

**B.TECH. DEGREE EXAMINATION, MAY 2014****Seventh Semester**

Branch : Applied Electronics and Instrumentation Engineering

AI 010 706 L01—ROBOTICS – (Elective II) (AI)

(Improvement/Supplementary—2010 Admissions)

Maximum : 100 Marks

Time : Three Hours

**Part A**

*Answer all questions.  
Each question carries 3 marks.*

1. State the three Asimov's laws of robotics.
2. What are proximity sensors?
3. Explain the joint actuator used in robotic systems.
4. What is a robotic manipulator?
5. What are the principles of edge detection?



(5 × 3 = 15 marks)

**Part B**

*Answer all questions.  
Each question carries 5 marks.*

6. Explain Denavit-Hartenberg notation.
7. How are grippers classified?
8. Explain the force control of robotic manipulation.
9. What are the different levels of robot programming?
10. What are the major components in robotic vision system?

(5 × 5 = 25 marks)

**Part C**

*Answer all questions.  
Each question carries 12 marks.*

11. (a) Briefly explain about different types of Robots.

Or

- (b) With a neat sketch, explain the major components and their functions in a robot system.

Turn over

12. (a) What are the tactile sensors? What are the different categories of tactile sensors used in robotic systems.

Or

- (b) Explain any *four* types of mechanical grippers with a neat sketch.

13. (a) Write short notes on :

- (i) Adaptive control.
- (ii) PID Control Scheme.

Or

- (b) Write short notes on force control of robotic manipulators.

14. (a) Give a description of the common robot specific programming languages available to the developers.

Or

- (b) Explain about Robot task planning.

15. (a) Explain in detail about image segmentation and its algorithms.

Or

- (b) Draw the schematic diagram of a typical vision assisted robot system consisting of a CCD camera, RS-170 interface card, computer with monitor and image processing card, RS-232 interface card, robot controller and robot manipulator doing pick and place operation. Describe the details about a vision assisted robot system.

(5 × 12 = 60 marks)

