

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

Subject Code: 3171712

Date: 08/06/2026

Subject Name: Image Processing (IC)

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 importance thresholding in image segmentation **03**
 - (b) Specify the components of Digital Image Processing system. **04**
 - (c) Explain the use of Laplacian-the second order derivative used for image sharpening. **07**
- Q.2**
- (a) Explain Lossy compression and Lossless compression. **03**
 - (b) Explain structure of human eye and discuss human vision system. **04**
 - (c) Explain various types of basic intensity transformation function for digital images and their applications. **07**
- OR**
- Q.2**
- (c) Explain about the Box filter kernels and their applications for image enhancement. **07**
- Q.3**
- (a) Write a short note on Hough transform. **03**
 - (b) Explain any two basic gray level transformations. **04**
 - (c) Briefly explain Huffman coding with example. **07**
- OR**
- Q.3**
- (a) Write about Smoothing using Spatial filters. **03**
 - (b) Explain different Image File Formats with application. **04**
 - (c) Explain how to obtain histogram of given digital image and histogram equalization algorithm with the help of an example **07**
- Q.4**
- (a) How can you read and write images in MATLAB? Explain with example. **03**
 - (b) What are different ways of region-based segmentation? **04**
 - (c) Explain the MMSE (Wiener) filter for image restoration. **07**
- OR**
- Q.4**
- (a) Discuss the applications of gray-scale morphology. **03**
 - (b) List properties of 2 D DFT and prove any one of them? **04**
 - (c) Prove that dilation and erosion are duals of each other with respect to set complementation and reflection **07**
- Q.5**
- (a) Which filter is used to remove salt pepper type of noise from image and why? **03**
 - (b) Explain any two applications of image processing in process industries. **04**

(c) What is importance of morphological image processing? Explain Opening and Closing with example and mathematical equations. **07**

OR

Q.5 (a) What is global, Local and dynamic or adaptive threshold. **03**

(b) Explain Erosion and Dilation with example and mathematical equations. **04**

(c) Briefly explain homomorphic filtering approach for image enhancement. **07**
