

GUJARAT TECHNOLOGICAL UNIVERSITY
BE - SEMESTER-VII (NEW) EXAMINATION – WINTER 2023

Subject Code:3171614**Date:19-12-2023****Subject Name: Computer Vision****Time: 10:30 AM TO 01:00 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) Differentiate between computer vision and image processing. **03**
 (b) Define the following terms: Image Digitization, Image Radiometry, Pixel Transformation, and Image Transformation. **04**
 (c) Define computer vision. Explain the various applications of computer vision. **07**
- Q.2** (a) Define filtering. Explain any one filter in detail. **03**
 (b) Write a short note on color transformation. **04**
 (c) What is the use of histogram equalization? Explain the histogram equalization method with an appropriate example. **07**
- OR**
- Q.3** (c) Explain 2D image transformation with a suitable example. **07**
 (a) Explain Sobel edge detection with a suitable example. **03**
 (b) Enlist corner detection techniques. Explain any one corner detection technique in brief. **04**
 (c) Explain the Histogram Oriented Gradient feature extraction technique with a suitable example. **07**
- OR**
- Q.3** (a) Explain Roberts edge detection with an example. **03**
 (b) Explain any one line detection method with an example. **04**
 (c) Explain morphological operations in detail. **07**
- Q.4** (a) Discuss the region-splitting method for image segmentation. **03**
 (b) Explain the mean-shift technique for image segmentation in brief. **04**
 (c) Write a detailed note on the optical flow algorithm with a suitable example. **07**
- OR**
- Q.4** (a) Write a short note on the perspective camera model. **03**
 (b) Explain the snake method for image segmentation in brief. **04**
 (c) Explain intrinsic and extrinsic parameters related to camera models. Also discuss how these types of parameters are useful in the field of computer vision. **07**
- Q.5** (a) Explain the image brightness constancy equation in brief. **03**
 (b) Define the following terms: Perspective Projection, Orthographic Projection, Pinhole Camera, and Lens Camera. **04**
 (c) What do you mean by appearance-based in object recognition? Also explain any two appearance-based methods for object recognition in detail. **07**
- OR**
- Q.5** (a) Write a short note on Image Eigen Space. **03**
 (b) Define the following terms: Object Detection, Object Recognition, Object Tracking, and Shape Representation. **04**
 (c) Explain the Kalman filters for motion tracking in detail. **07**