Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

BE - SEMESTER– VII (New) EXAMINATION – WINTER 2019

Subject Code: 2170308 **Date: 26/11/2019**

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.**

			MARKS
Q.1	**(a)**	Compare CCD and CMOS sensor.	**03**
	(b)	Explain Pixel Connectivity.	**04**
	(c)	Explain image acquisition in detail.	**07**
Q.2	**(a)**	Briefly explain basic of edge detection.	**03**
	(b)	Explain 2D convolution with example.	**04**
	(c)	Discuss objectives of Image Enhancement. Explain enhancement using Arithmetic & Logic operations.	**07**
		OR	
	(c)	Explain Histogram Equalization in detail.	**07**
Q.3	**(a)**	Explain need of morphological image processing.	**03**
	(b)	Describe convex hull method and its advantages.	**04**
	(c)	Explain filtering in frequency domain. Discuss its advantages over spatial domain.	**07**
		OR	
Q.3	**(a)**	Explain opening and closing of image.	**03**
	(b)	Explain hit-or-miss transform.	**04**
	(c)	Explain the basic concept of spatial filtering in image enhancement and explain importance of image sharpening and high-boost filtering.	**07**
Q.4	**(a)**	Explain basics of Hough transform.	**03**
	(b)	Explain non uniform quantization.	**04**
	(c)	Explain k-means clustering with example.	**07**
		OR	
Q.4	**(a)**	Explain Bit-plane slicing.	**03**
	(b)	Explain global thresholding.	**04**
	(c)	Explain Region based image processing.	**07**
Q.5	**(a)**	Explain different types of image formats.	**03**
	(b)	Explain the chain code with example.	**04**
	(c)	With the help of a neat block diagram, explain the Homomorphic filtering.	**07**
		OR	
Q.5	**(a)**	Explain image moments.	**03**
	(b)	Explain image compression model.	**04**
	(c)	Explain Huffman coding with given details. For the symbols a,b,c,d,e the respective probabilities are p(a)=0.4, p(b)=0.2, p(c)=0.2, p(d)=0.1, p(e)=0.1.	**07**

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