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B.E. (Information Technology) Eighth Semester (C.B.S.)

Elective-III : Digital Image Processing

P. Pages : 2 **NRT/KS/19/3703**

Time : Three Hours * 0 8 1 6 * 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.

1. a) What is digital image processing? Describe the elements of digital image processing system. **9**

b) Explain with the help of example image sampling & quantization. **5**

OR

2. a) Define: - **5**
i) Hue ii) Contrast
iii) Saturation iv) Brightness
v) Mach band effect

b) Explain the discrete cosine transform. **4**

c) Explain about Vidicon in brief. **5**

3. a) Elaborate Histogram processing. Gray level histogram of an image is given below. **10**

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

Compute the gray level histogram of output image obtaining by enhancing the input by histogram equalization technique.

b) Discuss RGB color model in detail. **3**

OR

4. a) Explain concept of special filtering. **7**

b) Write short note on **any two.** **6**
i) Median filter
ii) Histogram matching
iii) Harmonic filters

5. a) How Wiener filtering is useful to reduce the mean square error. **6**

b) What do you mean by unconstrained restoration? **3**

c) Write short note on Gray level interpolation. **4**

OR

6. a) What do you mean by degradation? Give degradation process model for a continuous function giving relevant mathematical support? **7**

b) Explain removal of blur caused by uniform linear motion. **6**

7. a) Elaborate the process of Dam construction & watershed in segmentation. **8**

b) Discuss how region splitting & merging approach is used in image segmentation. **6**

OR

8. a) Write short note on: - **5**
Region growing by Pixel segmentation.

b) Explain the global process via the Hough transform. **8**

9. a) Design a binary Huffman code for a discrete source three independent symbols α, β, γ with probability 0.9, 0.08 and 0.02 respectively. **8**
Determine -
i) Entropy of source
ii) Average length of code.
iii) Coding efficiency

b) How images are compressed using JPEG image compression standard? **5**

OR

10. a) Enlist objective of image compression. **5**

b) Briefly explain transform coding with neat sketch. **5**

c) Write short note on: - **3**
MPEG.

11. a) Explain feature extraction in topological & geometric attributes. **6**

b) Discuss about Region based description in details. **7**

OR

12. Write short notes on: - **13**
i) Stastical classification ii) Syntactic Recognition
iii) Clustering iv) Graph matching

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All our dreams can come true if we have the courage to pursue them.

~ Walt Disney