

GUJARAT TECHNOLOGICAL UNIVERSITY**BE - SEMESTER-VII EXAMINATION – SUMMER 2025****Subject Code:3171614****Date:27-05-2025****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) Write three applications of computer vision.	03
	(b) Define the term "radiometry" and explain its importance in computer vision.	04
	(c) Explain the concept of imaging geometry in computer vision. Discuss the principles of perspective projection.	07
Q.2	(a) How does the Fourier transformation play a role in image sharpening?	03
	(b) Define pixel. List all pixel transformation methods.	04
	(c) What is histogram? Explain histogram equalization algorithm. Write Matlab code for calculation of histogram and histogram equalization.	07
	OR	
	(c) Implement the various low pass and high pass filtering mechanisms.	07
Q.3	(a) Write use of SIFT and HOG in terms of image analysis.	03
	(b) Explain the watershed algorithm and its application in image segmentation.	04
	(c) Demonstrate the use of optical flow in any image processing application.	07
	OR	
Q.3	(a) Define the terms: Image Digitization, Normalized cut and kernel	03
	(b) Describe the split and merge algorithm in image segmentation. How does it work?	04
	(c) Briefly describe snake's method for active contours.	07
Q.4	(a) Explain the concept of optical flow in motion representation and its applications.	03
	(b) What are intrinsic and extrinsic camera parameters in camera calibration, and how are they determined?	04
	(c) Explain K-means and Gaussian Mixture Model in detail.	07
	OR	
Q.4	(a) What is regularization in motion representation, and why is it important?	03
	(b) Explain motion parallax effect in computer vision.	04
	(c) What is noise? List all types of noise and explain any four in detail.	07
Q.5	(a) Explain graph based segmentation.	03
	(b) Define appearance-based methods for object recognition and provide an example.	04
	(c) Explain optical flow algorithm and its usage.	07
	OR	
Q.5	(a) Explain the concept of image Eigen spaces and their use in object recognition.	03
	(b) Explain shape context descriptor.	04
	(c) Describe common camera projection models and discuss their strengths and limitations in representing the real world.	07
