

Seat No.: _____

Enrolment No. _____

GUJARAT TECHNOLOGICAL UNIVERSITY

BE - SEMESTER-VII (NEW) EXAMINATION – SUMMER 2024

Subject Code: 3170308

Date: 28-05-2024

Subject Name: Biomedical Image Processing

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 4-adjacency, 8-adjacency and m- adjacency? Explain with example. **03**
- (b) Explain chess board and city block distance measurement techniques using example. **04**
- (c) Draw and explain basic concepts of image sampling and quantization. Enlist different types of sampling techniques. **07**

- Q.2**
- (a) Find out Image Negative of 8-bit gray scale image given below. **03**

50	100	50	50
100	0	0	100
100	0	0	100
50	100	50	50

- (b) What is Affine transform? Explain Rotation and Translation transformation. **04**
- (c) Enlist different types of image formats. Explain different image sensors in detail. **07**

OR

- (c) Perform Histogram Equalization on a 3 bit image ($L=8$) of size 64×64 pixels has the intensity distribution shown in the below table. **07**

Image Gray Level Distribution								
Gray level(r_k)	0	1	2	3	4	5	6	7
No. of Pixel(n_k)	790	1023	850	656	329	245	122	81

- Q.3** (a) Explain Sobel operator with example. **03**
(b) Explain intensity level slicing and also explain importance of it. **04**
(c) Explain Hit and Miss transform in detail. **07**

OR

- Q.3** (a) Explain opening operation. **03**
(b) Explain point and line detection for image segmentation **04**
(c) Enlist different smoothing frequency domain filters. Explain any one in detail. **07**

- Q.4** (a) Draw and explain wavelet selection block diagram. **03**
(b) Explain Arithmetic coding for image compression. **04**
(c) Explain boundary detection in morphological image processing. **07**

OR

- Q.4** (a) Describe Region filling operation. **03**
(b) Explain K-means clustering with example **04**
(c) Explain DCT image compression in detail. **07**

- Q.5** (a) Describe types of Image features. **03**
(b) Explain Erosion using one example. **04**
(c) Write a short note on Circular Hough Transform. **07**

OR

- Q.5** (a) Describe types of Image moments. **03**
(b) Explain Dilation using one example. **04**
(c) Explain 4 direction and 8 directional chain code with example. **07**
