GUJARAT TECHNOLOGICAL UNIVERSITY
BE - SEMESTER–VII (NEW) EXAMINATION – WINTER 2021

Subject Code:3170308   **Date:13/12/2021**

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.**

Q.1	(a)	Explain Contrast stretching.	03
	(b)	Define Histogram. Draw histogram patterns of Dark and bright contrast Image.	04
	(c)	Explain image smoothing using Ideal Low pass filter.	07
Q.2	(a)	Explain Region Splitting and merging Segmentation.	03
	(b)	Explain how edge is detected by Sobel Operator?	04
	(c)	Explain K-Means clustering with flowchart and algorithm.	07
		OR	
	(c)	Write short note on Linear Hough Transform.	07
Q.3	(a)	Draw and explain wavelet selection block diagram.	03
	(b)	Describe types of Image features and Image moments.	04
	(c)	Explain general block diagram of Image Compression system.	07
		OR	
Q.3	(a)	List out different Lossy and Lossless Image compression methods.	03
	(b)	Explain Chain code.	04
	(c)	Explain variable length coding with example.	07
Q.4	(a)	What is opening operation? Explain in brief.	03
	(b)	What is 4-adjacency and 8-adjacency? Explain with example.	04
	(c)	Explain CCD and CMOS Sensor in detail.	07
		OR	
Q.4	(a)	What is Region filling operation? Explain in brief.	03
	(b)	Write a short note on Brightness adaptation and discrimination.	04
	(c)	Explain simple image formation model with neat sketch.	07
Q.5	(a)	Find out output of Erosion operation on following image using given structuring element.	03

Image:

			1			
		1	1	1		
	1	1	1	1	1	
1	1	1		1	1	1
	1	1	1	1	1	
		1	1	1		
			1			

Structuring Element:

	1	
1	1	1
	1	

(b) Find out boundary of following image using boundary extraction morphological operation.   04

Image:

			1			
		1	1	1		
	1	1	1	1	1	
1	1	1		1	1	1
	1	1	1	1	1	
		1	1	1		
			1			

Structuring Element:

	1	
1	1	1
	1	

(c) Explain Thinning and Thickening morphological operations in detail.   07

OR

Q.5 (a) Find out output of Dilation operation on following image using given structuring element.   03

Image:

		1	1	1		
	1	1	1	1	1	
	1	1		1	1	
	1	1	1	1	1	
		1	1	1		

Structuring Element:

	1	
1	1	1
	1	

(b) Explain Hit and Miss transform in detail.   04

(c) Explain convex hull morphological operation.   07

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