USN ☐☐☐☐☐☐☐☐☐☐ **17EC72**

Seventh Semester B.E. Degree Examination, July/August 2021
Digital Image Processing

Time: 3 hrs.   Max. Marks: 100

Note: *Answer any FIVE full questions.*

1 a. Draw the block diagram of General Purpose image processing system and explain it.
(08 Marks)
b. Explain the process of image sampling and quantization. **(08 Marks)**
c. Let p and q are pixels at co-ordinates (10, 12) and (15, 20) respectively. Find the which distance measure gives minimum distance between them. **(04 Marks)**

2 a. Discuss the relationship between pixels in details. **(08 Marks)**
b. Consider the image segment,

3	1	2	①	q
2	2	0	2	
1	2	1	1	
p	①	0	1	1

Let V = [0, 1], compute the length of 4, 8 and M path between p and q. If a particular path does not exist between p and q explain why? **(08 Marks)**
c. Mention the applications of image. **(04 Marks)**

3 a. Explain the following intensity transformation functions:
   (i)   Image negatives.
   (ii) Log transformation.
   (iii) Power law transformation. **(12 Marks)**
b. Explain Bit plane slicing with example. **(08 Marks)**

4 a. With the block diagram, and mathematical equations, explain Homomorphic filtering.
(10 Marks)
b. Explain the Butterworth LPF and Gaussian LPF for image smoothing. **(10 Marks)**

5 a. Discuss the most commonly used noise probability density functions in image processing applications. **(10 Marks)**
b. Explain the following techniques used for noise removal in image processing:
   (i)   Arithmetic mean filter.   (ii)   Median filter **(10 Marks)**

6 a. Explain the followings for periodic noise reduction:
   (i)   Band rejection filters.
   (ii) Band pass filters. **(10 Marks)**
b. Discuss the three principal way to estimate the degradation function for use in image restoration. **(10 Marks)**

7 a. Discuss the following color models:
   (i)   RGB color model.
   (ii) CMY model.
   (iii) HSI model **(15 Marks)**
b. Given RGB = (0.683, 0.1608, 0.1922) convert this to HSI model. **(05 Marks)**

8 a. Draw the block diagram of pseudo color processing and explain it. (08 Marks)
   b. Explain two dimensional four band filter band for subband image coding. (08 Marks)
   c. What is duality of a morphological image processing? (04 Marks)

9 a. Explain the following of image segmentation:
      (i)   Line detection
      (ii) Edge detection. (12 Marks)
   b. Explain region Splitting and Merging. (08 Marks)

10 a. Explain the chain codes used to represent a boundary. (08 Marks)
   b. Write the Otsu's algorithm used for optimum global thresholding. (08 Marks)
   c. What is skeletons? (04 Marks)

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