Seat No.: _____ Enrolment No._____

# GUJARAT TECHNOLOGICAL UNIVERSITY

**ME - SEMESTER– II EXAMINATION – SUMMER - 2017**

**Subject Code:2724112 Date:30/05/2017**

**Subject Name: Digital Video Processing**

**Time:02:30 PM to 05:00 PM Total Marks: 70**

**Instructions:**

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

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|---|---|---|---|
| **Q.1** | **(a)** | Explain the two-dimensional rectangular sampling. Derive the Fourier transform relations in discrete space. | **07** |
| | **(b)** | Describe the advantages and limitations of digital video. Explain different digital video standards. | **07** |
| **Q.2** | **(a)** | What is meant by rotation matrix? Explain Eulerian angles in the Cartesian coordinate. Also explain rotation about an arbitrary axis in Cartesian coordinate system. | **07** |
| | **(b)** | Explain the perspective projection in detail. | **07** |
| | | **OR** | |
| | **(b)** | Explain photometric image formation. | **07** |
| **Q.3** | **(a)** | Write a short note on estimations of gradients for optical flow equation. | **07** |
| | **(b)** | Briefly describe the two main problems in motion estimation. | **07** |
| | | **OR** | |
| **Q.3** | **(a)** | Explain block matching methods in brief. | **07** |
| | **(b)** | Explain the method to estimate the relative shift between two image blocks by means of a normalized cross-correlation function. Also discuss its implementation issues. | **07** |
| **Q.4** | **(a)** | Define occlusion field. Explain occlusion field model and line field model in brief. | **07** |
| | **(b)** | Explain Netravali-Robbins Algorithm for motion estimation. | **07** |
| | | **OR** | |
| **Q.4** | **(a)** | Derive the relationship between minimization of the Optical Flow Equation and Displaced Frame Difference. | **07** |
| | **(b)** | Write a short note on gradient based optimization. | **07** |
| **Q.5** | **(a)** | What is meant by motion tracking? Explain token tracking in detail. | **07** |
| | **(b)** | Explain sampling in temporal direction. Also discuss sampling on spatio-temporal lattice. | **07** |
| | | **OR** | |
| **Q.5** | **(a)** | Explain Still frame stereo imaging. | **07** |
| | **(b)** | Explain the motion tracking with monocular video in detail. | **07** |

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