Total No. of Questions : 12]

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SEAT No. :

[Total No. of Pages : 2

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B.E. (Electronics)

ROBOTICS AND AUTOMATION (Elective - II(d))

(2008 Pattern)

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

Instructions to the candidates:

1) ***Draw neat diagrams wherever necessary.***
2) ***Write side figures indicate marks.***
3) ***Solve Q.1 or Q.2, Q.3 or Q.4, Q5 or Q.6 from Section- I.***
4) ***SolveQ7orQ8,Q.9orQ.10,Q.11 orQ.12 from Section-II.***
5) ***Assume data necessary.***

SECTION - I

Q1) a) Explain the concept of robotics? How the classification of robotics carried out? **[8]**

b) Draw and explain general structure of robotic mechanical systems? **[8]**

OR

Q2) a) Explain the various components in robotics subsystem? **[8]**

b) What are the commercially available software packages for robot simulation? Explain any one application in brief? **[8]**

Q3) a) Explain dynamic modeling of robotic manipulators - force and torque balance on an isolated link? **[10]**

b) What is Kinematics and Inverse Kinematics? Explain it in robotics applications? **[6]**

OR

Q4) a) Explain the terms

i) Degree of freedom
ii) Workspace
iii) Kinematics
iv) Dynamics in regards with robotic systems? **[8]**

b) Write in brief about analytical approaches for reduction of Inverse Kinematics? **[8]**

Q5) a) What are the popular mechanisms in robotics? Explain four bar mechanism? **[9]**

b) What are actuators? What is role of actuators in robotics? How they are classified? Explain in brief electromagnetic actuator? **[9]**

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OR

Q6) a) What are encoders? How they are classified? How they are used in robotics systems? Explain linear and rotary encoders? **[9]**

b) Explain sensor mounting arrangement in robotics systems? Explain it with computer interface/circuitry? **[9]**

SECTION - II

Q7) a) Explain the role of fuzzy controller in robotics applications? **[8]**

b) Explain On-off trajectory, relocking and acceleration profile in robotics applications **[8]**

OR

Q8) a) Explain steps the trajectory planning to avoid the obstacle in the path? **[8]**

b) What is error budgeting in the robotics applications. **[8]**

Q9) a) Explain hardware considerations for robotic vision systems? **[8]**

b) Write in brief design methodology for robotic vision systems? **[8]**

OR

Q10)a) Explain the applications of robotics vision systems? **[8]**

b) Explain in short video analytics in robotic vision systems **[8]**

Q11)a) Explain Structure of Automatic Industrial Systems **[9]**

b) Explain welding automation? **[9]**

OR

Q12)a) How kinematics and control of automatic machines is carried out? **[9]**

b) Explain the relationship between the robot intelligence and the product, productivity of a manufacturing process **[9]**