Sixth Semester B.Tech. Degree Examination, May 2016
(2013 Scheme)
13.601 : IMAGE PROCESSING (AT)

Time : 3 Hours   Max. Marks : 100

PART – A

Answer **all** questions. **Each** question carries **4** marks.

1. Distinguish between lossy and lossless image compression schemes.

2. Distinguish between point processing and mask processing.

3. Explain any two color image models.

4. Explain chain codes for image segmentation.

5. Describe the process of color based segmentation.

PART – B

Answer **any one** question from **each** Module.

Module – I

6. a) Compute the 2D DFT of the image segment $x(n1, n2) = \begin{bmatrix} 1 & 1 \\ -1 & -1 \end{bmatrix}$.   **10**

   b) Compute the Walsh-Hadamard Transform of the ID sequence [2, 2, 4, 4].   **10**

7. a) Prove the linearity property and conjugate symmetry property of 2D Fourier transform.   **10**

b) Find the convolution between the sequences $x(n1, n2) = \begin{bmatrix} 1 & 1 & 1 \\ -1 & -1 & -1 \\ 1 & 1 & 1 \end{bmatrix}$ and

$h(n1, n2) = \begin{bmatrix} 1 & -1 \\ 1 & -1 \end{bmatrix}$.   **10**

Module – II

8. a) Explain the steps involved in the frequency domain filtering of an image.   **10**

b) Distinguish between unsharp masking and high boost filtering.   **10**

9. a) Explain the homomorphic filtering. How it is helpful to separate illumination component and reflective component in an image ?   **10**

b) Explain the Wiener filter for image restoration.   **10**

Module – III

10. a) Explain in detail about the canny edge detection.   **10**

b) With the help of necessary diagrams describe the region growing algorithm for image segmentation.   **10**

11. a) Perform image segmentation on the image $x = \begin{bmatrix} 1 & 1 & 2 & 2 \\ 1 & 1 & 2 & 2 \\ 1 & 1 & 2 & 2 \\ 1 & 1 & 2 & 2 \end{bmatrix}$ using the

thresholding.   **10**

b) Explain region splitting and merging based image segmentation.   **10**

A – 2748

Module – IV

12. a) Explain JPEG compression scheme. **10**

    b) Explain the morphological opening and closing. **10**

13. a) Determine the Huffman codes for symbols 0, 1, 2, 3 in the image

$$\begin{bmatrix} 1 & 1 & 3 & 0 \\ 0 & 1 & 2 & 2 \\ 1 & 2 & 3 & 2 \\ 1 & 1 & 1 & 1 \end{bmatrix}.$$

10

   b) Perform morphological erosion on the image $\begin{bmatrix} 1 & 1 & 1 & 1 \\ 1 & 0 & 0 & 1 \\ 1 & 1 & 0 & 1 \\ 1 & 1 & 1 & 1 \end{bmatrix}$ using structural

   element [1, 1]. **10**

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