

GUJARAT TECHNOLOGICAL UNIVERSITY**BE - SEMESTER-VII (NEW) EXAMINATION – SUMMER 2024****Subject Code: 3171614****Date:01-06-2024****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) What is computer vision? List and explain various applications of computer vision. **03**
- (b) Discuss various image representation methods of digital image. **04**
- (c) What is meant by 2D geometric transformation in image formation? Explain with examples. **07**
- Q.2** (a) Define pixel. Explain any one method of pixel transformation in brief. **03**
- (b) Discuss the pinhole imaging model in brief. **04**
- (c) What is image histogram? Explain histogram equalization in detail. **07**

OR

- (c) The following input image has a size of 5 x 5 pixels, and its gray level varies from 0 to 255. Apply 3 x 3 average filter for image enhancement to the input image and provide a 5 x 5 output image matrix. Make suitable assumptions for the border pixels. **07**

127	145	215	140	130
140	254	140	109	155
115	133	255	109	115
130	155	240	115	109
115	140	155	109	130

- Q.3** (a) Discuss any one method for edge detection in brief. **03**
- (b) Explain discrete cosine transform (DCT) in brief. **04**
- (c) What is the use of SIFT feature in image processing? Explain SIFT feature in detail. **07**

OR

- Q.3** (a) What is image segmentation? Discuss various applications of image segmentation. **03**
(b) Explain erosion and dilation morphological operations in brief. **04**
(c) What is descriptor? Explain HOG feature descriptor in detail. **07**
- Q.4** (a) Explain watershed segmentation method in brief. **03**
(b) Describe snakes method for image segmentation in brief. **04**
(c) Discuss the Intrinsic and Extrinsic parameters of camera calibration. **07**

OR

- Q.4** (a) Differentiate between low pass filtering and high pass filtering. **03**
(b) Describe radial distortion in camera calibration **04**
(c) Explain mean shift image segmentation method in detail. **07**
- Q.5** (a) Discuss the motion parallax in brief. **03**
(b) Explain appearance based object identification methods. **04**
(c) Explain the kalman filter for motion tracking in detail. **07**

OR

- Q.5** (a) Discuss optical flow algorithm in brief. **03**
(b) Discuss the significance of image eigenspaces in object identification. **04**
(c) Describe feature-based motion field estimation techniques in details. **07**
