Q.P. Code : 11076

[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) Discuss Logic Based Intelligence vs Machine Based Intelligence. **06**

(B) Explain the following w.r.t. Predicate Calculus. **07**

i. Predicates and Arguments
ii. Connectives
iii. Quantifiers

OR

Q.1 (A) What is Internal Representation? State its characteristics. **06**

(B) Explain LIST, FIRST and LAST w.r.t. LISP. **07**

Q.2 (A) Explain how strings can be used in LISP. **06**

(B) Explain Forward Chaining and Backward Chaining. **07**

OR

Q.2 (A) Explain the difference between LET and LET* in LISP. **06**

(B) Explain the common signal functions in Neural Networks. **07**

Q.3 (A) Explain the various crossover techniques giving examples. **06**

(B) Explain the various stages of a KDD process. **06**

OR

(A) Explain the working mechanism of a Genetic Algorithm. **06**

(B) Write a short note on Competing Schemata. **06**

SECTION - II

Q.4 (A) Explain the different applications of robots. **06**

(B) Define robotics and automation. Explain the following different types of automation : **07**

i. Fixed automation
ii. Flexible automation
iii. Programmable automation

OR

Q.4 (A) Explain the joint and link parameters involved in any robot arm. **06**

(B) What are homogenous co-ordinates? Define Homogenous Co-ordinate Transformation matrix. Explain the sub-matrices involved in this matrix. **07**

Q.5 (A) Why Inverse kinematics is not unique? Explain the different methods to solve the inverse kinematics. **06**

(B) Explain the following types of work envelopes: **06**

i. JSWE
ii. Dexterous

iii. TWE

OR

Q.5 (A) Define the terms Path and trajectory. Explain the speed distribution function. **06**

(B) Explain line and area descriptors and why are they used in shape analysis? **06**

Q.6 (A) Compare and contrast between configuration space method and the GVD gross motion planning methods. **06**

(B) What are moments? What are invariant moments? How are they made invariant to scaling, Translation and rotation? Illustrate with examples. **06**

OR

Q.6 (A) Write a short note on control problems due to robot moments of inertia. **06**

(B) Explain the Computer Numerically Controlled Machines. **06**
