Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

ME – SEMESTER II– EXAMINATION – WINTER - 2016

Subject Code: 2724112 **Date: 21/11/ 2016**

Subject Name: Digital Video 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)**	Explain the NTSC composite video standard in detail. Also draw and explain the spectrum of NTSC video signal.	**07**
	(b)	Explain rigid motion in homogeneous coordinates. Also represent translation, rotation and zooming in homogeneous coordinate system.	**07**
Q.2	**(a)**	Explain the process of 1-D interpolation in brief. Also draw impulse response of few practical interpolation filters.	**07**
	(b)	Explain unions of cosets of a lattice and the spectrum of signals on it.	**07**
		OR	
	(b)	Discuss the process of changing the sampling rate on one 3-D sampling lattice to another.	**07**
Q.3	**(a)**	What is the difference between 2-D motion and Apparent motion? Also discuss projected motion with reference to 3-D motion with appropriate diagram.	**07**
	(b)	Discuss the non parametric models for 3-D rigid motion in brief.	**07**
		OR	
Q.3	**(a)**	Explain the search procedures for finding the best matching block.	**07**
	(b)	Discuss the relationship between minimization of the displaced frame difference and the optical flow equation.	**07**
Q.4	**(a)**	Explain Metropolis algorithm for sampling the solution space.	**07**
	(b)	Explain direct methods for (i) Motion segmentation using mapping parameters. (ii) Motion segmentation using thresholding for change detection.	**07**
		OR	
Q.4	**(a)**	Explain region tracking algorithm based on motion segmentation and region boundary propagation.	**07**
	(b)	Given two stereo pairs at times t and t', discuss the approaches for the estimation of 3-D motion parameters R and T.	**07**
Q.5	**(a)**	Explain sub-Nyquist spatio-temporal sampling in detail.	**07**
	(b)	What are critical velocities? Discuss in detail.	**07**
		OR	
Q.5	**(a)**	Derive the relationship between Fourier transform of sampled signal and that of continuous signal.	**07**
	(b)	Explain digital video and digital video standards.	**07**

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