

GUJARAT TECHNOLOGICAL UNIVERSITY
BACHELOR OF ENGINEERING – SEMESTER 7 – EXAMINATION – SUMMER 2026

Subject Code: 3171113

Date: 05/06/2026

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.**

- Q.1**
- (a)** Explain basic component of Digital Image Processing. **03**
 - (b)** Describe human eye visual system for computer vision. **04**
 - (c)** Explain below spatial domain operations on image. **07**
 - (1) Image Negative
 - (2) Gray level slicing
- Q.2**
- (a)** Define Affine Transformation. **03**
 - (b)** Write a note on Geotagged Images. **04**
 - (c)** Discuss Butterworth Low Pass Filter (BLPF) with necessary equations. **07**
- OR**
- Q.2**
- (c)** Explain Homomorphic Filtering in brief. **07**
- Q.3**
- (a)** Define Pinhole camera. **03**
 - (b)** Implement python code which **04**
 - Reads an image from disk
 - Rotates it by a 45 Degree.
 - Resizes it by a fixed scaling factor of 0.5.
 - Displays the original, rotated, and resized images side by side
 - (c)** Describe Epipolar geometry in detail. **07**
- OR**
- Q.3**
- (a)** Explain the concept of Image Mosaicing. Describe its steps and mention at least three practical applications. **03**
 - (b)** Explain the concept of Image Warping. Write its mathematical representation and list two applications. **04**
 - (c)** Explain Scale Invariant Feature Transform (SIFT) with necessary equation. **07**
- Q.4**
- (a)** What is K-Means clustering? List one application in computer vision. **03**
 - (b)** List the main steps involved in detecting corners using the Harris Corner Detector. **04**
 - (c)** Explain the K-Nearest Neighbor (KNN) classifier. Describe its working principle and list two applications in image processing. **07**

OR

Q.4

	(a) Define Content-Based Image Retrieval (CBIR)?	03
	(b) Define scaling and shearing in 2D transformations. Give the mathematical formula for each.	04
	(c) Explain the working principle of the SVM algorithm.	07
Q.5	(a) Define Optical Character Recognition (OCR) and list two types of OCR systems.	03
	(b) Define image indexing and explain its purpose in image retrieval.	04
	(c) Evaluate the effectiveness of Graph Cut segmentation in images.	07
	OR	
Q.5	(a) Define stereo images.	03
	(b) Explain the difference between Augmented Reality (AR) and Virtual Reality (VR).	04
	(c) Explain the purpose of Principle Component Analysis (PCA) in reducing data dimensionality.	07
