Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

BE - SEMESTER–VIII EXAMINATION – SUMMER 2016

Subject Code:182006 **Date:16/05/2016**

Subject Name:Machine Vision (Department Elective - II)

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.**

Q.1	**(a)**	Define Digital Image. Give applications of X-ray and Radio Wave Imaging.	**07**
	(b)	Explain image sampling and quantization with sketch.	**07**
Q.2	**(a)**	Explain different low pass filters with their 2D radial cross sections.	**07**
	(b)	With the help of neat sketches describe the following smoothing filters: 1. Butterworth Low Pass Filter 2. Gaussian Low Pass Filter Also enumerate the applications of smoothing filters in real life.	**07**
		OR	
	(b)	1. Briefly describe the following properties of 2-D Fourier Transform: Translation and Distributivity 2. Differentiate between the convolution and correlation process of digital image processing	**07**
Q.3	**(a)**	What are the different methods available for bridging the gap between broken lines in the image of finger print? Compare the merits and demerits of these methods.	**07**
	(b)	Describe briefly the following morphological operations: 1. Boundary extraction 2. Region filling	**07**
		OR	
Q.3	**(a)**	Briefly discuss about the different kind of noises and their mathematical model in relation to image restoration process. Support your answer with neat graphs of respective noises.	**07**
	(b)	Discuss various methods available to bridge the gap of broken character for character recognition.	**07**
Q.4	**(a)**	Describe Hit-or-Miss transform with the help of suitable example.	**07**
	(b)	Explain the following morphological operations: 1. Opening of gray scale image 2. Closing of gray scale image	**07**
		OR	
Q.4	**(a)**	Discuss various methods available for edge enhancement in relation to digital image processing.	**07**
	(b)	Explain the use of median filter for the removal of salt and pepper noise from the digital image. Differentiate the working between adaptive median filter and routine median filter.	**07**
Q.5	**(a)**	Describe the erosion process used on binary digital image with suitable illustration. Give practical application of erosion process in which actual input image is considered as binary image.	**07**
	(b)	Briefly discuss the following logic operations based on morphology: NOT, AND, OR, XOR, NOT-AND	**07**
		OR	

Q.5	**(a)**	Explain with suitable illustrative method the dilation process used on binary digital image. Give practical application of dilation process in which actual input image is considered as binary image.	**07**
	(b)	Evaluate the statement: "Periodicity cannot be ignored, when working with convolution process in frequency domain."	**07**