

GUJARAT TECHNOLOGICAL UNIVERSITY
ME - SEMESTER-II EXAMINATION – SUMMER 2015

Subject Code: 2725001**Date: 28/05/2015****Subject Name: Robotics and Artificial Intelligence****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.

- Q.1 (a)** List out the robot arm configuration & Give at least one industrial application of each configuration. Explain the Articulated configuration with neat sketch. **07**
- (b)** Discuss the factors of consideration while selecting the gripper for the robot. **07**
- Q.2 (a)** Explain the steps for solving the trajectory planning problem in detail. **07**
- (b)** Explain Direct and Inverse kinematics with transformation matrix for two revolute joint robotic arm (2-DOF). **07**
- OR**
- (b)** Derive the Denavit-Hartenberg table & transformation matrix for the endpoint of the 3 ó D.O.F articulated robot arm. **07**
- Q.3 (a)** What is Image processing? Explain its steps in detail. **07**
- (b)** Explain with neat sketch òCharged Coupled Device (CCD) in Machine Vision Systemö. **07**
- OR**
- Q.3 (a)** Classify the types of the cost. Also explain the life cycle of cash flows in capital investment project of robot. **07**
- (b)** Enlist the use of sensors in robotics. Also List & Explain the seven Desirable Features of Sensors. **07**
- Q.4 (a)** By taking one industrial application, explain Mobile Robot cell. **07**
- (b)** Explain WAIT, SIGNAL & DELAY commands by taking one industrial application **07**
- OR**
- Q.4 (a)** List the Robot Applications. Explain Processing Applications. **07**
- (b)** Explain the Robot Language structure. **07**
- Q.5 (a)** List and Explain the different problem characteristics. **07**
- (b)** Compare Breadth-First search method with depth-First search method. Also give one example of each method. **07**
- OR**
- Q.5 (a)** What is AI problem? List out the task domains of AI. What kind of techniques will be useful for solving AI problems? **07**
- (b)** List out the heuristic search techniques. Explain Hill climbing technique by taking a real life problem. **07**
