

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

Subject Code: 3174206

Date: 08/06/2026

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.**

- Q.1** (a) Define: Convolution, correlation, sampling **03**
(b) Compare and contrast: low level and high level processing **04**
(c) Articulate the steps of a typical computer vision pipeline. **07**
- Q.2** (a) List out the difference between grayscale, binary, and color images. **03**
(b) Discuss histogram and explain histogram equalization **04**
(c) Interpret the imaging geometry. Explain intrinsic and extrinsic camera parameters **07**
- OR
- Q.2** (c) Illustrate the concept of camera calibration. Why is it necessary? **07**
- Q.3** (a) Define morphological operations: erosion and dilation. **03**
(b) Identify the difference between first-order and second-order edge detection methods. **04**
(c) Demonstrate the derivation of 2D Fourier transform. Also state its properties **07**
- OR
- Q.3** (a) List out the advantages and limitations of contour-based representations **03**
(b) Summarize how shape context is used for shape matching **04**
(c) Illustrate the steps and explanation of Principal Component Analysis **07**
- Q.4** (a) State the use of image pyramids in segmentation. **03**
(b) Articulate the wavelet descriptors and how do they differ from Fourier descriptors? **04**
(c) Write the watershed segmentation and its working principle. **07**
- OR
- Q.4** (a) Define intrinsic camera parameters with examples. **03**
(b) Discuss the practical applications of different camera models in computer vision. **04**
(c) Write a short note on optical flow. **07**
- Q.5** (a) Outline the relationship between homogeneous coordinates and camera projection. **03**
(b) Explain the motion field of a rigid object in a scene. **04**
(c) Discuss the use of Kalman filter in tracking **07**
- OR
- Q.5** (a) Describe the use of statistical filtering in the context of computer vision **03**

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| (b) Compare and contrast: Supervised and unsupervised machine learning | 04 |
| (c) Demonstrate the use of appearance-based methods for object recognition. | 07 |
