Enrolment No./Seat No_____

GUJARAT TECHNOLOGICAL UNIVERSITY

BE - SEMESTER–VII EXAMINATION – SUMMER 2025

Subject Code:3171113 Date:23-05-2025

Subject Name:Practical aspects of 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)**	Write down the names of any three Spatial Domain Operations to be carried out in Image Processing.	**03**
	(b)	Differentiate between Spatial Domain Operations and Frequency Domain Operations of Image Processing.	**04**
	(c)	Explain Image Registration Process in detail.	**07**
Q.2	**(a)**	Define a corner in an Image.	**03**
	(b)	Explain forward mapping and reverse mapping in Image Warping.	**04**
	(c)	Describe how to extract Difference of Gaussian images in SIFT.	**07**
		OR	
	(c)	Write down only steps of SIFT algorithm.	**07**
Q.3	**(a)**	Explain Camera Calibration in short.	**03**
	(b)	Write down matrix to obtain rotation and scaling of an image.	**04**
	(c)	The image in figure 1(a) has undergone an **affine** transformation $y = Mx + t$ to create the image of figure 1(b) . The locations of the transformed points A', B' and D'' are marked in the transformed image. Calculate the affine transformation (the 2 by 2 matrix M, and the vector t) from the point correspondences (A, A'), (B, B'), and (D, D').	**07**

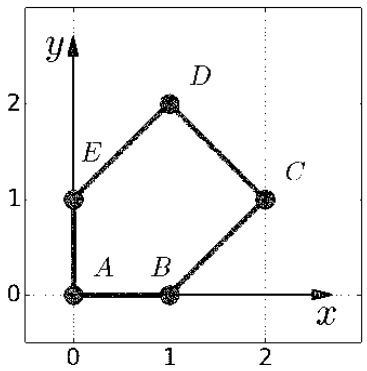

Figure 1 (a)

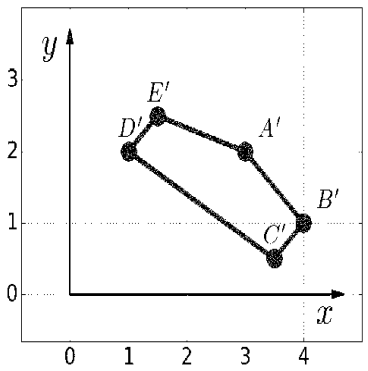

Figure 1 (b)

		OR	
Q.3	**(a)**	Explain about Stereo Images in brief.	**03**
	(b)	Write down matrix to obtain translation and shear of an image.	**04**
	(c)	Explain translation and rotation about X, Y and Z axis of an Image in detail.	**07**

Q.4	**(a)**	If you possess an extensive image database with diverse classes, what are two methods to search for a specific image class within the database?	**03**
	(b)	State the distinctions between Unsupervised Learning and Supervised Learning.	**04**
	(c)	Explain Spectral Searching Images.	**07**

OR

Q.4	**(a)**	State whether the following statement is true or false and provide a justification for your answer: "Clustering approach belongs to the supervised learning approach."	**03**
	(b)	Write down any four applications of Content-Based Image Retrieval (CBIR).	**04**
	(c)	Use K-Means Algorithm to create two clusters for Figure 2.	**07**

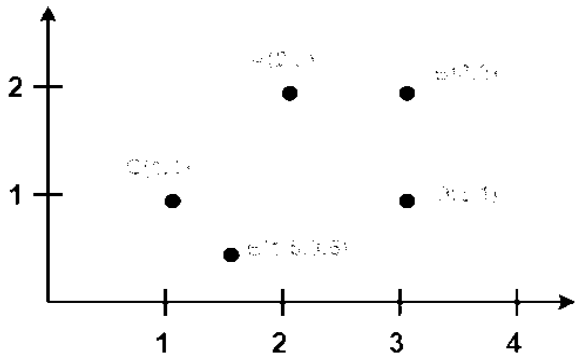

Figure: 2

Q.5	**(a)**	What is Image Segmentation and Write any one application of it.	**03**
	(b)	Discuss advantages and disadvantages of Principal Component Analysis (PCA).	**04**
	(c)	Explain Support Vector Machine classifier in detail.	**07**

OR

Q.5	**(a)**	Write any three applications of Optical Character Recognition (OCR).	**03**
	(b)	Discuss Pros and Cons of K- Nearest Neighbors algorithm.	**04**
	(c)	Write down steps pf PCA Algorithm.	**07**

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