Reg. No. : | | | | | | | | | | |

Question Paper Code: 99215

B.E./B.Tech. DEGREE EXAMINATION, NOV 2024

Professional Elective

Computer Science and Engineering

19UCS915 - IMAGE PROCESSING

(Régulations 2019)

Duration: Three hours | Maximum: 100 Marks

Answer All Questions

PART A - (10 x 2 = 20 Marks)

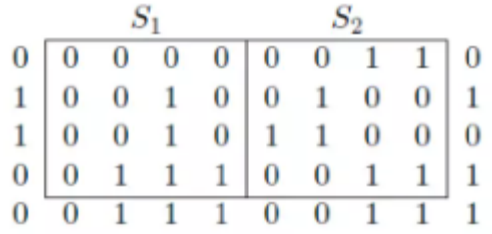
1.	Define sampling and quantization	CO1 -U
2.	Find the RGB coordinate of a color at (0.25, 0.5, and 0.75) in CMY space.	CO1 -App
3.	What is the difference between spatial and frequency domains in filtering?	CO1- U
4.	List the different types of spatial filters	CO1- U
5.	How the spatial domain signal is converted into frequency domain?	CO1- U
6	Write a matlab code for median filter.	CO1 -App
7	What is image segmentation?	CO1- U
8	Enumerate the steps in the region growing algorithm.	CO1- U
9	What are the five morphological operations?	CO1- U
10	What are the advantages of morphological image processing?	CO1- U

PART – B (5 x 16= 80 Marks)

11.	(a)	Use the following components R= 24, G=98 and B=118 and convert into HSI component, CMY, YIQ	CO2- App	(16)

Or

(b) Consider the two image subsets S1 and S2 shown below. For V={1}, determine how many 4-connected, 8-connected,m-connected Components there are in S1 and S2. Are S1 and S2 adjacent? CO2 -App (16)



12. (a) Consider the following image and perform different types of basic gray level transformation -Logarithmic(c=1 and c=L/log10(1+L)
Power –low (Gamma=0.5)
Digital negative CO1-U (16)

$$\begin{bmatrix} 4 & 4 & 4 & 4 & 4 \\ 3 & 4 & 5 & 4 & 3 \\ 3 & 5 & 5 & 5 & 3 \\ 3 & 4 & 5 & 4 & 3 \\ 4 & 4 & 4 & 4 & 4 \end{bmatrix}$$

Or

(b) Obtain Histogram and Histogram equalization for a given image (4 x 4) – 4 bit per pixel is given by CO1-U (16)

(i)

4	3	5	2
3	6	4	6
2	2	6	5
7	6	4	1

(ii)

10	12	8	9
10	12	12	14
12	13	10	9
14	12	10	12

13. (a) Convert the given spatial domain image using Fourier transform and perform Ideal low pass filter to smoothen the image choose D0 as 0.5. Show the step by step procedure for doing the same. CO2 -App (16)

1	0	1	0
1	0	1	0
1	0	1	0
1	0	1	0

Or

(b) Convert the given spatial domain image using Fourier transform and perform Gaussian low pass filter to smoothen the image choose D0 as 0.5. Show the step by step procedure for doing the same. CO2 -App (16)

1	0	1	0
1	0	1	0
1	0	1	0
1	0	1	0

14. (a) Construct the Huffman code for the given image CO2- App (16)

$$\begin{bmatrix} 4 & 4 & 4 & 4 & 4 \\ 3 & 4 & 5 & 4 & 3 \\ 3 & 5 & 5 & 5 & 3 \\ 3 & 4 & 5 & 4 & 3 \\ 4 & 4 & 4 & 4 & 4 \end{bmatrix}$$

Or

(b) Detect edge in the following image using strength (Magnitude) and direction of gradient. Use prewitt operator. Find an edge in horizontal direction.(Mx(x,y)= CO2- App (16)

-1	-1	-1
0	0	0
1	1	1

f(x,y)=

0	30	60
5	32	62
10	38	64

15. (a) Explain the morphological transform that uses morphological CO1- U (16)

erosion operation for detecting a given pattern in an image

Or

(b) Explain about region filling for morphological processing with a suitable example CO1- U (16)