Seat No./Enrollment No.: _____

GUJARAT TECHNOLOGICAL UNIVERSITY
BACHELOR OF ENGINEERING – SEMESTER 6 – EXAMINATION – SUMMER 2026

Subject Code: 3161604 **Date: 29/05/2026**

Subject Name: Image Processing

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)** Define Dynamic Range of the digital image. **03**

(b) Calculate the number of bits required to store a 256 X 256 image with 32 gray levels. **04**

(c) Explain the structure of the human eye. Draw a labeled diagram and describe the function of each part in the process of vision. **07**

Q.2 **(a)** Compare binary Image & Grayscale Image. **03**

(b) Explain how salt-and-pepper noise can be removed from a digital image. **04**

(c) Explain the working of Prewitt and Sobel operators for edge detection in digital images **07**

OR

Q.2 **(c)** Define sampling and quantization in digital image processing. **07**

Q.3 **(a)** Discuss Different Distance Measure techniques. **03**

(b) Perform Image Negative Operation on given below Gray scale image. **04**

60	125	32	255	0
200	35	87	0	255
41	90	135	222	110
111	0	10	255	211
30	50	70	60	80

(c) List out color models. Explain RGB and CMYK color model in brief. **07**

OR

Q.3 **(a)** Explain the concept of false coloring. **03**

(b) Discuss below Point Processing Techniques. **04**
(1) Log Transformation
(2) Powerlaw Transformation

(c) Describe Homomorphic Filtering. **07**

Q.4 **(a)** Contrast Image Restoration with Image Enhancement. **03**

(b) Apply segmentation technique to identify points and lines in a given image. Explain the steps involved. **04**

(c) Discuss different noise models in image. **07**

OR

Q.4 **(a)** Define Gradient Operator. **03**

	(b)	What is edge linking in digital image processing? Explain its purpose and name any two methods used for edge linking.	**04**
	(c)	Write a Short note on Laplacian of Gaussian (LoG) Operator.why it is called Isotropic Filter?	**07**
Q.5	**(a)**	Contrast: Lossless and lossy compression	**03**
	(b)	Explain DFT and DCT with their applications in image processing.	**04**
	(c)	Explain Region Merging & Splitting technique in detail.	**07**

OR

Q.5	**(a)**	Explain multiresolution expansion using wavelet function.	**03**
	(b)	What is Redundancy? Discuss Different types of Redundancy in Digital Image.	**04**
	(c)	Generate and explain an algorithm to achieve LZW Compression for image data compression.	**07**

*****