

Total No. of Questions : 8]

SEAT No. :

**PE5521**

[Total No. of Pages : 2

[6583]-95

**T.E. (E & TC)**

**DIGITAL IMAGE PROCESSING**

**(2019 Pattern) (Semester - VI) (Elective - II) (304195 (A))**

*Time : 2½ Hours]*

*[Max. Marks : 70*

*Instructions to the candidates:*

- 1) *Answer Q1 or Q2, Q3 or Q4, Q5 or Q6, Q7 or Q8.*
- 2) *Neat diagrams must be drawn wherever necessary.*
- 3) *Figures to the right indicate full marks.*
- 4) *Your answers will be valued as a whole.*
- 5) *Use of logarithmic tables slide rule, mollier charts, electronic pocket, calculator and steam tables is allowed.*
- 6) *Assume suitable data if necessary.*

- Q1)** a) Explain Laplacian edge detector. Explain why LoG mask is preferred over Laplacian edge detector? [6]
- b) Define thresholding in image segmentation differentiate between global thresholding and adaptive (local) thresholding with suitable example. [6]
- c) What is region-based segmentation? Explain region growing and region splitting discuss their advantages and disadvantages. [6]

OR

- Q2)** a) Explain how though transform is useful for edge linkage? [6]
- b) Describe the thresholding technique in image segmentation. What is global thresholding and adaptive thresholding, also explain otsu's method. [6]
- c) Define edge detection? Explain edge detection procedure using sobel mask. [6]

- Q3)** a) What is data compression? Explain the different types of redundancies used in image compression. Give suitable example for each. [6]
- b) Explain the concept of motion estimation with the help of any one algorithm in detail. [6]
- c) Describe the Discrete Cosine Transform (DCT) and its applications in image compression. [5]

OR

*P.T.O.*

- Q4)** a) What is Y-Cb-Cr color space? Explain its transformation from RGB and its relevance in compression. [6]  
b) Draw and explain JPEG base line encode. Comment on block size used in JPEG. [6]  
c) Explain the concept of video compression describe intraframe and interframe compression techniques used in modern codecs. [5]

- Q5)** a) Explain the image degradation/restoration model. Draw the basic block diagram and describe each component involved. [6]  
b) Explain how spatial filters like mean filter and median filter are used for image restoration. [6]  
c) Describe any two common noise models used in image restoration. [6]

OR

- Q6)** a) Compare in detail between image enhancement and image restoration. [6]  
b) What are geometric transformations in image restoration? Explain translation rotation, and scaling using appropriate mathematical models. [6]  
c) Explain the concept of wiener filtering derive the wiener filter expression and describe how it restores images degraded by blur and noise. [6]

- Q7)** a) Define patterns and pattern classes in the context of object recognition. Give suitable examples. [5]  
b) Explain any one algorithm of content-based image retrieval. [6]  
c) Explain structural methods of object recognition. Discuss the concept of primitives, relationship and structural descriptions. [6]

OR

- Q8)** a) Describe decision theoretic methods for object recognition. Explain minimum distance classification on Bayes classifies. [5]  
b) Write a short note on the following structural methods : [6]  
i) Matching shape numbers  
ii) String matching  
c) Explain the process of feature extraction in object recognition. Why is feature selection important? [6]

