

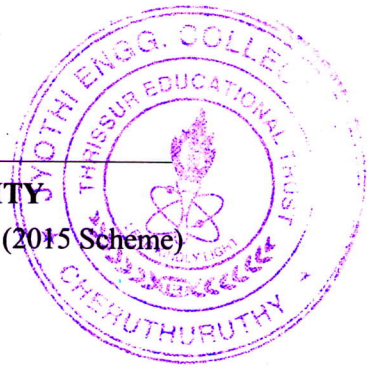
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APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY

B.Tech Degree S6 (S, FE) / S6 (PT) (S, FE) Examination January 2024 (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) Illustrate the RGB colour cube with a neat diagram with the primary and secondary colours. Explain the conversion of colours from RGB to CMY? (5)
- b) State and explain 2D sampling theorem for band limited images (10)
- 2 a) State and prove any two properties of 2D DFT. (7)
- b) Explain Kronecker Product of Matrices. Compute the $AB \wedge B \otimes A$ of given Matrices (8)

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

Check whether they are equal or not

- 3 a) Explain the terms Weber ratio and Mach band effect. (5)
- b) Explain singular value decomposition with respect to digital images (10)

PART B

Answer any two full questions, each carries 15 marks

- 4 a) Perform histogram equalization on the 5*5 image with intensity levels 0 to 7 (8)

4 4 4 4 4
5 3 3 5 5
5 5 5 4 4
4 3 3 5 5
4 5 4 3 4

- b) Explain logarithmic transformation and Power-Law transformation (7)
- 5 a) Write a short note on Lagrange multipliers (5)
- b) Explain the image restoration mechanism using a Weiner filter. (10)
- 6 a) Explain the smoothing of images in frequency domain using (i) ideal low pass filters and (ii) Butterworth low pass filters (8)
- b) Explain inverse filtering used in image processing (7)

PART C

Answer any two full questions, each carries 20 marks

- 7 a) Explain how image smoothing is used to improve global threshold in image segmentation (10)
- b) Explain split and merge procedure in image segmentation (10)
- 8 a) Explain arithmetic coding with suitable example (10)
- b) What are the basic data redundancies exploited in image compression? Explain. (10)
- 9 a) Explain how lines can be detected using Hough transform. (10)
- b) Construct Huffman coding to encode and decode the word "IMAGE". (10)
