Student Name: _____ Student ID # _____

Question 1: The Functional-Modules Approach (20 points)

A. **Explain** the difference between sensing and perception.

B. List and **explain** one positive quality of the functional-modules approach.

C. List and **explain** one negative quality of the functional-modules approach.

D. Of the positive and negative qualities you gave above, which do you think has the greater magnitude? (That is, do you think the negative quality you listed above outweighs the positive quality or vise versa?) **Explain your answer.**

Question 2: The Behavior-Based Approach (20 points)

Consider Turnip 1 (the robot in "From Task Level Planning to Analogical Navigation" by Mowforth and Grant). What parts of the programming of Turnip 1, if any, could not be accomplished using a strict behavior-based approach to robotics. **Explain your answer.**

Question 3: Subsumption (20 points)

Consider Turnip 1 (the robot in "From Task Level Planning to Analogical Navigation" by Mowforth and Grant). What parts of the programming of Turnip 1, if any, could not be accomplished using Brook's subsumption architecture. **Explain your answer.**

Question 4: Subsumption and Potential-Fields (20 points)

Consider the HandyBug (the robot in Chapter 2 of "Robotic Explorations: A Hands-on Introduction to Engineering" by Martin). Would it be more appropriate to describe its functionality (as given by the various programs in that chapter), using the subsumption architecture or the potential-fields approach? **Explain your answer.**

Question 5: Potential-Fields (20 points)

Consider Elvis (the Dog in "Do Dogs Know Calculus?" by Pennings). Could you model his actions using potential fields? **Explain your answer.**

(You only need to model the actions Elvis takes while playing fetch at the beach as described in the article, not other behaviors in which Elvis engages such as eating, sleeping, and differentiating simple polynomials.)