Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

ME - SEMESTER– II(New course) • EXAMINATION (Remedial) – WINTER- 2015

Subject Code: 2723103 **Date: 09/12/2015**

Subject Name: Biomedical Image Processing

Time: 2:30 pm to 5:00 pm **Total Marks: 70**

Instructions:

1. **Attempt all questions.**
2. **Make suitable assumptions wherever necessary.**
3. **Figures to the right indicate full marks.**

Q.1	**(a)**	Define the term image, image processing, image analysis and image understanding. Give the comparison and contrast between image processing, image analysis and image understanding.	**07**
	(b)	Enlist five applications of image processing in Biomedical engineering. Illustrate any one application from them in detail	**07**
Q.2	**(a)**	Enlist problems in biomedical imaging with respect to image processing. Explain any one from them in detail.	**07**
	(b)	Explain histogram equalization in detail.	**07**
		OR	
	(b)	Explain histogram matching in detail.	**07**
Q.3	**(a)**	Explain with suitable example the Graph cut algorithms for image segmentation.	**07**
	(b)	Design an algorithm for segmentation of region using region growing technique. (You can write already available/designed algorithm/technique also.)	**07**
		OR	
Q.3	**(a)**	What do you understand by the term 'Skeletonization'? Enlist different techniques for Skeletonization. Explain any one from them in brief.	**07**
	(b)	Design an algorithm for point, line and edge detection operations on an input image. (You can write already available/designed algorithm/technique also.)	**07**
Q.4	**(a)**	Design an algorithm for performing the boundary detection of an input image using morphological operator. (You can write already available/designed algorithm/technique also.)	**07**
	(b)	Explain level set edge detection method.	**07**
		OR	
Q.4	**(a)**	Design an algorithm for transforming the input image into frequency domain and then apply low pass filter for performing the smoothing operation on the input image. (You can write already available/designed algorithm/technique also.)	**07**
	(b)	Explain any one real time imaging application with suitable example.	**07**
Q.5	**(a)**	Briefly explain Diffusion Tensor Imaging	**07**
	(b)	Write a technical note on 'Cortical surface segmentation and flattening'.	**07**
		OR	
Q.5	**(a)**	Briefly explain functional Neuroimaging.	**07**
	(b)	Write a technical note on 'Hypothesis testing and statistical mapping'.	**07**

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