

**M.Sc. Semester-IV Examination 2017**  
**Computer Science**  
**Course : MCSC-41**  
**(Digital Image Processing)**

**Time : 3 Hours**

**Full Marks : 40**

Questions are of value as indicated in the margin

Answer **any four** questions

1. (a) Explain the role of kernel used in a digital image transformation. State the forward fourier kernel and the backward fourier kernel used in digital image. 2+2=4  
(b) Determine the complexity of transforming a spatial digital image of size  $m \times n$  into its frequency counterpart using fourier transform. Justify how this can be reduced by using fast fourier transformation? 2+4=6
  2. (a) What is adjacency of a pixel in a digital image? Explain how it is different from connectivity. Justify "Adjacency is preserved under translation". 1+2+3=6  
(b) Explain the importance of distance metric with respect to adjacency. In this context define a path connecting two pixels in a digital image. 2+2=4
  3. (a) Indicate the significance of image enhancement. Explain in this context –  
(i) Contrast stretching (ii) Gray level slicing 1+(3×2)  
(b) Explain histogram equalization with an example. 3
  4. What do you mean by image registration? With an example indicate a mask based procedure used for image registration. 2+8=10
  5. (a) What is image differencing? State one of its uses. 2+2=4  
(b) What is the significance of Laplacian in digital image processing? In this context provide two different Laplacian operators used. 2+2+2=6
  6. (a) Explain mean filtering and median filtering with suitable examples. 2+2=4  
(b) Reduce the computational complexity associated to these filters used on a digital image of size  $m \times n$ . 3+3=6
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