CBCS SCHEME

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17CS753

Seventh Semester B.E. Degree Examination, Jan./Feb.2021
Digital Image Processing

Time: 3 hrs. Max. Marks: 100

Note: ***Answer any FIVE full questions, choosing ONE full question from each module.***

Important Note : 1. On completing your answers, compulsorily draw diagonal cross lines on the remaining blank pages.
2. Any revealing of identification, appeal to evaluator and /or equations written eg, 42+8 = 50, will be treated as malpractice.

Module-1

1 a. Explain the concept of sampling and quantization. **(10 Marks)**

b. Explain the important relationships between pixels in a digital image. **(10 Marks)**

OR

2 a. Describe the spatial operations that are performed on the pixel of a given image. **(10 Marks)**

b. Explain the components of an image processing system with a suitable block diagram. **(10 Marks)**

Module-2

3 a. Perform the Histogram Equalization of the following image:

$f(x,y) =$

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

(10 Marks)

b. Apply Histogram specification to the 8×8, Eight level image given below:

Pixel Distribution of the image

P_K	8	10	10	2	12	16	4	2
Y_K	0	1	2	3	4	5	6	7

The target Histogram is as below:

Y_K	0	1	2	3	4	5	6	7
P_K	0	0	0	0	20	20	16	8

(10 Marks)

OR

4 a. Write note on :

(i) Bit-plane slicing.

(ii) Power law transformations.

(iii) Log Transformations. **(08 Marks)**

b. How do you characterize the spatial filters? **(04 Marks)**

c. Explain the spatial filters that are used for image sharpening. **(08 Marks)**

Module-3

5 a. Write the algorithm for frequency domain filtering. **(08 Marks)**

b. Discuss the following frequency domain filters:

(i) Two dimensional Ideal Low Pass filter.

(ii) Butterworth Low Pass filters.

(iii) Gaussian Low pass. **(12 Marks)**

OR

6 a. Explain homomorphic filter with procedure for applying the same. **(10 Marks)**
b. Write the properties of Discrete Fourier transforms. **(10 Marks)**

Module-4

7 a. Write the formal definition of image segmentation. **(06 Marks)**
b. What is an edge? Explain the edges normally encounterd in image processing. Why it is important? **(08 Marks)**
c. Explain the three types of Grey level discontinuities in image processing. **(06 Marks)**

OR

8 a. Explain various Gradient operators used for edge detection. **(12 Marks)**
b. Discuss the following:
(i) Marr-Hildrith operator.
(ii) Canny Edge detector. **(08 Marks)**

Module-5

9 a. Explain the principal types of data redundancies. **(10 Marks)**
b. With the block diagram, explain the general image compression system. **(06 Marks)**
c. Write the differences between lossless and lossy compression. **(04 Marks)**

OR

10 Explain the following:
a. Arithmetic coding.
b. LZW coding.
c. Run length coding.
d. Huffman coding. **(20 Marks)**

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