2021(A)New

Time : 3 hours

Full Marks : 70

Candidates are required to give their answers in their own words as far as practicable.

The figures in the margin indicate full marks.

*Answer any **five** questions.*

1. (a) With the help of a neat diagram explain the components of general purpose image processing system. 7

   (b) Explain the concept of image sampling and quantization with a proper example. 7

2. (a) Explain the concept of brightness adaption and discrimination in image processing. 7

   (b) Explain the smoothing of images in frequency domain using ideal, Butterworth and Gaussian Low pass filter. 7

3. (a) Explain the process of brightness adaption and discrimination in image processing. 7

(b) Explain the following terms : 7

(i) False contouring

(ii) Checker board effect

(iii) Neighbors of Pixel

(iv) Distance measure

4. (a) Perform histogram equalization of 5 × 5 image. 7

Gray level	Number of Pixels
0	0
1	0
2	0
3	6
4	14
5	5
6	0
7	0

(b) Explain with the block diagram, the basic steps for image filtering in frequency domain. 7

5. (a) Explain Adaptive filtering method of restoring images. List its advantages. 7

(b) Explain erosion and dilation operations used for Morphological processing. 7

6. (a) Explain the basic model of image restoration process. Explain any four important noise probability density function. 7

(b) Explain, in brief, the propertied of two dimensional Fourier Transform. 7

7. (a) Explain Wiener filtering in image processing. 7

(b) Draw the block diagram for converting Gray level intensity to color transformation and also explain it. 7

8. Write short notes on any **two** of the following : $7 \times 2 = 14$

(a) Uniform and Non-uniform quantization

(b) Perspective Projection

(c) Band pass filter

(d) Edge Linking

(e) Boundary Detection

UL (6)-Image Processing

Time: 3 hours **2022(A) New** **Full marks: 70**

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The figures in the margin indicate full marks. **Answer any five questions**

1) a) What is digital image processing? Explain the component of image processing system. [7]

b) Discuss the effects of sampling and quantization. [7]

2) Compute the length of the shortest 4, 8 and m-path between P and Q. if a particular path does not exist between these two points, explain why? If **V= {1, 2}** [14]

3	1	2	1(Q)
2	2	0	2
1	2	1	1
(P)1	0	1	2

3) Perform histogram equalization of the image. [14]

Gray Level r_k	0	1	2	3	4	5	6	7
No. of Pixels P_k	6	8	11	12	3	5	15	6

4) Suppose a continuous valued image is conserved having

$$P_r(r) = \begin{cases} 2r/(L-1)^2 & ; 0<=r<=L-1. \\ 0; \text{ otherwise.} \end{cases}$$

Calculate $P_s(s) = ?$ (Given $P_s(s) = P_r(r)\,(dr/ds)$) [14]

5 a) What is the need for image compression? Explain image compression standards in detail. [7]

b) Explain image recognition based on matching. [7]

6.) a) Explain region based segmentation technique. [7]

b) Explain in detail the method for smoothing the image in frequency domain. [7]

7) a) Explain in detail any two boundary representation schemes and illustrate with example. [7]

b) Calculate full correlation, crop correlation and convolution if 1-D function is 00010000 and W is 12328. [7]

8.) Write short notes on any two of the following: [7 + 7]

a) Gray level slicing. b) Run Length Coding.

c) Histogram. d) Logarithmic transformation.