

GUJARAT TECHNOLOGICAL UNIVERSITY**BE - SEMESTER-VI (NEW) EXAMINATION – WINTER 2023****Subject Code:3162009****Date:13-12-2023****Subject Name: Machine Vision****Time:02:30 PM TO 05:00 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 Match-Band effect in image processing. with graphical representation.	03
	(b) What is called “Isopreference curve” of digital image? Briefly describe the nature of the Isopreference curves for various images with different contents.	04
	(c) Explain various filters, which are used for removal of salt and pepper noise from the image.	07
Q.2	(a) Justify the statement : Both the size and coefficients of smoothing filter are significant for blurring the digital image.	03
	(b) Briefly describe various applications of image subtraction technique.	04
	(c) Evaluate the following statements with suitable explanation. 1. Bit plane slicing is used for image compression. 2. Gray level slicing is used for image compression.	07
	OR	
	(c) Derive Laplacian filter (size 3x3) in spatial domain. List out various applications which exhibit the use of Laplacian filter.	07
Q.3	(a) Briefly describe various logical operators used in digital image processing.	03
	(b) List out the steps to be followed for the image enhancement in frequency domain.	04
	(c) Describe following gray level transformation functions which are commonly applied on digital image for enhancement. Negative, Logarithmic, Power Law	07
	OR	
Q.3	(a) Briefly explain sampling and quantization of digital image.	03
	(b) Briefly describe the following properties of 2-D Fourier Transform: Periodicity and Translation	04
	(c) Describe the filtering process in which illumination and reflectance components of the digital image are separated out for image enhancement.	07
Q.4	(a) Explain the logical operations AND and OR, performed on a digital image.	03
	(b) Briefly explain about the interpixel redundancy present in the image also show how it can be eliminated or reduced.	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**
- Q.4** (a) Differentiate between 4-adjacency and 8-adjacency between pixels of digital image. **03**
- (b) What is called edge enhancement? Describe the edge enhancement technique in spatial domain. **04**
- (c) Explain the relative data redundancy and compression ratio of a digital image in context of image compression. **07**
- Q.5** (a) Differentiate between band pass and band reject filter with graphical representation. **03**
- (b) Evaluate the statement: “A high pass filter can be constructed from two low pass filters or by subtracting the low pass filter from unity”. **04**
- (c) Explain the Hit-or-Miss transformation method of Morphological image processing technique with the help of suitable example. **07**
- OR**
- Q.5** (a) Explain the working principle of alpha-trimmed mean filter for eliminating the noise from the given image. **03**
- (b) Justify the statement: Although there are areas of overlap, image enhancement is largely a subjective process, while image restoration is an objective process. **04**
- (c) Evaluate the statement – “Successive use of Erosion and Dilation (two Morphological operations) is used for the removal of unwanted information from digital image”. **07**
