## PA-10114

SEAT No. :

[Total No. of Pages : 2

Max. Marks : 30

[7]

## [6009]-418

## T.E. (Robotics & Automation) (Insem) ARTIFICIAL INTELLIGENCE FOR ROBOTICS (2019 Pattern) (Semester - II) (311509-A)

*Time : 1 Hour]* 

Instructions to the condidates :

- 1) Answer 0.1 or 0.2, 0.3 or 0.4.
- 2) Neat diagrams must be drawn wherever necessary.
- 3) Figures to the right side indicate full marks.
- 4) Use of calculator is allowed.
- 5) Assume suitable data, if necessary.

Q1) a) What is fuzzy logic? Explain applications of fuzzy logic in robotics.

- b) With suitable example, explain the difference between supervised learning and unsupervised learning [8]
- Q2) a) Explain following terms related to Bayesian networks for uncertain reasoning : [8]
  - i) Directed acyclic graph
  - ii) Nodes
  - iii) Links
  - iv) Joint probability distribution
  - b) What are advantages of metaheuristic methods over the mathematical optimization methods? [7]
- **Q3**) a) Genetic algorithm is to be used to minimize the function  $z = 3xy + x^2y$  such that  $2 \le x, y \le 6$ . Preform the following : [8]
  - i) Generate initial population of 5 solutions in binary coded form with string length as 4.
  - ii) Obtain the decoded values.
  - iii) Convert decoded values into actual values of variables.
  - iv) Obtain the values of objective function z.

*P.T.O.* 

b) Explain K-means clustering algorithm. Hence determine whether the points (4, 5, 3) and (8, 3, 7) fits in cluster 1 having center at (3, 7, 5) or cluster 2 having center at (4, 8, 6). [7] **O**R

