

**M.Sc. Examination 2018**  
**Semester-IV**  
**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 Histogram Equalization with an example. 7  
b) Illustrate Image Differencing. Indicate a use of this. 2+1=3
  2. a) Explain indicating respective transfer characteristics of (i) Gray image negation, (ii) Contrast stretching, (iii) Slicing. 2×3=6  
b) What is image binarization? Indicate the significance of thresholding in binarization. Can you suggest use of multiple thresholding to achieve infinitive gradation of a grey image? 1+1+2=4
  3. a) What is image sharpening ? Explain how Laplacian operator may be useful to achieve this. 1+4=5  
b) Define distance metric. Illustrate (i) Euclidean distance, (ii) Manhattan distance (iii) chessboard distance. 2+(1×3)=5
  4. a) Discuss how (i) Translation (ii) Rotation (iii) Scaling may be represented in respect of digital images. Hence explain composition. (2×3)+1=7  
b) Explain - (i)  $N_4$ , (ii)  $N_D$ , and (iii)  $N_8$  neighbour of a pixel. 1×3=3
  5. a) State – (i) Mean filtering, (ii) Median filtering with requisite diagram. Deduce their computation overhead in respect of a digital image of size  $MXN$ . (2×2)+(1×2)=6  
b) Describe Discrete Fourier Transform. 4
  6. Write short notes on (**any two**) : 5×2=10
    - a) Image Registration
    - b) Image digitization and sampling
    - c) Frequency Kernel
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