

III B.Tech. II Semester Regular Examinations, January -2005
ROBOTICS AND AUTOMATION
(Electronics & Control Engineering)

Time: 3 hours

Max Marks: 80

Answer any FIVE Questions
All Questions carry equal marks

1. Discuss critically various generations of robotics with particular reference to degrees of freedom highlighting their specific industrial applications.
2. (a) Discuss various variable speed arrangements of a robot mentioning their specific application.
(b) Discuss scope and developments in field of machine vision of robots.
3. (a) Discuss various types of electric drives used in robots mentioning their limitations and applications.
(b) Discuss usage of fibre optic sensors in machine vision.
4. Discuss various types of manipulators used in robots for industrial application and suggest a method for its selection.
5. Discuss critically manipulator dynamics and its scope in development of robot in industry.
6. (a) Discuss various hill climbing for a robot.
(b) Discuss various robot programming languages in use and compare best two types.
7. Discuss critically machine interface robots in manufacturing industry. Discuss the problems involved in using generalized robot for specific industrial applications like welding, painting.
8. Write short notes on any TWO:
 - (a) Asimov's law of robotics
 - (b) Acoustic sensors
 - (c) Hill climbing technique.

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1. Classify Robots mentioning then Principle, Specific application, Limitation and Specific advantages.
2. (a) Discuss various types of Hydraulic Drives used in Robots. What is Electro Hydraulic Motor.
(b) Discuss various types of Tactile sensors used in Robotics.
3. (a) Discuss various Techniques used for robot path determination.
(b) Discuss various Accoustic sensors used in machine vision.
4. Discuss various types of Pneumatic manipulator control circuits used for Robots. Discuss the effect of Parameters on smooth operation of effector.
5. Discuss various types of controllers used in Robots mentioning their principle, operation, advantages and specific applications.
6. Discuss critically inverse kinematics problem of robots. Derive the equation.
7. Discuss critically role of Robots in nonmanufacturing applications.
8. Write short notes on any two:
 - (a) Asimovid AW of Robotics.
 - (b) Variable speed Arrangements

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1. (a) Define Robot and discuss historical development of robotics.
(b) Discuss Asimov's law of robotics and its practical utility.
2. (a) Discuss various methods of measuring range, through machine vision for robotics.
(b) Discuss various steps involved in determination of HP of a motor (electric drive) used as an actuator in robots.
3. (a) Explain the principle and operation of Hydraulic motors as actuators for robots and explain advantages of electro hydraulic motor.
(b) Discuss principle, advantages and limitations of fibre communications for measuring range in robot.
4. Discuss various types of electronic control circuits used for manipulation of manipulators in industrial robots.
5. Discuss the need and operation of various types of grippers used in robots. What special precautions have to be take into consideration while designing the same.
6. (a) How multiple solution problem is solved using inverse kinematics?
(b) Discuss concept of Jacobian concept of work envelope and how it going to help in inter locking of robots.
7. (a) Discuss various steps involved in selection of a robot.
(b) Discuss concept of multiple robots and its need in industry.
8. Write short notes on any TWO:
 - (a) Generations of robot.
 - (b) Robot programming languages.
 - (c) Robot cell design.

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1. (a) Discuss Asimou's law of Robotics.
(b) Discuss need and scope of dynamic stabilization of robots.
2. (a) Discuss various pneumatic drives used in robotics and why they are not used widely in robotic.
(b) Discuss various magnetic sensons used in robotics.
3. With an example explain the procedure wise steps used in determination of HP of motor used as actuator in robots.
4. Discuss critically various types of grippers used for robots with special emphasis on design considerations.
5. Discuss various method used in indeterming force and discuss various types of force controllers used for robots.
6. Discuss various types of programming langauages and their specific usage.
7. Discuss cirticaly machine interface robots used in manufacturing activities of robots.
8. Write short notes on any two:
 - (a) Degress of freedom of robots and its significance.
 - (b) Path determination techniques for robots.
 - (c) Laser sensors for robots.
