

1T01036 - T.E.(Electronics and Telecommunication )(SEM-VI)(Choice Base Credit Grading System ) (R- 19) (C Scheme) / 89343 - Image Processing and Machine Vision

QP CODE: 10039562

DATE: 15/12/2023

Duration: 3 hrs

[Max Marks: 80]

- N.B. : (1) Question No 1 is Compulsory.  
(2) Attempt any three questions out of the remaining five.  
(3) All questions carry equal marks.  
(4) Assume suitable data, if required, and state it clearly.

1 Attempt any **FOUR**. [20]

- a Explain Butterworth frequency domain filtering. 5  
b List edge models and explain any one in short. 5  
c For the following 2 images perform 1)  $P1 = A*B$  and 2)  $P2 = \max(A, B)$  while Result =  $P1 - P2$  which is a 4-bit unsigned image. 5

$$A = \begin{bmatrix} 2 & 3 & 3 \\ 3 & 4 & 18 \\ 4 & 3 & 8 \end{bmatrix}$$
$$B = \begin{bmatrix} 2 & 5 & 8 \\ 3 & 2 & 3 \\ 5 & 2 & 1 \end{bmatrix}$$

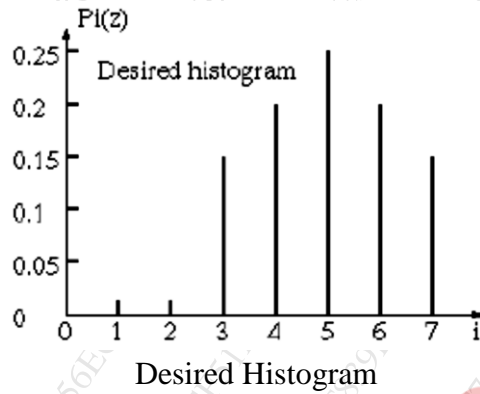
- d True or False: Second order filter is better than first order filter in edge detection. Justify. 5  
e With example explain Distance measures.
- 2 a Explain Canny edge detection algorithm in detail steps with proper diagrams. [10]  
b Write brief notes on any two of the following [10]  
1. Thresholding  
2. Fundamental steps in image processing.  
3. High boost filtering

3 a Apply 3x3 averaging filter and median filter on following image. Use mirror padding. [10]

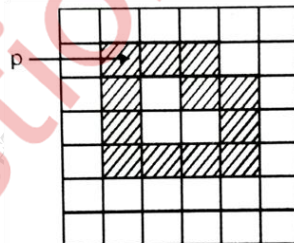
1	4	0	1	3	1
2	2	4	2	2	3
1	0	1	0	1	0
1	2	1	0	2	2
2	5	3	1	2	5
1	1	4	2	3	0

- b A 3-bit 64x64 image with 8 intensities is described in following table. Perform histogram equalization for it. The desired histogram is shown in figure below. [10]

Level	0	1	2	3	4	5	6	7
Intensity	790	1024	850	656	329	245	122	81



- 4 a Explain Hit and Miss transform with example. [10]
- b Elaborate on the following (5 marks each) [10]
1. Log transformation
  2. Co-occurrence Matrix
- 5 a Find the Chain code, Shape no., and first difference for the following image using 4 connectivity. Arrow indicates starting point. [10]



- b Generate Haar Basis for  $N=4$ . [10]
- 6 a Describe the k-means algorithm with proper diagrams. Explain all the steps. [10]
- b Explain region growing algorithm with proper example. [10]