

PARUL UNIVERSITY
FACULTY OF ENGINEERING & TECHNOLOGY
B.Tech. Summer 2018 - 19 Examination

Semester: 8
Subject Code: 03113480
Subject Name: Digital Image Processing for Mechatronics

Date: 29/04/2019
Time: 10:30 am to 1:00 pm
Total Marks: 60

Instructions:

1. All questions are compulsory.
2. Figures to the right indicate full marks.
3. Make suitable assumptions wherever necessary.
4. Start new question on new page.

Q.1 Objective Type Questions - (All are compulsory) (Each of one mark) (15)

1. Define 'Pixel'.
2. Explain 'Hue'.
3. Which filter(s) used to find the brightest point in the image?
 - a) Median filter
 - b) Max filter
 - c) Mean filter
 - d) All of the mentioned
4. What do you mean by image enhancement?
5. To convert a continuous sensed data into Digital form, which of the following is required?
 - a) Sampling
 - b) Quantization
 - c) Both Sampling and Quantization
 - d) Neither Sampling nor Quantization
6. Define 'averaging filter'.
7. The smallest discernible change in intensity level is called _____.
 - a) Contrast
 - b) Contour
 - c) Saturation
 - d) Intensity Resolution
8. What do you mean by zooming an image?
9. Which expression is obtained by performing the negative transformation on the negative of an image with gray levels in the range $[0, L-1]$?
 - a) $s=L+1+r$
 - b) $s=L-1-r$
 - c) $s=L-1+r$
 - d) $s=L+1-r$
- 10 List any two color models.
- 11 Write the formulae to calculate D_4 distance (city-block distance).
- 12 What is the thickness of the edges produced by first order derivatives when compared to that of second order derivatives?
 - a) Finer
 - b) Equal
 - c) Thicker
 - d) Independent
- 13 Why temporal redundancy occurs in an Image?

- 14 State true or false, “In an Image, if an appreciable number of pixels exhibit high dynamic range, the image will have high contrast.”
- 15 What do you mean by Mach band effect?

Q.2 Answer the following questions. (Attempt any three) **(15)**

- A) With reference to image processing, briefly explain following terms:
(i) Dynamic range (ii) Simultaneous contrast
- B) List types of mean filter and explain any two of them in brief.
- C) Differentiate between point processing and mask processing.
- D) What do you mean by image sharpening? What is Laplacian operator? List its advantages.

Q.3 A) Explain in detail with neat sketch: “Image sampling and quantization.” **(07)**

B) What do you mean by image interpolation? Explain any two methods of image interpolation. **(08)**

OR

B) What do you mean by histogram? How the histogram is useful in getting an idea about the contrast of an image? Explain all cases with example. **(08)**

Q.4 A) What do you mean by noise and noise models with respect to an image? List types of noise models and explain any one of them in detail. **(07)**

OR

A) Explain thresholding with respect to image segmentation. Also explain in short: “Types of thresholding”. **(07)**

B) What is morphology? Explain two basic morphological operations: ‘Erosion’ and ‘Dilation’. **(08)**