M.E. DEGREE EXAMINATIONS: DECEMBER 2009

First Semester

CAD / CAM

CCM503: Industrial Robotics and Expert Systems

Time: Three Hours   **Maximum Marks: 100**

Answer All the Questions:-

PART A (10 x 2 = 20 Marks)

1. What is meant by robot anatomy?

2. List the three degrees of freedom associated with the arm and body motion.

3. What are actuators?

4. Classify the robots according to the drive system.

5. State the working principle of a touch sensor.

6. Name any four proximity sensors used in robotics.

7. What is tracking window?

8. Define a robot work cell.

9. Distinguish between 'on-line' and 'off-line' programming.

10. List and explain any two commands associated with programming of an end effector.

PART B (5 x 16 = 80 Marks)

11. (a) Discuss with neat sketches the robot configurations and show the degree of freedom.

     Also list the merits and demerits of each type.

(OR)

   (b) (i) Sketch a robot wrist and explain its joint movements.   (8)

       (ii) Write a sample specification of a robot.   (8)

12. (a) (i) With a neat sketch explain the working of a AC servo drive.   (8)

       (ii) Explain the working of a stepper motor with a neat diagram.   (8)

(OR)

(b) (i) Describe the various types of gripper mechanism with neat sketches.   (8)

(ii) Give a note on type of grippers and their applications.   (8)

13. (a) (i) Name few proximity sensors and with a neat sketch, explain *any two* of them. (8)

(ii) Explain how a force sensor works?   (8)

(OR)

(b) Explain clearly the steps involved in image processing and analysis of a typical machine vision system.

14. (a) (i) Explain the coordination of multiple robots in a work cell and machine inference. (8)

(ii) Explain the functions performed by the work cell controller.   (8)

(OR)

(b) (i) Explain any two industrial applications of robot.   (8)

(ii) Define an interlock. Explain its types.   (8)

15. (a) (i) Compare powered lead through and manual lead through programming methods. (8)

(ii) Discuss capabilities and limitations of lead through methods.   (8)

(OR)

(b) List the commands used in VAL II programming and describe its functions.

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