(2 ½ Hours) [Total Marks: 75]

- N.B. 1) All questions are compulsory.
 - 2) Figures to the right indicate marks.
 - 3) Illustrations, in-depth answers and diagrams will be appreciated.
 - 4) Mixing of sub-questions is not allowed.

Q. 1 Attempt All (Each of 5Marks)

(15M)

- (a) Multiple Choice Questions:
- The transition between continuous values of the image function and its digital equivalent is called _____
 - a) Quantisation
 - b) Sampling
 - c) Rasterisation
 - d) None of the Mentioned
- 2 The mask shown in the figure below belongs to which type of filter?

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- a) Sharpening spatial filter
- b) Median filter
- c) Sharpening frequency filter
- d) Smoothing spatial filter
- 3 Hit-or-miss transformation is used for shape
 - a) Removal
 - b) Detection
 - c) Extraction
 - d) Hiding
- 4 Encoder is used for
 - a) image enhancement
 - b) image compression
 - c) image decompression
 - d) image equalization
- 5 Which of the following color model is used for color printing?
 - a) RGB
 - b) CMY
 - c) CMYK
 - d) CMY and CMYK

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Paper / Subject Code: 87005 / Digital Image Processing

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Attempt the following (Any THREE) (Each of 5Marks)												
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Write a short note on Gray Level slicing.												
Explain various techniques of image arithmetic.												
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Gray levels	0	0	0	6	14	5	0	0	ion			
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The range of values space Erosion followed by dilar A gradient operator for The difference in intensite levels in an image is	The range of values spanned Erosion followed by dilation A gradient operator for edge The difference in intensity be levels in an image is	The range of values spanned by the Erosion followed by dilation is call A gradient operator for edge detect. The difference in intensity between levels in an image is	The range of values spanned by the gray Erosion followed by dilation is calledA gradient operator for edge detection in the difference in intensity between the levels in an image is	The range of values spanned by the gray scale Erosion followed by dilation is called	The range of values spanned by the gray scale is callerosion followed by dilation is called A gradient operator for edge detection is The difference in intensity between the highest and levels in an image is is the general form of represent transformation. Short Answers: What is the name of process used to correct the pophenomena? The transformation s = T(r) producing a gray level input image. Then, if the T(r) is satisfying 0 ≤ T(r) ≤ what does it signifies? What do you mean by the term pixel depth? State True or False- Lossy Compression achieves g What do you mean image segmentation? Attempt the following (Any THREE) (Each of 5M. Write a short note on Sampling and Quantization. The input matrix x(m,n) and h(m,n). Perform the lithese two matrices. x(m,n)={1,2,3; 4,5,6; 7,8,9} h(m,n)={1,1; 1,1; 1,1} Differentiate between monochrome and grayscale Discuss Haar Transform. Give any five applications of image processing sys Write a short note on KL transform. Attempt the following (Any THREE) (Each of 5M. What is Structuring Element? Discuss its usage in the Write a short note on Gray Level slicing. Explain various techniques of image arithmetic.	The range of values spanned by the gray scale is called_Erosion followed by dilation is called A gradient operator for edge detection is The difference in intensity between the highest and the levels in an image is is the general form of representation transformation. Short Answers: What is the name of process used to correct the power-laphenomena? The transformation s = T(r) producing a gray level s for input image. Then, if the T(r) is satisfying 0 ≤ T(r) ≤ 1 in what does it signifies? What do you mean by the term pixel depth? State True or False- Lossy Compression achieves greater What do you mean image segmentation? Attempt the following (Any THREE)(Each of 5Marks) Write a short note on Sampling and Quantization. The input matrix x(m,n) and h(m,n). Perform the linear of these two matrices. x(m,n)={1,2,3; 4,5,6; 7,8,9} h(m,n)={1,1; 1,1; 1,1} Differentiate between monochrome and grayscale image Discuss Haar Transform. Give any five applications of image processing system. Write a short note on KL transform. Attempt the following (Any THREE) (Each of 5Marks) What is Structuring Element? Discuss its usage in morph Write a short note on Gray Level slicing. Explain various techniques of image arithmetic.	The range of values spanned by the gray scale is called	Erosion followed by dilation is called A gradient operator for edge detection is The difference in intensity between the highest and the lowest intensity levels in an image is is the general form of representation of log transformation. Short Answers: What is the name of process used to correct the power-law response phenomena? The transformation s = T(r) producing a gray level s for each pixel value r of input image. Then, if the T(r) is satisfying 0 ≤ T(r) ≤ 1 in interval 0 ≤ r ≤ 1, what does it signifies? What do you mean by the term pixel depth? State True or False- Lossy Compression achieves greater compression. What do you mean image segmentation? Attempt the following (Any THREE)(Each of 5Marks) Write a short note on Sampling and Quantization. The input matrix x(m,n) and h(m,n). Perform the linear convolution between these two matrices. x(m,n)={1,2,3; 4,5,6; 7,8,9} h(m,n)={1,1; 1,1; 1,1} Differentiate between monochrome and grayscale image. Discuss Haar Transform. Give any five applications of image processing system. Write a short note on KL transform. Attempt the following (Any THREE) (Each of 5Marks) What is Structuring Element? Discuss its usage in morphological operation? Write a short note on Gray Level slicing. Explain various techniques of image arithmetic.		

Q. 4 Attempt the following (Any THREE) (Each of 5Marks) (15)(a) Obtain the Huffman code for the word 'COMMITTEE'. (b) Write a short note on Laplacian of Gaussian (LOG). (c) Discuss how Arithmetic coding is used in image compression? (d) Compare and contrast between inter pixel redundancy and coding redundancy. (e) How is thresholding used in image segmentation? Explain- Region Splitting and Merging. (f) Q. 5 Attempt the following (Any THREE) (Each of 5Marks) (15)(a) Explain 2D Line Impulse signal in detail. (b) List and Explain limitations of the RGB Color Model. (c) Compare lossy and lossless image compression. (d) Explain Euclidean distance, City block distance, chess board distance. Write a short note on Slant Transform. (e)

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