PRESIDENCY UNIVERSITY
BENGALURU

SCHOOL OF ENGINEERING
END TERM EXAMINATION - JAN 2023

Semester : Semester III - 2021
Course Code : CSE3081
Course Name : Sem III - CSE3081 - Digital Image Processing
Program : B.Tech. CSE (All)

Date : 11-JAN-2023
Time : 1.00PM - 4.00PM
Max Marks : 100
Weightage : 50%

Instructions:
(i) Read all questions carefully and answer accordingly.
(ii) Question paper consists of 3 parts.
(iii) Scientific and non-programmable calculator are permitted.

PART A

ANSWER ALL THE TEN QUESTIONS   **10 X 2 = 20M**

1. Descibe the principles used in image segmentaion.   (CO4) [Knowledge]

2. List different types of color models in image processing.   (CO4) [Knowledge]

3. List the differences between Binary and Grey scale image.   (CO1) [Knowledge]

4. Define Periodic Noise and Mention how it can be removed from an image.   (CO3) [Knowledge]

5. Descibe salt and pepper noise and name the filters using which these can be eliminated.
                    (CO3) [Knowledge]

6. Define order statistic filters and Mention the difference between mean and median filter.
                    (CO3) [Knowledge]

7. Mention the differences between histogram stretching and equalisation.   (CO2) [Knowledge]

8. Define Sampling and quantisation.   (CO1) [Knowledge]

9. Define Image smoothning and sharpening in spatial domain.   (CO2) [Knowledge]

10. Define Noise and mention its spatial propeties.   (CO3) [Knowledge]

PART B

ANSWER ALL THE FIVE QUESTIONS   **5 X 10 = 50M**

11. Discuss the process of histogram stretching on the following image so that new image has dynamic range of 0 to 7.

Gray Levels	0	1	2	3	4	5	6	7
No. of Pixels	100	0	90	0	0	85	0	70

                    (CO2) [Comprehension]

12. Discuss the process of enhacing the contrast of the below image by trying to distribute pixels equally across all grey levels.

K	0	1	2	3	4	5	6	7
NK	8	10	10	2	12	16	4	2

(CO2) [Comprehension]

13. Explain the basic model of image restoration process with a neat diagram and discuss any two noise probability density functions with plot representation.

(CO3) [Comprehension]

14. Colour models provide a standard way to specify a particular colour, describe different types of colour models and how to convert from RGB to CMY model.

(CO4) [Comprehension]

15. Identify functions in matlab to perform following operations.

- Reading and displaying an image.
- Converting color image to grey scale and grey scale to binary.
- Scaling and rotating an image over coordinate axis.
- Performing image arithmetic operations.
- Performing image logical operations.

(CO1) [Comprehension]

PART C

ANSWER ALL THE TWO QUESTIONS   2 X 15 = 30M

16. A threshold value is set as T<=3. Apply Split and Merge algorithm to segment the regions based on principle of similarity and show the segmented image.

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

(CO4) [Application]

17. Describe dilation and erosion morphological operations in image processing, consider the binary image and the structuring elements as shown below and apply image dilation and erosion operations.

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

Image

1
1
1

Structuring element

(CO4) [Application]

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