of KL Transform? (3)
- 2 a) Describe the construction and working of a Vidicon camera tube with a neat diagram. (10)
- b) Find the DCT of the sequence $x(n) = \{11, 22, 33, 44\}$ (5)
- 3 a) Explain the theory of Colour Representation Model. (8)
- b) Compute Haar transform of the given matrix (7)

$$A = \begin{bmatrix} 4 & -1 \\ 2 & 3 \end{bmatrix}$$

PART B

Answer any two full questions, each carries 15 marks

- 4 a) Explain the block diagram of homomorphic filtering method? (8)
- b) Explain geometric transformations in image restoration. (7)
- 5 a) What is meant by histogram equalisation of an image? Explain how histogram equalisation can be performed on a given gray scale image, with necessary mathematical details. (10)
- b) Explain image degradation model /restoration process in detail? (5)
- 6 a) What is the value of the central pixel (marked by a round) if it is smoothed by a 3x3 box filter? (5)

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

- b) Explain the Wiener filter for image restoration. State the advantages and disadvantages of wiener filter over inverse filter. (10)

PART C

Answer any two full questions, each carries 20 marks

- 7 a) How Hough transform can be used to detect lines? (7)
b) How edge detection is performed in images? (3)
c) Design a Huffman code for a source that puts out letters from an alphabet (10)
 $A = \{a_1, a_2, a_3, a_4, a_5\}$ with $P(a_1) = P(a_3) = 0.2, P(a_2) = 0.4$ and
 $P(a_4) = P(a_5) = 0.1$
- 8 a) Describe split/merge approach of segmentation. (10)
b) What are different types of Redundancies? Explain. (10)
- 9 a) Describe global thresholding algorithm for segmentation. (10)
b) Write notes on JPEG Compression Standards. (10)
