

IV B.Tech II Semester Regular Examinations, Apr/May 2006
ROBOTICS AND AUTOMATION
(Common to Electronics & Instrumentation Engineering and Bio-Medical Engineering)

Time: 3 hours

Max Marks: 80

Answer any FIVE Questions
All Questions carry equal marks

1. Define the terms 'Robot' and 'Robotics'. Discuss the role of robots in engineering. [16]
2. (a) What is robot software? Discuss the software elements of robot and different teaching methods of robot. [8]
(b) Discuss need of Dynamic stabilization of Robot. [8]
3. What are the various methods for determining a desired trajectory of joint? Discuss any one method in brief. [16]
4. (a) What are the used of sensors in robotics? Explain. [8]
(b) What are the different types of sensors used in robots? Explain the suitable sensor to measure the position of the gripper accurately. [8]
5. Explain various force control methods in robot manipulators. [16]
6. (a) What are the advantages and disadvantages of hydraulic grippers?
(b) With the help of a neat sketch explain the principle and working of optical encoder. [8+8]
7. What is inverse kinematics problem? Explain the solution to the inverse kinematics problem with an example. [16]
8. In which type of production, robots are preferred for loading and unloading function? Explain. [16]

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1. Classify the robots based on their different configurations and discuss their applications and limitation. [16]
2. (a) What are the advantages of off line programming languages of robots over other teaching methods. [8]
(b) Explain the significance of Dynamic stabilization of Robot. [8]
3. What are the different types of electric drives used in the robots? Describe them with the help of neat sketches. [16]
4. Discuss the applications and working principle of the following sensors:
(a) Range sensors
(b) Acoustic sensors
(c) Tactile sensors. [5+5+6]
5. Explain briefly the two stage control of manipulator using interpolation of end effectors position method. [16]
6. What is the function of gripper? Discuss various types of Grippers used in industrial Robots. [16]
7. Explain the different techniques for finding the inverse kinematics for any manipulator. [16]
8. State characteristics of work which promote application of robots. Discuss robot application in painting. [16]

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1. Classify Robots illustrating their characteristics and applications. [16]
2. (a) What are the advantages of off line programming languages of robots over other teaching methods. [8]
(b) Explain the significance of Dynamic stabilization of Robot. [8]
3. Explain the double axis rotation method to find out trajectory of end effect. [16]
4. (a) Enumerate the differences between tactile and non tactile sensors. [6]
(b) What are position sensors? What are the different types of position sensors? What are the conditions that determine the choice of a particular type of position sensor. [10]
5. Draw the block diagram of hybrid control system and explain briefly. [16]
6. What is the function of gripper? Discuss various types of Grippers used in industrial Robots. [16]
7. Explain the different techniques for finding the inverse kinematics for any manipulator. [16]
8. State characteristics of work which promote application of robots. Discuss robot application in painting. [16]

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1. Define Degree of Freedom and discuss the various degrees of freedom. Associated with the polar coordinate robot arm and body. [16]
2. (a) List the advantages and disadvantages of off-line programming? [8]
(b) Define degree of freedom. Explain the various degrees of freedom used in the robot. [8]
3. What are the advantages of using pneumatic drives in the robots? Discuss the different types of pneumatic drives used in the robots with the help of neat sketches. [16]
4. (a) What are the used of sensors in robotics? Explain. [8]
(b) What are the different types of sensors used in robots? Explain the suitable sensor to measure the position of the gripper accurately. [8]
5. What is passive impedance method and active impedance method? Explain them briefly. [16]
6. (a) What are the advantages and disadvantages of hydraulic grippers?
(b) With the help of a neat sketch explain the principle and working of optical encoder. [8+8]
7. Discuss with an illustrative example for any one type of Robot, solution for inverse kinematics problem of Robot. Discuss algorithm to be deployed for solving multiple solutions. [16]
8. In which type of production, robots are preferred for loading and unloading function? Explain. [16]
