Total No. of Questions : 12]

SEAT No. :

[Total No. of Pages : 3

P3005

B.E. (Semester - I)
ELECTRONICS ENGINEERING
Robotics and Automation (Elective - II)
(2008 Pattern)

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

Instructions to the candidates:

1) ***Answers to the two sections should be written in separate answer books.***
2) ***Answer any three questions from each section.***
3) ***Neat diagrams must be drawn wherever necessary.***
4) ***Figures to the right side indicate full marks.***
5) ***Use of Calculator is allowed.***
6) ***Assume suitable data, if necessary.***

SECTION - I

Q1) a) Define a Robot as per Russian Industrial Association (RIA)? State Law of Robotics as stated by Issac Asimov? **[8]**

b) Describe different components of a typical robot system, explaining their function with the help of a block diagram? **[10]**

OR

Q2) a) Discuss Cartesian robot and articulated robot for **[10]**

i) Coordinate system.

ii) Work envelope (Draw figure).

iii) Advantages & Disadvantages.

iv) Applications.

P.T.O.

b) Explain the following terms : [8]

i) Payload.

ii) Degree of freedom.

iii) Work envelop.

iv) End Effectors.

Q3) a) Write note on forward kinematics? Explain the use of Forward kinematics in detail? [8]

b) Explain the concept of inverse kinematics its importance and problems associated with it. [8]

OR

Q4) a) Discuss Kane's method in detail? [8]

b) What do you mean by robot dynamics? Why study of robot dynamics is important? Discuss different robot dynamics. [8]

Q5) a) Explain the method for rotary to rotary motion conversion. [8]

b) Explain sensors, actuators and their selection criteria for a robot application. [8]

OR

Q6) a) Explain any two with neat block diagram : [8]

i) Touch & slip sensor.

ii) Laser range finder.

iii) Encoders.

b) Explain different type of Grippers used in robotic applications. [8]

SECTION - II

Q7) a) Explain Jacobian in terms of D-H matrix in details? [8]

b) Explain the role of trajectory planning in Pick & place operation? [8]

OR

Q8) a) What is Cartesian motion of manipulator? Explain in details. [8]

b) What is the fuzzy controller & role of Fuzzy controller in robotics? [8]

Q9) a) Explain in detail Hardware Considerations for robot Vision Systems. **[8]**

b) Explain design methodology for vision systems. **[8]**

OR

Q10) a) Explain the terms segmentation object recognition. **[8]**

b) Write detail note on Robot Vision Systems. **[8]**

Q11) a) Explain the relationship between the Robot Intelligence and the Product & productivity? **[6]**

b) Explain the following automation : **[12]**

i) Welding Automation

ii) Inspection Systems

iii) Automatic assembly

OR

Q12) a) What is automation? Discuss the benefit of the automation. **[6]**

b) Write note on : **[12]**

i) Feedback Sensors.

ii) Transporting Devices.

iii) Feeding and Orientation Devices.

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