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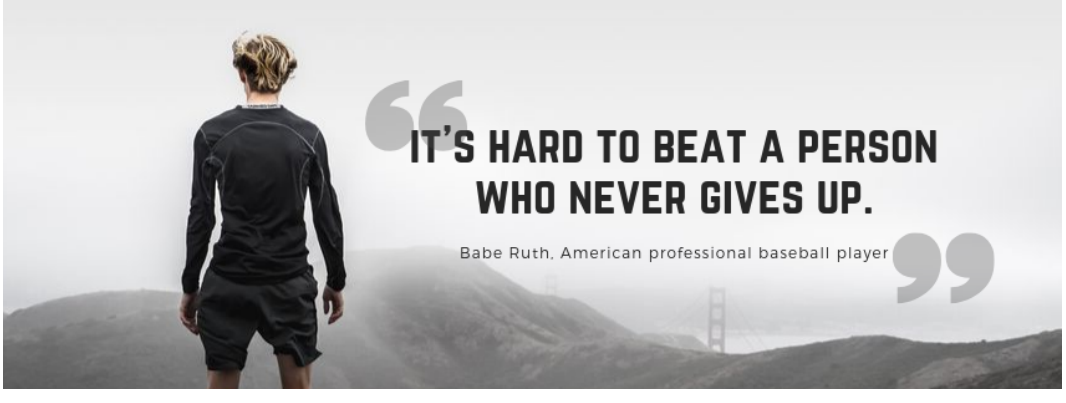

B.E. (Computer Science & Engineering) Eighth Semester (C.B.S.)

Elective-IV : Digital Image Processing

P. Pages : 2 **NRJ/KW/17/4753**

Time : Three Hours * 0 2 7 2 * 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.
10. Use of non programmable calculator is permitted.

1. a) Explain about Vidicon in details. **7**

b) What is sampling and Quantization? Explain the basic idea behind sampling and quantization with the help of diagram. **6**

OR

2. a) Differentiate between **6**
i) Photopic vision and scoptopic vision.
ii) Luminance and Reflectance.

b) Consider the image segment shown. Let v = {0,1} and v = {1,3} compute the length of the shortest 4,8, and m path between p & q, if a particular path doesn't exists, explain the reason. **7**

	3	1	2	1 (q)
	2	2	0	2
	1	2	1	1
(p)	1	0	1	2

3. a) What is Histogram. Gray level histogram of an image is given below. **7**

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 input by histogram equalization technique.

b) Explain Homomorphic Filtering approach for image enhancement. **7**

OR

4. a) What is the purpose of color model in image enhancement? Explain RGB and YIQ color model. **7**

b) Explain Smoothing & sharpening of Spatial Filter. **7**

5. a) Explain Wiener Filtering with constraint restoration. **7**

b) Write short note on following Mean filters. **6**
i) Arithmetic Mean filter.
ii) Geometric Mean filter.
iii) Harmonic Mean filter.

OR

6. a) Explain important Noise probability Density function in details. **7**

b) Explain Spatial transformation as a part of geometric transformation. **6**

7. a) Enlist and explain in details the detection of basic discontinuities in a digital image. **7**

b) Write short note on image thresholding. **6**

OR

8. a) Explain the process of region splitting and merging with an example. **7**

b) What is the role of Hough transform in edge linking. **6**

9. a) Explain with neat block diagram the working of an image compression model. **7**

b) Perform Huffman coding for following: **7**

Symbols:	S_1	S_2	S_3	S_4	S_5	S_6	S_7	S_8
Probability:	0.02	0.15	0.03	0.15	0.05	0.2	0.1	0.3

Determine
i) Average length of code. ii) Entropy of source.

OR

10. a) Explain briefly Fidelity Criteria in image compression. **7**

b) Explain the different type of data redundancies in digital image compression. **7**

11. a) Explain chain codes in detail. Find the chain code and shape number of the image in figure. Also Find the order of the shape number. **7**
[Assume 4-connectivity]

b) Write short note on polygonal approximation. **6**

OR

12. a) Explain skeleton and shape numbers in detail. **7**

b) Explain boundary segmentation. **6**

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The secret of getting ahead is getting started.

~ Mark Twain