[Time: Three Hours]   **[Marks:75]**

Please check whether you have got the right question paper.

N.B: 1. All questions are compulsory.
    2. Answers to the two sections must be written in same answer book and should be submitted together
    3. Write answers to same questions together.
    4. Mixing of sub-questions is not allowed.

SECTION - I

Q.1.	a.	What is Internal Representation? State its characteristics.	6
	b.	Explain SETQ and LET w.r.t. LISP.	7

OR

Q.1.	a.	Explain the various Inference Rules of Predicate Calculus.	6
	b.	Explain LAMBDA functions in LISP giving examples.	7

Q.2.	a.	Give the basic classification of Neural Network Models.	6
	b.	Explain how to define and use recursive functions in LISP.	7

OR

Q.2.	a.	Explain how to define and use structures in LISP.	6
	b.	Explain the common signal functions in Neural Networks.	7

Q.3.	a.	Write a short note on Roullete Wheel Selection.	6
	b.	Explain the working of a Genetic Algorithm.	6

OR

Q.3.	a.	State the various applications if Genetic Algorithms.	6
	b.	Explain the various stages of a KDD process.	6

SECTION - II

Q.4.	a.	How are robots classified? Explain the following classification based on Motion control. i)Pick and place robots ii)Point to point robots iii)Continuous Path	6
	b.	Differentiate between Hard automation and Soft automation.	7

OR

Q.4.	a.	Explain the Screw Transformation matrix. What is a screw pitch.	6
	b.	What is a D-H algorithm? Explain the Pass 1 and Pass 2 of a 4-axis planar articulated robot.	7

Q.5.	a.	Explain the role of Tool Configuration vector in inverse kinematics of robots.	6
	b.	"Dexterous work envelope is smaller than total work envelope". Justify.	6

OR

Q.5.	a.	Define path planning and trajectory planning with examples.	6
	b.	Describe in brief the different types of workspace fixtures used in the robot manipulation task.	6

(P.T.O)

Q.6. a. Explain the edge Detection algorithm. 6
b. Write a short note on joint interpolation trajectory planning method. 6

OR

Q.6. a. Explain numerically controlled machine. 6
b. Write a short note on Robot dynamics. 6