Total No. of Questions : 9]

SEAT No. :

P4880

[Total No. of Pages : 2

[5155] - 6
ME (Mechanical Design)
ROBOTICS (Elective - II)
(2008 Pattern)

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

Instructions to the candidates:

1) ***Answer three question from each section.***
2) ***Answer to the each section should written in separate books.***
3) ***Figures to the right indicate full marks.***
4) ***Use of electronic pocket calculator is allowed.***
5) ***Assume suitable data, if required.***

SECTION - I

Q1) a) Write a note on Robot classifications. **[6]**

b) Explain Laws of robotics and give at least three configurations of robotic systems. **[10]**

Q2) a) Explain terms. **[6]**

i) Resolutions

ii) Repeatability

iii) Precision and Accuracy

b) Explain DH representation for robotic mechanisms. **[4]**

c) Write a note on Inverse Kinematics with example. **[6]**

Q3) a) Explain 3R and 3P manipulators with appropriate sketch. **[10]**

b) Explain different sensors used in robotics. **[6]**

i) Position

ii) Tactile

iii) Vision

iv) Speed Measurement

Q4) a) Write down Newton Euler's dynamic formulation. **[8]**

b) Explain Lagrangian Formulation of Manipulator dynamics. **[10]**

SECTION - II

Q5) a) Write down general consideration in path descriptions and generations. **[4]**

b) Explain Joint space scheme for trajectory planning with sketch. **[6]**

c) Write down differences of point to point and continuous trajectory. **[6]**

Q6) a) Explain following sensors. **[8]**

i) Velocity and Acceleration Sensors

ii) Force and Torque Sensors

b) Write a note on Real time operating system for Robotics. **[8]**

Q7) a) Explain hydraulic actuators used in robotics. **[8]**

b) Explain H - bridge drives for DC motor control. **[8]**

Q8) a) Explain Machine vision system used in Robotics. **[10]**

b) Write a note on robot programming languages. **[6]**

Q9) Attempt any three **[18]**

a) Microrobotics

b) Stability issues in legged robots

c) Under actuated Manipulators

d) Telecheirs.