Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

ME – SEMESTER II (OLD) – • EXAMINATION – SUMMER 2016

Subject Code: 1724104 **Date:19/05/2016**

Subject Name: Digital Video 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.**

Q.1	**(a)**	Justify the need of digital video over analog video. Briefly explain various digital video standards. Also list out disadvantages/limitations of digital video.	**07**
	(b)	Derive the equation of rotation matrix with Eulerian angles in cartesian co-ordinate system for rigid object.	**07**
Q.2	**(a)**	Explain perspective projection in detail.	**07**
	(b)	Explain photometric image formation.	**07**
		OR	
	(b)	Explain sampling of time varying images $S_c(X,t) = S_c(x_1, x_2, t)$ on three dimensional sampling structure.	**07**
Q.3	**(a)**	Briefly describe the occlusion problem and aperture problem in motion estimation.	**07**
	(b)	Explain the search procedures for finding the best matching block.	**07**
		OR	
Q.3	**(a)**	Describe the factors by which optical flow differs from the 2-D velocity. Also derive the optical flow equation.	**07**
	(b)	Explain Netravali-Robbins algorithm for motion estimation.	**07**
Q.4	**(a)**	Derive the relationship between minimization of the Displaced Frame Difference (DFD) and Optical Flow Equation (OFE)?	**07**
	(b)	Explain the Bayesian Segmentation algorithm in detail.	**07**
		OR	
Q.4	**(a)**	Discuss how thresholding is used to segment a video frame. Explain the method of finding optimum threshold.	**07**
	(b)	Describe two block motion models namely translational and deformable block motion.	**07**
Q.5	**(a)**	Explain region tracking in detail.	**07**
	(b)	Explain the motion tracking with monocular video in detail.	**07**
		OR	
Q.5	**(a)**	Write a short note on motion compensated reconstruction filtering.	**07**
	(b)	Write a short note on sub-Nyquist spatio-temporal sampling.	**07**

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