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B.E. (Computer Science & Engineering) Eighth Semester (C.B.S.)

Elective - IV : Digital Image Processing

P. Pages : 2 **NIR/KW/18/3697**

Time : Three Hours * 1 4 1 8 * 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. Assume suitable data whenever necessary.
9. Illustrate your answers whenever necessary with the help of neat sketches.

1. a) What is digital image acquisition process? Explain with diagram. **7**

b) What is image sampling & quantization? Illustrate your answer with suitable diagram. **7**

OR

2. a) Explain fundamental steps in DIP using block diagram. **7**

b) Consider two image subsets S_1 and S_2 shown below for $V = \{1\}$, determine whether these two subsets are 4-adjacent or 8-adjustment. **7**

	S_1				S_2				
0	0	0	0	0	0	0	1	1	0
1	0	0	1	0	0	1	0	0	1
1	0	0	1	0	1	1	0	0	0
0	0	1	1	1	0	0	0	0	0
0	0	1	1	1	0	0	1	1	1

3. a) Differentiate among smoothing filters and sharpening filters. **6**

b) State and explain the conditions necessary for transformation function in histogram equalization. **7**

OR

4. a) Explain the following gray. Level transformations. **6**

i) Image negative. ii) Log transformation.

iii) Contrast – stretching. iv) Power-Law transformation.

b) Describe following with respect to spatial filtering. **7**

i) Filter ii) Mask

iii) Window iv Template

5. a) Explain the model of image restoration process (degradation). **7**

b) How individual elements are divided in inverse filtering? Explain in detail. **6**

OR

6. a) Compare and contrast mean filters and adaptive filters. **6**

b) Explain spatial transformation as a part of geometric transformations. **7**

7. a) What is role of flough transform in edge linking. **6**

b) Explain basic formulation of edge detection. **7**

OR

8. a) How segmentation is performed using morphological water shades. **7**

b) Explain following with respect to region based segmentation. **6**

i) Region Growing.

ii) Region splitting & merging

9. a) Draw and explain lossless predictive coding model with its encoder & decoder. **7**

b) What are different JPEG standards of image compression. **6**

OR

10. a) Explain Huffman coding algorithm. Perform Huffman coding for following string "Save trees save forests". **7**

b) What is vector quantisation? Explain with example. **6**

11. Write short notes on **any two.** **14**

i) Graph matching. ii) Clustering.

iii) Tree search. iv) Tropological Attributes.

OR

12. a) Describe the recognition based on decision theoretic methods. **7**

b) Explain boundary based description and region based description. **7**

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The secret of getting ahead is getting started.

~ Mark Twain