



G1134

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APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY

Scheme for Valuation/Answer Key

Scheme of evaluation (marks in brackets) and answers of problems/key

SEVENTH SEMESTER B.TECH DEGREE EXAMINATION (S), MAY 2019

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 concepts of Adjacency, Connectivity, Regions and Boundaries among pixels in a digital image. (8)
Adjacency, Connectivity, Regions, Boundaries = 4x2
- b) Statement- 3marks (7)
Proof- 4 marks
- 2 a) Discuss the conceptual relationship between the RGB and HSI colour models with neat diagrams. (8)
Diagrams- 4 marks
Description-4 marks
- b) Vector formation, covariance, eigen value, eigen vector-6 marks; transformation matrix- 1mark. (7)
- 3 a) Discuss 2-D sampling theory . How is an image reconstructed from its samples ? (10)
Discussion of 2-D sampling theory with sketches-7 marks, Reconstruction-3 marks
- b) Block-1 mark; Toeplitz- 1mark; block toeplitz-2mark; example-1mark (5)

PART B

Answer any two full questions, each carries 15 marks

- 4 a) Explanation(5) Diagram(3) (8)
- b) Explanation(5) Diagram(5) Limitations(5) (7)
- 5 a) Any two advantages-Each 2.5 marks (5)
- b) Constraint Restoration method Explanation-5 marks, Unconstraint Restoration method Explanation -5 marks (10)
- 6 a) Example-4 marks, explanation-4 marks (8)
- b) Wiener filter derivation-7 marks (7)

PART C

Answer any two full questions, each carries 20 marks

- 7 a) Parameter space-2marks; subdivision-2 marks; rho-theta representation-3 marks; (10)
collinearity detection and reflective adjacency-3marks
- b) Discuss Vector quantization. (10)
Scheme block diagram-3
Description of code book formation and reconstruction of image -7
- 8 a) Definition-3marks; steps-7marks (10)
- b) Computation (2) + Storage (2) + Transmission (1) (5)
- c) {0, 01, 11} (5)

The codeword 0 is a prefix for the codeword 01. The dangling suffix is 1. There are no other pairs for which one element of the pair is the prefix of the other. Let us augment the codeword list with the dangling suffix.

{0, 01, 11, 1}

Comparing the elements of this list, we find 0 is a prefix of 01 with a dangling suffix of 1. But we have already included 1 in our list. Also, 1 is a prefix of 11. This gives us a dangling suffix of 1, which is already in the list. There are no other pairs that would generate a dangling suffix, so we cannot augment the list any further. Therefore, Code 5 is uniquely decodable. ♦

- 9 a) Zero crossings-5marks; laplacian-5marks (10)
- b) Algorithm (5) + Explanation (5) (10)

