

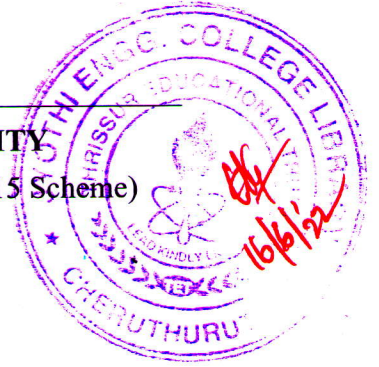
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APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY

Sixth Semester B.Tech Degree (S,FE) Examination May 2022 (2015 Scheme)



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) Explain false contouring and weber ratio (5)
- b) Explain the conversion of RGB color model to HSI color model (10)
- 2 a) What are orthogonal transforms? Define the energy compaction property of an unitary transform. (5)
- b) Explain Orthogonal and Unitary Matrices. Check whether the given matrices are orthogonal or unitary (10)

$$A = 1/\sqrt{2} \begin{bmatrix} 1 & 1 \\ 1 & -1 \end{bmatrix} \quad B = 1/\sqrt{2} \begin{bmatrix} \sqrt{2} & j \\ -j & \sqrt{2} \end{bmatrix}$$

- 3 a) Define and illustrate using example 8-adjacency and m-adjacency of pixels. (7)
- b) Perform Haar Transform on the matrix $\begin{bmatrix} 4 & 2 \\ 3 & -1 \end{bmatrix}$ (8)

PART B

Answer any two full questions, each carries 15 marks

- 4 a) Explain image averaging and image subtraction (5)
- b) Explain the different spatial filtering techniques used in images. Distinguish them with appropriate masks. (10)
- 5 a) Discuss the process of image restoration with block diagram and derive the degradation model. (5)
- b) With appropriate equations, explain the issue with inverse filtering for restoring the image. How Wiener filtering eliminates the issue? (10)
- 6 a) Explain any two geometrical transformations used for image processing (7)

- b) How the separation of illumination and reflectance components is achieved in homomorphic filtering? (8)

PART C

Answer any two full questions, each carries 20 marks

- 7 a) Explain any one clustering algorithm for image segmentation (10)
b) Discuss the role of derivatives in edge detection. (10)
- 8 a) Explain vector quantization based image compression algorithm. (10)
b) Discuss the image compression mechanisms employed in MPEG (10)
- 9 a) Explain wavelet based image compression (10)
b) Explain the region based approaches for image segmentation. (10)
