

Total No. of Questions : 12]

SEAT No. :

P770

[Total No. of Pages : 3

[4659] - 118

B.E. (Electronics) (Semester - I)
ROBOTICS & INDUSTRIAL AUTOMATION
(2008 Pattern) (Theory)

Time : 3 Hours]

[Max. Marks : 100

Instructions to the candidates:

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

SECTION - I

- Q1)** a) With the help of neat diagram show the components of robot system? Also explain function of each component. **[10]**
- b) Discuss various specifications of Robot system. **[8]**

OR

- Q2)** a) Classify the robot based on the type joints. Explain all the types in detail with neat sketches.
- b) Explain in detail History of robotics & three Laws of robotics. Also discuss current research in robotics.

- Q3)** a) What is Composite Transformation Matrix? Explain the rules to be followed in the formation of the same. **[8]**
- b) Explain the term robot arm dynamics explain Kane's method used for formulation of dynamical equations. **[8]**

OR

P.T.O.

- Q4)** a) What is D-H representation? Discuss D-H Algorithm. [8]
b) Explain the term inverse solutions. Explain any one approach for obtaining inverse solution.

Q5) a) Explain following mechanisms with neat diagram: [8]

- i) Gear & Gear trains.
- ii) Slider - Crank Mechanism.

b) Write short note on (any two): [8]

- i) Stepper motor & servo motors.
- ii) Touch & slip sensor.
- iii) Infrared sensors.

OR

Q6) a) Discuss Lift & Try Technique for slip detection with the help of neat diagram.

b) With the neat diagram explain the operation of proximity sensor.

SECTION - II

Q7) a) Draw the block diagram of fuzzy controller & explain. [10]

b) What is Obstacle avoidance? How it is achieved in motion planning? [8]

OR

Q8) a) Explain pick & place operations in Trajectory planning.

b) Explain feed forward control action.

- Q9)** a) What are different types of vision sensors used in robotics? Explain any one of them with the help of neat sketch. [8]
- b) Explain use of object recognition with reference to industrial robots. [8]

OR

- Q10)** a) With the help of block diagram explain components of video analytics system.
- b) Write short note on:
- i) Object recognition.
 - ii) Camera calibration.

- Q11)** Write short note on: [16]
- a) Automatic assembly operations.
 - b) Automatic part inspection system using robot.
 - c) Welding automation using robot.
 - d) Intelligence requirement of robot in glass/mirror industries.

OR

- Q12)** a) Write short note on roll of robotics to improve productivity of manufacturing processes.
- b) Write short note on:
- i) Need of feedback sensors for automation.
 - ii) Relationship between the robot intelligence & the product.

