Reg. No. :

Question Paper Code: U2301

M.E. DEGREE EXAMINATION, APRIL 2024

Second Semester

Computer Science and Engineering

21PCS201 - IMAGE PROCESSING AND ANALYSIS

(Regulations 2021)

Duration: Three hours   Maximum: 100 Marks

Answer ALL Questions

PART A - (10 x 2 = 20 Marks)

1. What is the size of the image, if its pixel resolution is 1024X1024 and bpp=8?   CO2- App

2. Convert RGB Color Space image to HSI Components Value of Pixel   CO2- App
   (100,150,200).

3. Consider the following 2-bit image of size 5X5: Find the mean(Average Intensity)   CO2- App
   value of r?

0	0	1	1	2
1	2	3	0	1
3	3	2	2	0
2	3	1	0	0
1	1	3	2	2

4. Consider the following image, Apply Weighted Average Filter to calculate the new   CO2- App
   value of the pixel (2,2) if smoothing is done using a 3X3 Neighborhood.

0	1	0	2	7
2	7	7	4	0
5	6	4	3	3
1	1	0	7	5
5	4	2	2	5

5. Formulate how the derivatives are obtained in edge detection   CO2- App

6. Identify the detection of discontinuity in an image using segmentation   CO2-App

7. Calculate values of a standard 8.5" by 11" sheet of paper scanned at 100 samples   CO2- App
per inch (dpi) and quantized to two gray levels (binary image) would require more
than 100k bytes to represent

8. If an image contain spatial or temporal redundancies can be exploited for data   CO2- App
compression. Differentiate Lossy and Lossless Compression

9. Find the normalized starting point of the code 10176722335422.   CO2- App

10. What is the order of the shape number for the figure shown? Please obtain the   CO1- App
shape number
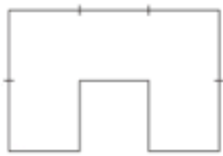
PART B - (5 x 16 = 80 Marks)

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

Or

(b) Let V = {1, 2} and compute the lengths of the shortest 4-, 8-, and m-   CO2-App   (16)
path between p and q. If a particular path does not exist between
these points, explain why.

3	1	2	1(q)
2	2	0	2
1	2	1	1
1 (p)	0	1	2

12 (a) Equalize the Given Histogram   CO2- App   (16)

Gray Levels	0	1	2	3	4	5	6	7
No of Pixels	790	1023	850	656	329	245	122	81

Or

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(b) Consider the given input image (f) and the filter. Apply Correlation on the input image. Find the final output of the image (g) CO2- App (16)

2	2	2	3
2	1	3	3
2	2	1	2
1	3	2	2

1	-1	-1
1	2	-1
1	1	1

13. (a) Given the following set of Points use Hough Transform to join these points A(1,4) B(2,3) C(3,1) D(4,1), E(5,0) CO2- App (16)

Or

(b) Apply the laplacian operator for detection of isolated points and lines in image segmentation. CO2- App (16)

14. (a) Decode the message 0.32256 based on the coding model CO2- App (16)

Symbol	a	e	i	O	u	!
Probability	0.2	0.3	0.1	0.2	0.1	0.1

Or

(b) Use Run length coding to find the frequency of occurrence in the given image and brief about the method. CO2- App (16)

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

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15 (a) Calculate the Erosion and dilation of the following image. Let the CO2- App (16)
. image A be

11	18	13	12
12	2	22	22
22	22	22	2
1	68	70	6

Let the image B be

1	1	1
1	1	1
1	1	1

Or

(b) Design a coder for a source that emits letters from an alphabet CO2- App (16)
A={k1,k2,k3,k4,k5} with probabilities P(k1)=p(k3)=0.2, P(k2)=0.4,
P(k4)= P(k5)=0.1, entropy = 2.122bits/symbol. Find a Huffman code
for this source, the average length of the code and its redundancy

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