## Paper / Subject Code: 42605 / Elective I: 1) Image Processing

(3 hours)	[80 marks]
Instructions:	
Question 1 is compulsory.	
Answer any 3 from remaining 5 Questions.	
Figures to the right indicate full marks.	
Assume suitable data wherever necessary	
Q1. a. Explain 4, 8 and m connectivity between pixels	7 5 6 6 6 6 6 6 6 6 6 6 6 6 6 6 6 6 6 6
b. Explain euclidean, D4, D8 and Dm distance by taking a su	uitable example
(5)	
c. How is line detected? Explain using the operators and also	demonstrate by taking a set of
points how edge linking can be done.	(5)
d. What is a Median filter, maximum filter and minimum fil	ter? When is the median filter
not effective in noise removal	(5)
Q2. a. Do histogram equalisation on the following image which h	as 8 discrete pixel levels (0 - 7),
transforming it into a histogram equalised image also with	
range (0-7).	(10)
02555520	£ \$ \\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\
03267230	
03322330	
02322330	
03244240	
0 2 6 4 4 4 2 0	
111111	30,000
b. What is the effect of repeatedly applying a contrast stretchi	ng and intensity slicing (10)
preserving background on a digital image	ing and intensity sheing (10)
preserving background on a digital image	
Q3. a. Consider an 8- pixel line of gray-scale data, {12, 10, 13, 13	8 10 13 57 54) which has been
uniformly quantized with 6-bit accuracy. Construct its 3-bit	
b. Given an input image F of size (3 X 3). Find filtered image R	
	using median inter using (10)
mask M.	0 1 0
$F = \begin{bmatrix} 3 & 2 & 1 \\ 5 & 2 & 6 \end{bmatrix}$ $R = \begin{bmatrix} R1 & R2 & R3 \\ R4 & R5 & R6 \end{bmatrix}$	$M = \begin{bmatrix} 0 & 1 & 0 \\ 1 & 1 & 1 \end{bmatrix}$
7 9 1 R8 R9	$\begin{bmatrix} 0 & 1 & 0 \end{bmatrix}$
Q4. a. Show that a high pass-filtered image in the frequency dom	
method of subtracting a low pass filtered image from the or	
b. How many Huffman codes possible for a 3-symbol source	? Construct these codes. (10)
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Q5. a. Segment the given 8X8 image using Region splitting. Let the predicate be threshold<=3. Also draw the quad tree. (10)

5	6	6	6	7	7	6	6
6	7	6	7	5	5	4	7
6	6	4	4	3	2	5	6
5	4	5	4	2	3	4	6
0	3	2	3	3	2	4	7
0	0	0	0	2	2	5	6
1	1	0	1	0	3	4	4
1	0	1	0	2	3	5	4

b. Explain the process of high boost filtering mathematically

(10)

(20)

- Q6. Write Short note: (Any 4)
- a) Biometric Authentication
- b) Hough Transform
- c) Opening and Closing Operations
- d) Justify the statement Laplacian is not a good edge detector
- e) Differentiate lossy and lossless Compression

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