

GANPAT UNIVERSITY
B.Tech Sem- VII Mechatronics Engineering
MC705 - Digital Image Processing & Machine Vision
Regular Examination: - Nov/Dec - 2011

[Time: 3 Hour]

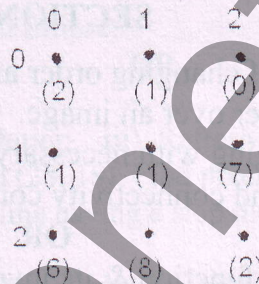
[Total Marks: 70]

Instructions:

- (1) All questions are compulsory.
- (2) Assume suitable data if necessary and mention in answer book.
- (3) Figures to the right indicate full marks.
- (4) Support answers with appropriate diagram.

SECTION – I

- Que.1 (a)** Find the edge corresponding to the minimum cost path in sub image shown below, where the numbers in parenthesis indicates intensity. Assume that edge starts in the first column and ends in last column. [8]



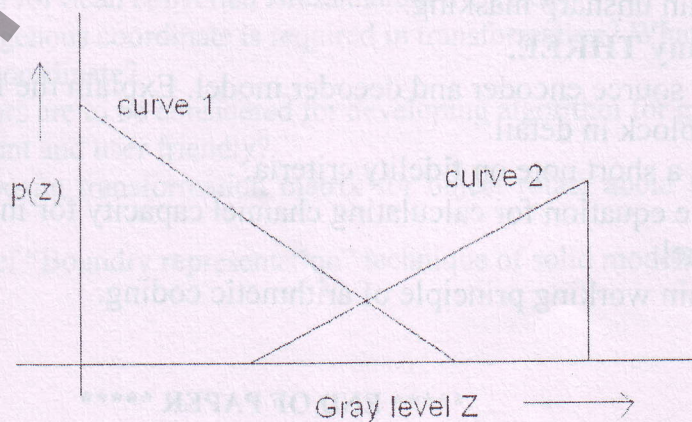
- (b)** What are the advantages of selecting threshold based on boundary characteristics? Explain thresholding technique for segmentation based on boundary characteristics. [4]

OR

- Que.1 (a)** For triangular shaped probability density function, prove that optimal threshold value is given by [8]

$$T = \frac{c_2 - c_1}{m_1 - m_2}$$

Where c_1, c_2 are constants and m_1, m_2 are slopes of curve1 and curve2 respectively.



(b) Explain combined detection technique and write down frei & chen filters. [4]

Que.2 (a) What is texture? Write down different approaches to describe texture. [6]
(b) Explain dilation and erosion operations. [5]

OR

Que.2 (a) Explain chain code representation scheme. [6]
(b) Explain signature scheme for shape representation [5]

Que.3 **Attempt any THREE.** [12]

- (a) Explain region splitting and merging technique.
(b) How the varying illumination over an image affects thresholding. Explain solution to the problem.
(c) Write down an algorithm to find orientation of an object.
(d) What is image analysis? Write a short note on elements of image analysis.

SECTION - II

Que.4 (a) Discuss the effect of changing order and cutoff frequency of butterworth low filter over an image. [4]
(b) Explain stereo imaging with necessary figure. [4]
(c) Explain neighbor and connectivity concept in an image. [4]

OR

Que.4 (a) Draw filter transfer function & its inverse fourier transform for Gaussian low pass & high pass filter. Compare result with respective ideal frequency domain filter. [4]
(b) Explain labeling algorithm. [4]
(c) Write a short note on perspective transform. [4]

Que.5 (a) Derive transformation function for contrast stretching. [4]
(b) Write a short note on laplacian operator. [4]
(c) Explain gray level slicing. [3]

OR

Que.5 (a) Write a short note on image averaging. [4]
(b) Draw block diagram for lossy predictive compression and explain its working. [4]
(c) Explain unsharp masking. [3]

Que.6 **Attempt any THREE.** [12]

- (a) Draw source encoder and decoder model. Explain the function of each block in detail.
(b) Write a short note on fidelity criteria.
(c) Derive equation for calculating channel capacity for information channel.
(d) Explain working principle of arithmetic coding.

***** END OF PAPER *****