

B.E./B.TECH. Degree Examination, December 2020

Semester - VI

**IT16005-DIGITAL IMAGE PROCESSING****(Common to CS, EE, EC & IT)**

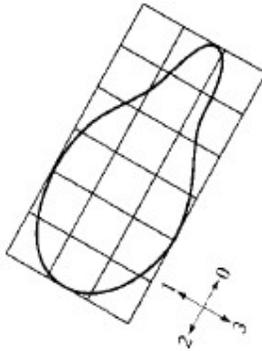
(Regulation 2016)

Time: Three hours

Maximum : 80Marks

Answer **ALL** questions**PART A - (8 X 2 = 16 marks)**

- How many bits of storage is required by a 128X128 image with 64 gray levels?  
 (a)4096  
 (b)8192  
 (c)12288  
 (d)98304
- The chain code for the following shape is given as:



- 000030032232221211
  - 003010203310321032
  - 022332103210201330
  - 012302301023100321
- What is the Euler number of the image shown below?



- 0
- 1
- 2
- 1

4. In bit-plane slicing, if an image is represented by 8 bits and is composed of eight 1-bit plane, with plane 0 showing least significant bit and plane 7 showing most significant bit. Then, which plane(s) contain the majority of visually significant data.
- Plane 4, 5, 6, 7
  - Plane 0, 1, 2, 3
  - Plane 0
  - Plane 2, 3, 4, 5
5. Sketch an image degradation model.
6. How Image brightening done with respect to Foreground and background?
7. Determine the DFT basis matrix for  $N=2$ .
8. Analyze the limitations of inverse filter?

**PART B - (4 X16 = 64 marks)**

09. (a) (i) Examine the various distance measures used for image analysis. (8)
- (ii) Demonstrate the process by which an analog image is converted in to a digital image with suitable diagrams. (8)

(OR)

- (b) (i) Perform Histogram Equalization of the given image and plot the input and output histograms of the same. (10)

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

- (ii) Describe the concept by which Homomorphic filtering is used to correct Non uniform illumination in an image. (6)
10. (a) (i) What are the derivative operators useful in image enhancement? Enumerate their role in the detection of a point, line and an edge. (8)
- (ii) Illustrate the methodology employed in region based segmentation. (8)
- (OR)
- (b) (i) What are the different types of noise model used for image restoration? Explain how Wiener filter removes the noise effectively. (10)
- (ii) Discuss the various methods of performing Dilation and Erosion on an image with an example. (6)

11. (a) Justify that image processing plays a vital role in Invehicle vision system ( 16 )

**(OR)**

- (b) Justify that Image Enhancement could be carried out efficiently by point operators. ( 16 )

12. (a) (i) Discuss about Patterns and Pattern classes. ( 8 )

- (ii) Explain an application of image recognition based on matching. ( 8 )

**(OR)**

- (b) Mention different techniques for the representation of shapes in a digital image. Explain the principle behind "Fourier Descriptor" based shape representation ( 16 )