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BTECH
(SEM VII) THEORY EXAMINATION 2024-25
DIGITAL IMAGE PROCESSING

TIME: 3 HRS

M.MARKS: 100

Note: Attempt all Sections. In case of any missing data; choose suitably.

SECTION A

1. Attempt all questions in brief.

2 x 10 = 20

Q no.	Question	CO	Level
a.	Differentiate between a grayscale image and a binary image.	1	K1
b.	Define quantization and its effect on image quality.	1	K1
c.	Define unsharp masking and its application.	2	K1
d.	What is the purpose of bandpass filtering.	2	K2
e.	Mention any two properties of the Fourier Transform.	3	K2
f.	Mention one advantage and one limitation of the DST.	3	K2
g.	Define the term "redundancy".	4	K1
h.	What is run-length encoding (RLE) and where is it used?	4	K1
i.	Define the principle of edge detection in image segmentation.	5	K1
j.	What is a "seed point" in region-growing techniques?	5	K2

SECTION B

2. Attempt any three of the following:

10 x 3 = 20

Q no.	Question	CO	Level
a.	Enlist various fundamental steps in Digital Image Processing with neat block diagram.	1	K2
b.	Describe the concept of image smoothing using spatial domain techniques. Include examples of low-pass filters.	2	K2
c.	What is Haar Transform? Write the procedure to determine the Haar transformation matrix.	3	K1
d.	Explain the MPEG video compression standard and its application in multimedia systems.	4	K2
e.	What is the Hough Transform used for in image processing? What types of shapes can be detected using the Hough Transform?	5	K2

SECTION C

3. Attempt any one part of the following:

10 x 1 = 10

Q no.	Question	CO	Level
a.	Explain the structure and usage of common image file formats, such as JPEG, PNG, BMP, and TIFF. Highlight the advantages and limitations of each.	1	K1
b.	Describe the digital halftone process and its significance in image representation for printing and display.	1	K2



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4. Attempt any one part of the following: 10 x 1 = 10

Q no.	Question	CO	Level
a.	Explain histogram-based techniques for image enhancement. Illustrate with examples how histogram equalization enhances image quality.	2	K2
b.	Define image restoration and explain its role. Discuss the different types of image degradations.	2	K2

5. Attempt any one part of the following: 10 x 1 = 10

Q no.	Question	CO	Level
a.	What is Hadamard transform? Explain in detail and Write its properties.	3	K1
b.	Explain the Karhunen-Loève Transform and its significance in image compression. Discuss its advantages.	3	K2

6. Attempt any one part of the following: 10 x 1 = 10

Q no.	Question	CO	Level
a.	Differentiate between lossless and lossy compression techniques with suitable examples.	4	K1
b.	Explain the working of Huffman coding as a lossless compression algorithm with an example.	4	K2

7. Attempt any one part of the following: 10 x 1 = 10

Q no.	Question	CO	Level
a.	What is the region-growing technique in image segmentation? How is the seed point selected in the region-growing algorithm?	5	K1
b.	Define thresholding. What is the difference between global and adaptive thresholding?	5	K2