Reg. No. : | | | | | | | | | | | | |

Question Paper Code : 80593

B.E./B.Tech. DEGREE EXAMINATION, NOVEMBER/DECEMBER 2016.

Sixth Semester

Electronics and Instrumentation Engineering

IT 6005 — DIGITAL IMAGE PROCESSING

(Regulations 2013)

Time : Three hours Maximum : 100 marks

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

1. What is Machband Effect?
2. Define Checker Board Effect.
3. What is meant by bit plane slicing?
4. What is unsharp masking?
5. State the causes of degradation in an image?
6. What do you understand by Mexican hat function?
7. What is an image pyramid?
8. State whether the given Huffman code 0, 10, 01, 011 for the symbols a1, a2, a3, a4 is uniquely decodable or not?
9. What is Skeletonizing?
10. Define texture.

PART B — (5 × 16 = 80 marks)

11. (a) (i) With necessary diagrams explain how an Analog image is Converted into digital image. (8)

(ii) What is meant by image sensing? Explain in detail the construction and operation of various image acquisition devices. (8)

Or

(b) (i) What is a color model? What are its types? Explain RGB and HSI models with necessary diagrams. (12)

(ii) Explain the various distance measures used for image analysis. (4)

12. (a) (i) Briefly discuss about histogram equalization technique. (8)

(ii) Perform histogram equalization of the image. (8)

$$\begin{bmatrix} 4 & 4 & 4 & 4 & 4 \\ 3 & 4 & 5 & 4 & 3 \\ 3 & 5 & 5 & 5 & 3 \\ 3 & 4 & 5 & 4 & 3 \\ 4 & 4 & 4 & 4 & 4 \end{bmatrix}.$$

Or

(b) (i) Explain in detail the method for smoothening the image in frequency domain. (10)

(ii) Explain Gradient operators for Image Enhancement. (6)

13. (a) (i) Apply order statistics filters on the selected pixels in the image.

(ii) Explain how wiener filter is used for image restoration. (8)

$$\begin{pmatrix} \boxed{1} & 2 & 3 \\ 0 & \boxed{1} & \boxed{2} \\ 1 & 4 & 5 \end{pmatrix}$$

Or

(b) (i) Explain the process of edge linking using Hough transform. (8)

(ii) Explain region based segmentation techniques. (8)

14. (a) (i) Explain two dimensional Discrete Wavelet Transform (DWT). (8)

(ii) Encode the word $a_1\ a_2\ a_3\ a_4$ using arithmetic code and generate the tag for the given symbol with probabilities.

$a_1 \rightarrow 0.2, a_2 \rightarrow 0.2, a_3 \rightarrow 0.4, a_4 \rightarrow 0.2$ (8)

Or

(b) What is the need for image compression? Explain image compression standards in detail. (16)

15. (a) Explain in detail any two boundary representation schemes and illustrate with examples. (16)

Or

(b) Explain image recognition based on matching. (16)
