Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

BE - SEMESTER–VII (NEW) EXAMINATION – SUMMER 2022

Subject Code:3171614 Date:10/06/2022

Subject Name:Computer 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)**	What is Computer Vision? List any four applications of computer vision.	**03**
	(b)	Describe two-dimensional convolution operation with the required equation.	**04**
	(c)	Describe digitization of the image with necessary figures.	**07**
Q.2	**(a)**	Describe the pinhole imaging model in brief.	**03**
	(b)	Differentiate locally adaptive histogram equalization and block histogram equalization methods.	**04**
	(c)	What is a pixel? Discuss different pixel transformation methods with necessary equations.	**07**
		OR	
	(c)	What is the significance of wiener filter in image processing? Discuss wiener filter in detail.	**07**
Q.3	**(a)**	Discuss weak perspective projection in detail.	**03**
	(b)	What is the significance of morphological operation? Discuss erosion operation in detail.	**04**
	(c)	What is the use of SIFT feature in image processing? Explain SIFT feature in detail.	**07**
		OR	
Q.3	**(a)**	Discuss orthographic projection in detail.	**03**
	(b)	Discuss a Sobel operator to detect edges from the image.	**04**
	(c)	Discuss Harris corner detection method in detail.	**07**
Q.4	**(a)**	Discuss region splitting and region merging image segmentation method in brief.	**03**
	(b)	Explain graph based segmentation with details.	**04**
	(c)	Describe feature-based motion field estimation technique in details.	**07**
		OR	
Q.4	**(a)**	Describe watershed segmentation method in brief.	**03**
	(b)	Discuss basics of the motion field of rigid objects with necessary equations.	**04**
	(c)	Discuss snake method for image segmentation with the necessary equations.	**07**
Q.5	**(a)**	Describe intrinsic parameters of camera calibration in brief.	**03**

	(b)	Discuss the role of image eigenspaces in object identification.	**04**
	(c)	Discuss the kalman filter for motion tracking in detail.	**07**

OR

Q.5	**(a)**	Discuss optical flow in brief.	**03**
	(b)	Describe linear dynamics model for constant velocity and constant acceleration of motion tracking.	**04**
	(c)	Discuss invariant-based object recognition algorithm in detail.	**07**

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