

(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 (5)
 b. Explain euclidean, D4, D8 and Dm distance by taking a suitable 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 filter? When is the median filter not effective in noise removal (5)
- Q2. a. Do histogram equalisation on the following image which has 8 discrete pixel levels (0 - 7), transforming it into a histogram equalised image also with 8 discrete grey levels in the range (0-7). (10)
- | | | | | | | | |
|---|---|---|---|---|---|---|---|
| 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| 0 | 2 | 5 | 5 | 5 | 5 | 2 | 0 |
| 0 | 3 | 2 | 6 | 7 | 2 | 3 | 0 |
| 0 | 3 | 3 | 2 | 2 | 3 | 3 | 0 |
| 0 | 2 | 3 | 2 | 2 | 3 | 3 | 0 |
| 0 | 3 | 2 | 4 | 4 | 2 | 4 | 0 |
| 0 | 2 | 6 | 4 | 4 | 2 | 0 | |
| 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
- b. What is the effect of repeatedly applying a contrast stretching and intensity slicing preserving background on a digital image (10)
- Q3. a. Consider an 8- pixel line of gray-scale data, {12, 10, 13, 13, 10, 13, 57, 54}, which has been uniformly quantized with 6-bit accuracy. Construct its 3-bit IGS code. (10)
 b. Given an input image F of size (3 X 3). Find filtered image R using median filter using mask M. (10)
- | | | |
|---|---|---|
| 3 | 2 | 1 |
| 5 | 2 | 6 |
| 7 | 9 | 1 |
- | | | |
|----|----|----|
| R1 | R2 | R3 |
| R4 | R5 | R6 |
| R7 | R8 | R9 |
- | | | |
|---|---|---|
| 0 | 1 | 0 |
| 1 | 1 | 1 |
| 0 | 1 | 0 |
- Q4. a. Show that a high pass-filtered image in the frequency domain can be obtained by using the method of subtracting a low pass filtered image from the original (10)
 b. How many Huffman codes possible for a 3-symbol source? Construct these codes. (10)

