

12/11/14
LT B

Reg. No. :

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Question Paper Code : 91609

B.E./B.Tech. DEGREE EXAMINATION, NOVEMBER/DECEMBER 2014.

Seventh Semester

Mechanical Engineering

ME 2028/ME 702/IC 1404/080120060/10177 MEE 22/10122 MEE 22 —
ROBOTICS/INDUSTRIAL ROBOTICS

(Common to Production Engineering and Automobile Engineering)

(Regulation 2008/2010)

Time : Three hours

Maximum : 100 marks

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

1. Define work volume.
2. List out various methods for controlling a mechanical manipulator in the joint variable space.
3. What are the problems associated with Magnetic gripper?
4. State limitations of stepper motor as a drive system for a robot.
5. What do you mean by thresholding? How is it accomplished?
6. Give an example of touch sensor in the context of a robot.
7. Write a short note on importance of kinematic study of the robot.
8. List out four methods of entering commands into the robot controller memory.
9. List out any two important factors in the selection of robot for an application.
10. State some of the reasons made use of robots in welding operation.

PART B — (5 × 16 = 80 marks)

11. (a) (i) Discuss about the need for Robots. (8)
(ii) Present a brief survey on how robots are applied in inspection work. (8)

Or

- (b) (i) Explain with the help of a neat sketch the basic components of a robot connected as a system. (8)
(ii) Sketch and explain 3 DOF associated with wrist. (8)
12. (a) (i) Explain about selection and design considerations of gripper. (8)
(ii) Explain the various drive system used with an industrial robot and compare their features, merits and demerits. (8)

Or

- (b) (i) Explain the working of DC servo motors used in robots. (8)
(ii) Explain vacuum grippers, with reference to the principle, use and applications. (8)
13. (a) (i) Explain how image segmentation helps to improve the quality of the images in a vision system. (8)
(ii) Describe the four different types of photo electric sensors. (8)

Or

- (b) (i) Explain in detail the tactile and non tactile sensors. (8)
(ii) Explain the principles of edge detection technique. (8)
14. (a) (i) Explain Denavit-Hartenberg parameters with suitable examples and sketch. (10)
(ii) Explain Wait, DELAY, SIGNAL command with suitable examples. (6)

Or

- (b) Discuss various programming languages used in computer controlled robots. (16)

15. (a) (i) Explain with an example the procedure of applying Pay back method in the economic analysis of Robots. (8)
- (ii) Explain various steps involved for implementing the robot in industries. (8)

Or

- (b) (i) Explain in detail the Safety sensors and safety monitoring of Robots. (8)
- (ii) What is meant by blocking in AGV's? Explain the methods used in commercial AGV's to accomplish blocking. (8)
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