

GUJARAT TECHNOLOGICAL UNIVERSITY**BE - SEMESTER-VI (NEW) EXAMINATION – SUMMER 2024****Subject Code:3162009****Date:24-05-2024****Subject Name:Machine Vision****Time:10:30 AM TO 01:00 PM****Total Marks:70****Instructions:**

1. Attempt all questions.
2. Make suitable assumptions wherever necessary.
3. Figures to the right indicate full marks.
4. Simple and non-programmable scientific calculators are allowed.

		Marks
Q.1	(a) Explain image formation in eye with graphical representation.	03
	(b) Explain the components of an image processing system.	04
	(c) Explain the fundamental steps to be required for digital image processing.	07
Q.2	(a) Define basic concept of image sampling and quantization.	03
	(b) Differentiate between 4-adjacency and 8-adjacency between pixels of digital image.	04
	(c) Define histogram. Draw histograms of various digital images like bright, dark, poor contrast and high contrast. Bring out the significance of histogram equalization.	07
	OR	
	(c) Explain why the discrete histogram equalization technique does not, in general, yield a flat histogram.	07
Q.3	(a) Explain the logical operations AND and OR, performed on a digital image.	03
	(b) Justify the statement: Both the size and coefficients of smoothing filter are significant for blurring the digital image.	04
	(c) Derive Laplacian filter (size 3x3) in spatial domain. List out various applications which exhibit the use of Laplacian filter.	07
	OR	
Q.3	(a) Briefly describe the digital image acquisition using sensor-strip. Give suitable examples of applications where this system of acquisition is used.	03
	(b) Briefly describe various applications of image subtraction technique.	04
	(c) Write an expression for 2-D continuous convolution.	07
Q.4	(a) Discuss the limiting effect of repeatedly applying a 3 x 3 lowpass spatial filter to a digital image. You may ignore border effects.	03
	(b) List out the steps to be followed for the image enhancement in frequency domain.	04
	(c) Prove that both the 2-D continuous and discrete Fourier transforms are linear operations	07
	OR	
Q.4	(a) Explain the working principle of midpoint filter for eliminating the noise from the given image.	03
	(b) Explain Butterworth highpass filters.	04
	(c) Describe following gray level transformation functions which are commonly applied on digital image for enhancement. Negative, Logarithmic, Power Law.	07
Q.5	(a) Define image compression model with functional block diagram.	03
	(b) Explain the band reject filtering for periodic noise removal.	04

- (c) Describe in detail the working of adaptive local noise reduction filter. How does adaptive filter differ from the normal filter? **07**

OR

- Q.5** (a) What is called edge enhancement? Describe the edge enhancement technique in spatial domain. **03**
- (b) Briefly explain about the interpixel redundancy present in the image. **04**
- (c) List out some basic compression methods and explain any one of them. **07**