Roll No ....

MCADD-804 (3)
M.C.A. (Integrated), VIII Semester
Examination, May 2023
Digital Image Processing
(Elective - III)
Time : Three Hours

Maximum Marks : 70

Note: i) Attempt any five questions.

ii) All questions carry equal marks.

1. a) What is the need of Image Digitalization? Explain image sampling and quantization.

   b) A 5×5 image patch is shown below. Compute the value of the marked pixel it is smoothened by a 3×3 average filter.

$$f(m,n) = \begin{bmatrix} 0 & 1 & 2 & 3 & 2 \\ 5 & 6 & 7 & 8 & 4 \\ 4 & 3 & ② & 1 & 2 \\ 8 & 7 & 6 & 5 & 3 \\ 1 & 5 & 3 & 7 & 8 \end{bmatrix}$$

2. a) What do you mean by histogram processing? If all the pixels in an image are shuffled, will there be any change in the histogram? Justify your answer.

   b) What is Image Filtering? Compare frequency domain and spatial domain filters.

3. a) Draw and explain image degradation/restoration model. How degradation function is estimated? Explain in detail.

b) Explain Median Filter. List three main properties of a median filter.

4. a) Explain:
   i) Directional Filters
   ii) Prewitt Filters
   b) Explain sharpening of an image using low pass and high pass filters.

5. a) What is meant by Pseudo-colouring? For what purpose is it useful? Explain how a pseudo coloured image can be obtained?
   b) Explain the following in terms of colour image processing:
   i) Colour spare
   ii) Tristimulus values

6. a) What do you mean by homomorphic filters? Explain its advantages in frequency domain.
   b) Explain edge enhancement using frequency domain filters.

7. a) Distinguish between image segmentation based on thresholding with image segmentation based on region-growing techniques.
   b) Explain Dilation, Erosion, Opening and Closing.

8. Write short notes (any two):
   i) Image segmentation based on colours
   ii) Line and edge detection
   iii) Image sensing and acquisition
   iv) Laplarian Filters

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