

**General Exam in Robotics**  
**March 17, 2004**  
**Spring 2004**  
**(Answer any 4 Questions)**  
**Each questions carries 25 points**

- I. (a) What is a Distributed Sensor Network?  
  
(b) Give several applications of Sensor Networks.  
  
(c) How do you minimize the power consumption of sensor in a Sensor Network communication algorithmic? Describe several protocols to minimize power in a Sensor Network?
  
- II. In order to fuse two sensor readings, the reading must first be put into a common coordinate system. Describe a method in Image Registration for sensor fusion application. Your discussion should include some algorithmic solution to the problem.
  
- III. What is a Genetic Algorithm?  
  
Describe a genetic algorithm for finding stable path in Sensor Network application. Please be clear and specific.
  
- IV. Discuss a method for designing Optimal Sensor Systems within dependability Bounds. Can you think of a new paradigm for a specific application?
  
- V. What is an Intelligent System? Describe an optimal path finding algorithm when a robot is exploring a path in an unstructured environment with a large number of convex types of obstacles.