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Reg. No. :

Question Paper Code : 20386

B.E./B.Tech. DEGREE EXAMINATION, NOVEMBER/DECEMBER 2018.

Sixth/Eighth Semester

Electronics and Communication Engineering

EC 6003 — ROBOTICS AND AUTOMATION

(Common to Medical Electronics)

(Regulations 2013)

(Also common to PTEC 6003 – Robotics and Automation for B.E. (Part-Time) –
Sixth Semester – Electronic and Communication Engineering – Regulations 2014)

Time : Three hours

Maximum : 100 marks

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

1. Define workspace in Robotics.
2. Write the Limitations of Robotics.
3. List the uses of sensors in robotics.
4. Write any two advantages of pneumatic drive system.
5. Define manipulator.
6. Give some examples of Robot End Effectors.
7. Write steps to drive kinematics model.
8. State that robot language element.
9. Differentiate palletizing and de-palletizing.
10. Mention the technologies used in manufacturing system.

PART B — (5 × 13 = 65 marks)

11. (a) (i) Explain any six important features of robotics. (8)
 (ii) Describe the various generations of robot. (5)

Or

- (b) (i) Explain the types of joints used in robots. (8)
 (ii) Explain the Asimov's Laws of Robotics. (5)

12. (a) (i) With suitable examples explain how the images are processed and analyzed in a machine vision system. (7)
 (ii) Sketch and explain major features of the various drive systems used in robots. (6)

Or

- (b) Explain the working principle of any four types of sensors with suitable sketches. (13)

13. (a) (i) Draw and explain the basic principles in Pneumatic manipulator system. (7)
 (ii) Describe the working of principle of AC stepper motor controller with suitable diagrams. (6)

Or

- (b) Describe any two Gripper mechanisms with suitable sketch. (13)

14. (a) With suitable sketch explain the teach pendant of Robot system. (13)

Or

- (b) Describe the Programming Languages used in Robotics. (13)

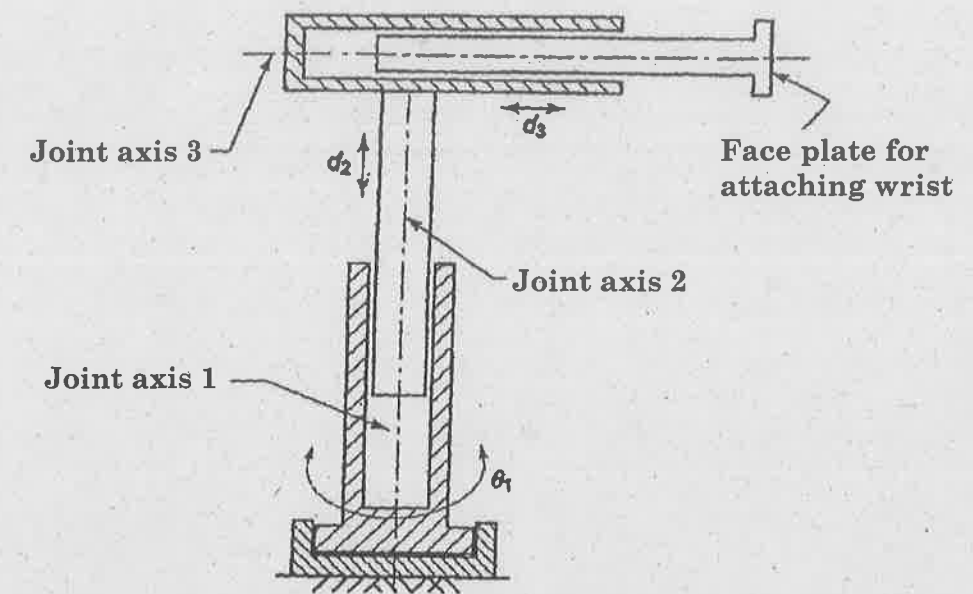
15. (a) (i) Describe the various considerations taken into account for material handling. (8)
 (ii) What is a robot cell? Discuss the popular robotic cell layouts. (5)

Or

- (b) List and explain any four non-manufacturing application areas of robotics. (13)

PART C — (1 × 15 = 15 marks)

16. (a) Formulate the forward kinematic model of the 3-DOF cylindrical (RPP) manipulator arm shown in Figure 16(a).

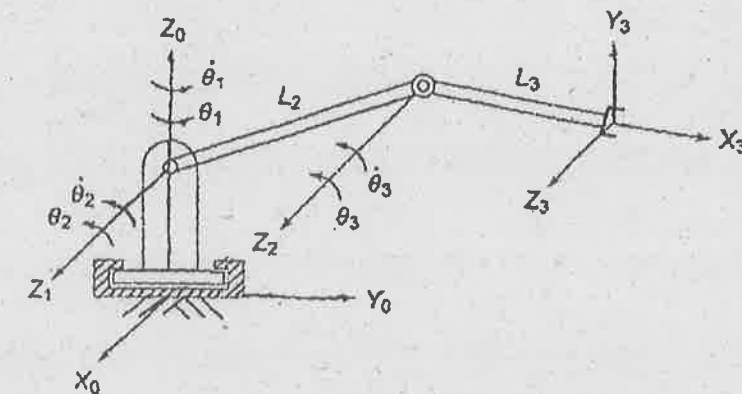


Mechanical structure of a 3-DOF cylindrical (RPP) manipulator arm.

Figure 16(a)

Or

- (b) Determine the manipulator Jacobian matrix for the 3-DOF articulated arm shown in Figure 16(b).



3-DOF articulated manipulator arm

Figure 16(b)