B.E. (Electronics Engineering) Seventh Semester (C.B.S.)
Elective – I : Digital Image Processing

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Notes : 1. All questions carry marks as indicated.
2. Solve Question 1 OR Questions No. 2.
3. Solve Question 3 OR Questions No. 4.
4. Solve Question 5 OR Questions No. 6.
5. Solve Question 7 OR Questions No. 8.
6. Solve Question 9 OR Questions No. 10.
7. Solve Question 11 OR Questions No. 12.
8. Due credit will be given to neatness and adequate dimensions.
9. Assume suitable data whenever necessary.
10. Illustrate your answers whenever necessary with the help of neat sketches.

1. a) Explain the need of Sampling and Quantization, how it is implemented in Digital image processing. **8**

   b) Consider the image segment shown ut $V = \{1, 2\}$, compute the length of shortest 4-, 8- & m – path between 'p' and 'q'. If particular path does not exists between there points explain why? **5**

   3 1 2 1
   2 2 0 ②q
   1 2 1 0
   p① 0 1 2

OR

2. a) Explain the image Acquisition Methods. **8**

   b) Differentiate Spatial and Gray level resolution. **5**

3. a) The Gray level histogram of an image is given below. **8**

Gray Level	0	1	2	3	4	5	6	7
Frequency	400	700	1350	2500	3000	1500	550	0

   Compute the gray level histogram of the output image obtained by enhancing the i/p by histogram equalization Technique.

   b) What is histogram matching explain with example. **6**

OR

4. a) Explain smoothening can be achieved in time domain for image enhancement. **8**

   b) Explain Arithmetic and logical operations between images. **6**

5.	a)	Obtain the 4 – length DCT for the discrete time sequence $u(n) = \{1, 3, -2, 4\}$	6
	b)	Explain the slant transform, derive its 4×4 matrix and prove that it is read and orthogonal.	7

OR

6.	a)	Explain Haar transform and derive its 4×4 matrix.	7
	b)	Explain the properties of Hadamard transform.	6

7.	a)	Explain the various types of data redundancies in an uncompressed image.	6
	b)	Write a short notes on Huffman coding with example.	7

OR

8.	a)	Explain LZW process of compression.	7
	b)	Write short notes on Bit plane compression technique.	6

9.	a)	Find the chain code and shape numbers of the images given in fig. below also find the order of shape number. Assume 4 – connectivity.	7

	b)	Describe a point detection method for detection of isolated points in an image.	7

OR

10.	a)	Find out signature of each of following.	7

    i)   Circle   ii)   Square

    iii) equilateral triangle.

	b)	Use a hough transform to find a straight line given data points are $(0, 1),\ (1, 1),\ (2, 2)\ \&\ (3, 3)$	7

11.	a)	Explain image degradation model.	6
	b)	Explain Inverse Filtering.	7

OR

12.	a)	Explain Image restoration in presence of noise in spatial domain.	7
	b)	Explain wiener filtering.	6

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