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

Subject Code:3170308   **Date:14-12-2023**
Subject Name: Biomedical 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.**

			MARKS
Q.1	**(a)**	Explain Non Uniform Quantization.	**03**
	(b)	Write down difference between CCD and CMOS sensor.	**04**
	(c)	Explain neighborhoods, adjacency, connectivity and pixel distances in detail.	**07**
Q.2	**(a)**	Discuss derivative based Edge detection method	**03**
	(b)	Explain color models.	**04**
	(c)	Explain frequency domain filtering with Smoothing filters.	**07**

OR

(c) Perform Histogram Equalization on given image.   **07**

5	6	0	1	3
1	5	2	2	2
7	1	2	1	0
0	3	0	1	1
1	2	5	0	0

Q.3	**(a)**	Briefly explain boundary extraction.	**03**
	(b)	Explain Dilation using suitable example. **04**	
	(c)	Perform spatial domain high pass filtering on image given below. (use Laplacian)	**07**

22	18	35	19
45	26	95	23
18	23	52	68
25	26	86	25

OR

Q.3	**(a)**	Explain uses of thickening and thinning.	**03**
	(b)	Discuss Skeletonization process in detail.	**04**
	(c)	Perform opening and closing on image given below.	**07**

Structuring element

1	1	1
0	1	0
1	1	1

Image

1	1	1	0
0	1	1	0
1	1	0	1
1	1	0	0
0	0	1	1

Q.4	**(a)**	Give difference between global and adaptive thresholding.	**03**
	(b)	Enlist various region based segmentation and explain any one in detail.	**04**
	(c)	Perform Hit or Miss transform on image given in Q3.C (OR)	**07**

OR

Q.4	**(a)**	Write down advantages and disadvantages of Hough transform.	**03**

(b)	Give difference between variable length and arithmetic coding.	**04**
(c)	Explain linear hough transform with example.	**07**

Q.5 **(a)** Draw image compression model. **03**
(b) What is lossy compression? Explain briefly any one method. **04**
(c) Explain K-means clustering. **07**

OR

Q.5 **(a)** Draw and explain chain codes. **03**
(b) Explain image features and image moments **04**
(c) Explain arithmetic coding using example. **07**

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