

**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**

\*\*\*\*\*