

B.E.Eighth Semester (Electronics & Telecommunication /
Electronics & Communication Engineering) (C.B.S.)
Elective - II : Digital Image Processing

P. Pages : 3

Time : Three Hours



NKT/KS/17/7565

Max. Marks : 80

- 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.
 11. Use of non programmable calculator is permitted.

SECTION - A

1. a) Explain the fundamental steps in Digital Image Processing. 7
- b) Consider the image segment shown: 7
- i) Let $V = \{0, 1\}$ and compute the lengths of the shortest 4-, 8- and on - path between p and q. If a particular path does not exist between these two points, explain why?
- ii) Repeat for $V = \{1, 2\}$
- | | | | | |
|-----|---|---|---|-----|
| 3 | 1 | 2 | 1 | (q) |
| 2 | 2 | 0 | 2 | |
| 1 | 2 | 1 | 1 | |
| (p) | 1 | 0 | 1 | 2 |

OR

2. a) Explain in details image sensing and acquisition process. 7
- b) Explain the spatial and gray level resolution. Taking one example differentiate between these two quantities. 7
3. a) Write short note on Histogram processing. 6

b) The gray level histogram of an image is given below:

7

Gray Level Frequency of occurrence

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

Compute the gray level Histogram of the o/p image obtained by enhancing the i/p by Histogram equalization technique.

OR

4. a) Explain the bit-plane slicing technique. Show the different bit planes of 3-bit image shown below.

8

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

b) Describe the RGB, color model.

5

5. a) Generate 8×8 Harr transform from Harr function and show how it is an "orthogonal" transform.

8

b) Write short note on wavelet transform.

5

OR

6. a) Find a 8×8 transformation matrix for the Hadamard transform. State any two properties of Hadamard transform.

7

b) Explain 2-dimensional DFT.

6

7. a) Explain the generalized image compression model with neat block diagram.

6

b) Explain coding redundancy, interpixel and psychovisual redundancy.

8

OR

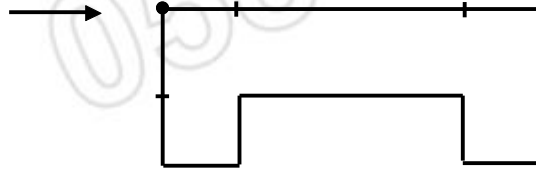
8. a) Explain LZW coding technique.

7

- b) Write a short note on MPEG and JPEG. 7
9. a) Write short note on Fourier descriptors. 7
- b) Write short note on chain code descriptor. 6

OR

10. a) What is the order of the shape number for the figure shown ? Obtain the shape number. 6



- b) Explain Gradient and Laplacian operator. 7
11. a) Draw and explain the digital image restoration system. 7
- b) Write short note on Inverse/Pseudoinverse filtering. 6

OR

12. a) Write short note on digital implementation of the Weiner filter using DFT method. 7
- b) Explain the following terms related to image restoration. 6
- i) Blind Deconvolution
- ii) Extrapolation and Super-resolution.
