Total No. of Questions : 10]

SEAT No. :

P4942

[Total No. of Pages :3

[4959]-1109
B.E. (Elex) (Elective - II)
(b) : Robotics and Automation
(2012 Pattern)

Time : 2.½ Hours] *[Maximum Marks : 70*

Instructions to the candidates:

1) ***Answer Q.1 or Q.2, Q.3 or Q.4, Q.5 or Q.6, Q.7 or Q.8. Q. 9 or Q. 10.***
2) ***Neat diagrams must be drawn wherever necessary.***
3) ***Figures to the right side indicate full marks***
4) ***Assume suitable data, if necessary.***

Q1) a) Define " Automation". Draw and explain Automation pyramid. **[5]**

b) What are CNC Machines, Explain types of CNC machines **[5]**

OR

Q2) a) Draw and explain architecture of industrial automation systems. **[5]**

b) Write application of CNC machines. **[5]**

Q3) a) Write and explain "Three Rules (or Laws) of the Robotics"? **[5]**

b) How do we classify Robots. Explain any two **[5]**

OR

Q4) a) Describe Robot drive systems. Explain Hydraulic systems in detail. **[5]**

b) Explain: (Any two) **[5]**

i) Accuracy

ii) Repeatability

iii) Robotic Joints

P.T.O.

Q5) a) What are different types of gripers? Explain any three in detail. **[8]**

b) Write note on (Any Four): **[8]**

i) Pressure sensor

ii) Force sensor

iii) Proximity sensor

iv) LASER range finder

v) Tactile sensors

vi) Range sensor

OR

Q6) a) Draw and explain Slider crack mechanism based grippers. **[6]**

b) What do you mean by Vision sensors. Draw and explain vision based Inspection systems. **[6]**

c) What do you mean by homogeneous coordinate systems. **[4]**

Q7) a) What is Jacobian control ? Discuss the jacobian in terms of DH matrices. **[8]**

b) What do you mean by trajectory planning? Explain types of motions used in it. **[8]**

OR

Q8) a) State and explain Newton-Euler dynamics of robots. Explain Newton-Euler formulations for manipulators. **[8]**

b) Write notes on (Any two) **[8]**

i) Solvability

ii) Stiffness

iii) Singularities

Q9) a) What are different types of Robotic controllers. Explain any two in detail. **[8]**

b) Draw and explain basic architecture of Fuzzy logic controller. **[5]**

c) Describe vision based object tracking robot. **[5]**

OR

Q10)a) Discuss advanced strategies for control of aerial vehicles. **[8]**

b) Write note on direction control of X4-flyer. **[5]**

c) What are different applications of neural networks in Robotics. **[5]**