Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

BE – SEMESTER- VII EXAMINATION-SUMMER 2023

Subject Code: 3171109 Date: 21/06/2023

Subject Name: Digital Image and Video Processing

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.**

			MARKS
Q.1	**(a)**	What is Digital Image Processing and Video Processing?	**03**
	(b)	Explain image sensing and acquisition. What are different types of image sensors?	**04**
	(c)	What is the motivation behind digital image processing? Explain: Low level, Mid level and High level digital image processing.	**07**
Q.2	**(a)**	Explain A Simple Image formation model.	**03**
	(b)	What is histogram equalization and how is it used in image processing?	**04**
	(c)	What are different components of a digital image processing system?	**07**
		OR	
	(c)	Explain Image Sampling and Quantization? What is sampling resolution and quantization resolution?	**07**
Q.3	**(a)**	What is the difference between low-pass and high-pass filters in frequency domain filtering?	**03**
	(b)	Explain the concept of gray level transformations and give an example of their application in image processing.	**04**
	(c)	What is the difference between smoothing and sharpening filters, and how are they used in image processing? Provide examples of each type of filter and explain how they affect the appearance of an image.	**07**
		OR	
Q.3	**(a)**	What are the three commonly used color models in color image processing?	**03**
	(b)	How does color complementing work and how is it useful in color correction?	**04**
	(c)	Compare and contrast the RGB, YUV and HSI color models with respect to their advantages and disadvantages in color image processing.	**07**
Q.4	**(a)**	What is the difference between global and adaptive thresholding?	**03**
	(b)	Discuss region-based segmentation.	**04**
	(c)	Explain Edge linking and boundary detection using Hough transform.	**07**
		OR	
Q.4	**(a)**	What is the difference between time-frequency localization and frequency-domain representation?	**03**
	(b)	Explain the concept of continuous wavelet transform.	**04**
	(c)	Compare JPEG and JPEG-2000 image compression standard.	**07**
Q.5	**(a)**	What is redundancy in image? List different types of redundancy available in the digital image.	**03**
	(b)	Explain temporal segmentation in brief.	**04**
	(c)	Explain MPEG video coding standard in detail.	**07**
		OR	
Q.5	**(a)**	Explain Inter frame redundancy.	**03**
	(b)	Explain forward and backward motion prediction.	**04**
	(c)	Write a note on video object detection and tracking.	**07**