Reg. No. : ☐☐☐☐☐☐☐☐☐☐☐☐☐

Question Paper Code : 52408

B.E./B.Tech. DEGREE EXAMINATION, NOVEMBER/DECEMBER 2017
Seventh Semester
Electronics and Communication Engineering
EC 2029 – DIGITAL IMAGE PROCESSING
(Common to Electronics and Instrumentation Engineering)
(Regulations 2008)
(Also common to PTEC 2029 – Digital Image Processing for BE (Part – Time)
Seventh Semester – ECE – Regulations 2009)

Time : Three Hours   Maximum : 100 Marks

Answer ALL questions.

PART – A   (10×2=20 Marks)

1. What do you understand from mach band effect and simultaneous contrast ?

2. Write note on conversion of RGB to HSI.

3. Describe the PDF of exponential noise and sketch the PDF.

4. Define geometric mean filter.

5. How a degradation process is modeled ?

6. Give the difference between Enhancement and Restoration.

7. Give the properties of the second derivative around an edge.

8. What is global, local and dynamic or adaptive threshold ?

9. Write the need for compression.

10. Define I, P and B frames.

11. a) With neat diagram, explain the elements of visual perception and image formation in eye. (16)

(OR)

    b) i) Discuss about Zooming and shrinking digital images. (8)

       ii) Explain how DCT is useful in image compression and find DCT for the following sub image $\begin{pmatrix} 1 & 4 \\ 2 & 1 \end{pmatrix}_{[2\times2]}$ matrix. (8)

12. a) i) For a 5 bit input image given below, perform equalization. (10)

          8   8   8   1   1
          5   1   10   10   30
         15   15   30   30   10
          5   5   1   10   30
          8   10   15   8   30 (5×5) matrix

       ii) Write about directional smoothing and compare it advantages with average filter. (6)

(OR)

    b) i) Explain how Homomorphic filter is used in image enhancement. (10)

       ii) Write notes on color image smoothening. (6)

13. a) Explain how image restoration can be obtained with Inverse and Weiner filter. (16)

(OR)

    b) Describe the concept of geometric transformation for image restoration. (16)

14. a) i) How do you link edge pixels through Hough transform ? (8)

       ii) Explain region growing segmentation. (8)

(OR)

    b) Explain how dam construction technique is useful in morphological watershed segmentation. (16)

15. a) i) Design a Huffman code and find average length for a source that puts out letters from an alphabet $A = \{a_1, a_2, a_3, a_4, a_5\}$ with $P(a_1) = P(a_3) = P(a_4) = 0.1$ $P(a_2) = 0.3$ and $P(a_5) = 0.4$. (10)

       ii) Write note on run length encoding. (6)

(OR)

    b) How JPEG image compression is obtained using transform coding ? Explain. (16)