www.FirstRanker.com   www.FirstRanker.com

(Time: 3 hours)   [Total Marks: 75]

Please check that you have got the correct question paper.

N. B.: (1) **All** questions are **compulsory**.
(2) Make **suitable assumptions** wherever necessary and **state the assumptions** made.
(3) Answers to the **same question** must be **written together**.
(4) Numbers to the **right** indicate **marks**.
(5) Draw **neat labeled diagrams** wherever **necessary**.
(6) Use of **Non-programmable** calculators is **allowed**.

SECTION – I

1.
a. Explain in brief the historical development of artificial intelligence. **7**
b. Explain SETQ and LET w.r.t. LISP. **6**

OR

1.
a. What is Internal representation? State the characteristics of Internal representation. **7**
b. What is predicate calculus? Explain components of predicate calculus with example. **6**

2.
a. Explain how to define and use recursive functions in LISP. **7**
b. Explain how strings can be used in LISP. **6**

OR

2.
a. Write a short note on SUBSETHOOD theorem. **7**
b. Explain the different common signal functions in detail. **6**

3.
a. Explain the concept of biological neuron with neat diagram and compare it with the Artificial neural network. **6**
b. Explain the various stages of a KDD process. **6**

OR

3.
a. State the various applications in Genetic Algorithms. **6**
b. Explain forward chaining and backward chaining. **6**

SECTION II

4.

a. Name and explain with diagrams all the lower kinematic pairs. State those that cannot be used in an actuated robot joint with reasons. **7**

b. The relative position and orientation of the axes of two successive joints be specified by two link parameters. Explain. **6**

OR

4.

a. Explain the Screw Transformation matrix. What is a screw pitch? **7**

b. What are homogenous co-ordinates? Define Homogenous Co-ordinate Transformation matrix. Explain the sub-matrices involved in this matrix. **6**

5.

a. Write a short note on: **6**
   i. SCARA robots   ii. Robot programming

b. Write the inverse kinematic algorithm for the five axes spherical co- ordinate robot. **6**

OR

5.

a. Explain the role of Tool Configuration vector in inverse kinematics of robots. **6**

b. Explain the Bounded Deviation Algorithm for a straight line motion and its basic principle. **6**

6.

a. What are moments? How are they used in shape analysis of objects? **6**

b. Explain the merits of NC, CNC machines and robots used in industrial automation **6**

OR

6.

a. Write a short note on control problems due to robot moments of inertia. **6**

b. Write a short note on Robot dynamics. **6**

_____