(2)

Total No. of Questions : 12] MAY 2016 SEAT No. :

P5065 [Total No. of Pages : 3

[4959]-121
B.E. (Electronics)
ROBOTICS AND AUTOMATION
(2008 Pattern)

Time : 3 Hours] *[Max. Marks : 100*

Instructions to the candidates:-

1) *Answers to the two sections must be written in separate answer papers.*
2) *Answer any three questions from each section.*
3) *Figures to the right indicates full marks.*
4) *Assume suitable data if necessary.*

SECTION - I

Q1) a) What is a robot? Explain specification of robot system. **[8]**

b) Explain the term work envelop and work volume for the following types of robot. **[8]**

i) Cartesian Robot

ii) Cylindrical Robot

iii) Spherical Robot

Explain the significance of these terms with respect to Industrial applications.

OR

Q2) a) Draw neat sketch showing basic components of Robot system 8 explain function of each. Explain the term Degree of freedom related to Robot. **[8]**

b) Explain the mechanical transmission systems used in robots. **[8]**

Q3) a) What is direct and inverse kinematics of a robot? **[8]**

b) Explain the Euler - angle representation for robot kinematics. **[8]**

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OR

Q4) a) Describe the Inverse kinematics problem. What are its characteristics. **[8]**

b) Explain the Lagrangian mechanics for finding dynamic equations of a robot. **[8]**

Q5) a) Explain any three types of actuators used in robotics. **[9]**

b) With the neat diagram explain the operation of Laser range finder. **[9]**

OR

Q6) a) Write short notes on : (any two) **[9]**

i) Infrared sensors

ii) Proximity sensors

iii) Accelerometer

b) Describe sensors and classify them in the robotic context. **[9]**

SECTION - II

Q7) a) Explain the Denavit - Hartenberg method of transformation. **[8]**

b) Explain types of motion used while trajectory planning. **[8]**

OR

Q8) a) With a block diagram explain any two types of fuzzy controller. **[8]**

b) What is D-H representation? Discuss D-H Algorithm. **[8]**

Q9) a) Explain the hardware consideration and specifications of a vision controlled system. **[8]**

b) With the help of block diagram explain components of video analytics system. **[8]**

OR

Q10) a) Explain different types of sensors along with their specifications used for vision system. **[8]**

b) Write short note on : **[8]**

i) Object tracking

ii) Motion detection

Q11) Write short notes on : **[18]**

a) Automatic welding machine using robot.

b) Automatic inspection system using machine vision.

c) Relation between robotics and automation.

OR

Q12) Write short notes on : (any two) **[18]**

a) Control mechanism used for robot manipulators

b) Automatic assembly using robotics

c) Major factors that influence the positioning capability of a robot.