MCA   (Sem.–4)
DIGITAL IMAGE PROCESSING
Subject Code : PGCA1963
M.Code : 91860
Date of Examination : 13-07-22

Time : 3 Hrs.   Max. Marks : 70

INSTRUCTIONS TO CANDIDATES :
1. **SECTION-A is COMPULSORY consisting of TEN questions carrying TWO marks each.**
2. **SECTION - B & C have FOUR questions each.**
3. **Attempt any FIVE questions from SECTION B & C carrying TEN marks each.**
4. **Select atleast TWO questions from SECTION - B & C.**

SECTION-A

l.   **Write short notes on :**

a)   Define the terms brightness, contrast, hue and saturation with respect to a digital image.

b)   Give a short note on geometric transformations in digital image.

c)   What is quantization in image processing?

d)   Explain the process of up-sampling in image.

e)   Distinguish between smoothing and sharpening filters.

f)   Explain about image restoration using Weiner filter.

g)   Differentiate between lossless and lossy image compression.

h)   Compare the image compression standards JPEG and MPEG.

i)   Define edge and corner information in image. State the significance of edge information.

j)   What is multivariable thresholding in segmentation?

SECTION-B

2. Write about different colour models in image processing. Explain how colour images are represented using HSI colour space model.

3. What is histogram equalization? Perform equalization on the histogram given below :

Grey Level	0	1	2	3	4	5	6	7
Frequency	0	10	80	220	300	242	75	0

4. What is morphological processing? Explain erosion and dilation operation in detail?.

5. Differentiate between low pass and high pass filter. Explain how low pass filtering can be performed using frequency domain method.

SECTION-C

6. Explain inverse filtering. Give the drawbacks of inverse filtering in image restoration.

7. Explain any DCT based image compression scheme. Compare the same with Wavelet based image compression method.

8. Explain Huffman coding. Perform Huffman coding for the following set of symbols.

Symbol	Probability
A	0.2
B	0.1
C	0.05
D	0.6
E	0.05

9. Explain edge detection using gradient operator. How edge linking can be done using Hough transforms?

NOTE : Disclosure of Identity by writing Mobile No. or Marking of passing request on any paper of Answer Sheet will lead to UMC against the Student.