Total No. of Questions : 8] SEAT No. :

P4433 [Total No. of Pages : 2

[4859] - 1055
B.E. (Electronics)
ROBOTICS AND AUTOMATION
(2012 Pattern) (Elective - II (b))

Time : 2½ Hours] *[Max. Marks : 70*

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, Q.5 or Q.6, Q.7 or Q.8.***
4) ***Assume data necessary.***

Q1) a) What is automation? What are the effects of modern developments in automation on global competitiveness? **[8]**

b) What are the various components in robot drive systems hydraulic/ pneumatic systems? **[6]**

c) What are the specifications of robot? How robots are classified? **[6]**

OR

Q2) a) What are the basics and need of CNC machines? What are the applications of CNC machines in manufacturing? **[8]**

b) What are the various components in robot drive systems hydraulic, pneumatic and electric system? **[6]**

c) What are the different actuators are used in robotics systems **[6]**

Q3) a) Direct and inverse kinematics for industrial robots for position and Orientation redundancy? **[10]**

b) What is RPY representation in robotics applications? **[6]**

OR

Q4) a) Explain the terms **[8]**

i) Degree of freedom

ii) Workspace

iii) Kinematics

iv) Dynamics in regards with robotic systems?

P.T.O.

b) Explain the terms **[8]**

i) Manipulator

ii) Jacobian Joint

iii) End effector

iv) Velocity - direct and Inverse velocity analysis?

Q5) a) What are the dynamics of systems of interacting rigid bodies? **[8]**

b) What is D-H convention? What are the dynamics considerations in robotic applications? **[8]**

OR

Q6) a) Explain Trajectory planning for Flexible Robots? **[8]**

b) Explain

i) Newton-Euler Dynamics of Robot

ii) Newton-Euler formulation for RR & RP manipulators? **[8]**

Q7) a) Explain the role of fuzzy controller in robotics applications? **[9]**

b) Explain robotic vision systems in complex control system? **[9]**

OR

Q8) a) Explain the role of neural controller in robotics applications? **[9]**

b) Write in short about human robotic interaction? **[9]**