USN | | | | | | | | | | | 10CS/IS762

Seventh Semester B.E. Degree Examination, Dec.2016/Jan.2017
Digital Image Processing

Time: 3 hrs.   Max. Marks:100

Note: *Answer any FIVE full questions, selecting*
atleast TWO questions from each part.

PART – A

1 a. Explain the fundamental steps involved in digital image processing, using a diagram.
                                                                            (10 Marks)
   b. Discuss metrics used in digital images.   **(05 Marks)**
   c. Briefly explain image digitization.   **(05 Marks)**

2 a. Write an algorithm to perform histogram equalization. Apply this algorithm for the image
      shown in Fig.Q2(a).   **(08 Marks)**

10	10	75	75	90
10	75	75	75	90
75	75	75	90	90
75	75	90	90	10
75	90	90	10	10

Fig. Q2(a)

   b. Explain the three criteria's of canny edge detection. Also briefly explain the five important
      steps in the canny edge detection.   **(12 Marks)**

3 a. Define basic thresholding. Write an iterative algorithm for optimal threshold selection.
                                                                            (10 Marks)
   b. Explain the algorithm for curve detection using Hough transform.   **(10 Marks)**

4 a. Explain segmentation using split and merge technique with suitable diagram. **(10 Marks)**
   b. Briefly explain watershed segmentation.   **(10 Marks)**

PART – B

5 a. Explain following gray level transformations : image negative, log transformation, gray
      level slicing.   **(08 Marks)**
   b. Explain the application of power law transformation in CRT monitors. **(06 Marks)**
   c. Describe homomorphic filters and further list and explain the steps of homomorphic
      filtering.   **(06 Marks)**

6 a. Define image compression. Explain types of redundancies in the images that are used to
      achieve higher compression ratio.   **(08 Marks)**
   b. Write an algorithm for Huffman coding. Construct the codeword for the word
      'ABBCCCDDD'.   **(12 Marks)**

7 a. Describe the procedure of region identification using 4–neighbourhood and
      8–neighbourbood concept.   **(08 Marks)**
   b. Briefly explain following scalar descriptors : Euler's number, projections, eccentricity,
      Elongatedness, direction, compactness.   **(12 Marks)**

8 a. Explain four principles of mathematical morphology.   **(08 Marks)**
   b. Explain following morphological operations :
      Dilation, Erosion, Opening, Closing. Give examples for each.   **(12 Marks)**

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