Code No: RR321302 **Set No.1**

III B.Tech. II Semester Supplementary Examinations,
November/December -2005
ROBOTICS AND AUTOMATION
(Electronics & Control Engineering)

Time: 3 hours **Max Marks: 80**

Answer any FIVE Questions
All Questions carry equal marks

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1. (a) Explain the Asimov's laws of robotics. [8]
   (b) Sketch robot anatomy and discuss the important components. [8]
2. (a) Dicuss the working principle of hydraulic drives with the help of neat sketch. [8]
   (b) Enumerate the differences between electric drives and pneumatic drives. [8]
3. Discuss the diferent types of sensors used in robots and explain their applications.
4. (a) What is end effector? Discuss the following terms in relation to end effector:
      i. Yaw
      ii. Roll
      iii. Pitch [8]
   (b) What are the different types of grippers? Explain any one type briefly. [8]
5. What are the important robot programming languages? Explain their characteristics. [16]
6. (a) How will you select a robot? Explain briefly. [8]
   (b) Briefly discuss the procedure of hill climbing techniques. [8]
7. (a) Discuss the applications of robots in the non-manufacturing field. [8]
   (b) What is 'machine interface'? Discuss the cases under which the machine interface occures. [8]
8. Write short notes on the following:
   (a) Range and accuracy
   (b) Multiple robots
   (c) Jacobian work envolope. [5+5+6]

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Code No: RR321302 **Set No.2**

III B.Tech. II Semester Supplementary Examinations,
November/December -2005
ROBOTICS AND AUTOMATION
(Electronics & Control Engineering)

Time: 3 hours **Max Marks: 80**

Answer any FIVE Questions
All Questions carry equal marks

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1. How do you classify the robots? Briefly discuss their characteristics and applications. [16]

2. (a) Enumerate the differences between tactile sensors and non-tactile sensors.
   (b) What is machine vision? Discuss the application of machine vision in robots. [8+8]

3. (a) Draw the electronic manipulators circuit for end effector and explain briefly.
   (b) What is advantage of using DC servo motor in robots? Explain briefly with the help of block diagram. [8+8]

4. (a) What is the function of gripper? Explain the mechanical type of gripper used in robots. [8]
   (b) Explain the various design considerations for robot grippers. [8]

5. (a) Discuss the various applications of robots in the manufacturing field. [8]
   (b) What is the meaning of multiple robots? Discuss its importance. [8]

6. (a) What is inverse kinematics problem? Briefly explain. [8]
   (b) Discuss the important factors to be considered in the selection of robot. [8]

7. Explain the following terms used in robot
   (a) Hill climbing technique
   (b) Machine interface. [8+8]

8. Write short notes on the following:
   (a) Vaccum grippers
   (b) Robot cell design
   (c) Fibre optic sensors. [6+5+5]

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Code No: RR321302 **Set No.3**

III B.Tech. II Semester Supplementary Examinations,
November/December -2005
ROBOTICS AND AUTOMATION
(Electronics & Control Engineering)

Time: 3 hours **Max Marks: 80**

Answer any FIVE Questions
All Questions carry equal marks

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1. (a) Explain the following terms used in robotics.
   i. Work envelope
   ii. Work cell [8]
   (b) Sketch and explain spherical type of robot configuration. [8]
2. What are the basic components of robot system? Explain them briefly with the help of neat sketches wherever it is possible. [16]
3. Describe the working principle and applications of the following sensors:
   (a) Tactile sensors
   (b) Acoustic sensors
   (c) Range sensors [6+5+5]
4. (a) Draw the neat sketch of hydraulic actuator and describe briefly its working.
   (b) Enumerate the differences between hydraulic actuators and preumatic actuators.
   [10+6]
5. (a) List out the various robot programming languages and explain the characteristics of any two types of languages. [8]
   (b) Explain the role of machine vision in the field of robotics. [8]
6. Discuss the applications of robots in manufacturing and non-manufacturing fields. [16]
7. (a) What is robot cell design? Explain any two types of robot cells. [8]
   (b) Define inverse kinematics problem. Explain briefly the solution of inverse kinematic problem. [8]
8. Write short notes on the following:
   (a) Dynamic stabilization
   (b) Machine Interface
   (c) Asimov's laws. [6+5+5]

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Code No: RR321302 **Set No.4**

III B.Tech. II Semester Supplementary Examinations,
November/December -2005
ROBOTICS AND AUTOMATION
(Electronics & Control Engineering)

Time: 3 hours **Max Marks: 80**

Answer any FIVE Questions
All Questions carry equal marks

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1. (a) Discuss the following terms:
   i. Degrees of freedom
   ii. Repeatability
   iii. Accuracy. [6]
   (b) Discuss the following two types of robot configuration:
   i. Polar
   ii. Cartesion [10]
2. What are the different drives used in robots? Explain any three types of drives with the help of neat sketches. [16]
3. (a) What is function of actuator used in robots? Explain penumatic manipulator circuit used for end effectors. [10]
   (b) Explain the factors to be considered in design of robot grippers. [6]
4. (a) Sketch and explain the proximity sensor and list out the applications of proximity sensors. [10]
   (b) Enumerate the differences between contact type and non-contact type sensors. [6]
5. (a) Define 'work envelope' and discuss the Jocobian work envelope for any type of robot configuration. [10]
   (b) What are the advantages of using robot programming languages? [6]
6. What is robot cell design? What are the different types of robot cells? Describe them briefly with the neat sketches. [16]
7. (a) Discuss the applications of robots in medical field. [8]
   (b) What are the limitations of using robots in place of human being in the countries like India. [8]
8. Write short notes on the following:
   (a) Asimov's laws
   (b) Mechanical gripper
   (c) Determination of power of motor of a robot. [16]

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