

B.TECH. DEGREE EXAMINATION, NOVEMBER 2014**Seventh Semester**

Branch : Electronics and Communication Engineering

EC 010 706 (L) 03—DIGITAL IMAGE PROCESSING (Elective II) (EC)

(New Scheme—2010 admission onwards)

[Regular/Supplementary]

Time : Three Hours

Maximum : 100 Marks

Part A*Answer all questions.**Each question carries 3 marks.*

1. Give the mathematical representation of digital images. Also mention names of different file formats used.
2. What is SVD ? Explain its application in DIP ?
3. Write note on pseudo colour enhancement.
4. What are the *two* immediate problems in region growing ?
5. Describe the parameters to be considered while selecting a particular transform in a given application.

(5 × 3 = 15 marks)

Part B*Answer all questions.**Each question carries 5 marks.*

6. State Weber's law. Explain its role in DIP.
7. Why Hadamard transform is also called as Walsh-Hadamard transform ?
8. Differentiate between spatial domain and frequency domain image enhancement techniques.
9. What are the two types of segmentation algorithm ?
10. What is bit plane coding ? Explain.

(5 × 5 = 25 marks)

Turn over

Part C

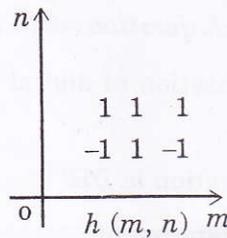
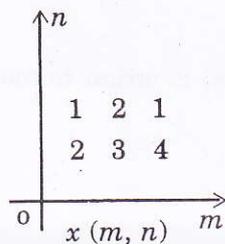
Answer all questions.

Each question carries 12 marks.

11. (a) (i) Explain how an image is represented in 2D and explain the fundamental steps in processing a digital image.
 (ii) With block diagram, explain the functions of different blocks of a digital image processing system.

Or

- (b) (i) Describe 2D-sampling of digital images.
 (ii) State and prove 2D-sampling theorem.
12. (a) (i) State 2D-convolution theorem.
 (ii) Find 2D-convolution of the following image pixel values :



Or

- (b) (i) Express H_8 Hadamard matrix.
 (ii) Find 2D-DFT of the following matrix :

$$\begin{bmatrix} 1 & 1 & 1 & -1 \\ 1 & 1 & 0 & 1 \\ -1 & 1 & -1 & 1 \\ 1 & 0 & 1 & 1 \end{bmatrix}$$

13. (a) (i) Describe the operation of different point operators used for basic gray level transformation.
 (ii) With block diagram, explain the working of a homomorphic filter.

Or

- (b) Describe the following in detail :
- Histogram equalization.
 - LPF and HPF in image enhancement.
 - High-boost filters.

14. (a) (i) Describe the bilevel and multilevel luminance threshold techniques.
(ii) Describe the region growing and split-merge spatial segmentation methods.

Or

- (b) Describe the following :
- (i) Curve fitting and edge linking.
 - (ii) Hough transform.
 - (iii) Texture segmentation.

15. (a) (i) Give Huffman coding algorithm.
(ii) Explain interface coding scheme in MPEG - 1.
(iii) Describe 2D-mesh coding in MPEG - 4.

Or

- (b) Explain how the following transforms are employed for 2D-image compression :
- (i) Arithmetic coding.
 - (ii) LZ - coding.
 - (iii) MPEG - 7 compression standard.

(5 × 12 = 60 marks)