Name: _____   Student ID: _____

1. (21 points) For each of the following assertions, say whether it is true or false.

    (a) ___ One of our goals in AI is to design an agent program that implements the agent function—the mapping from percepts to actions.

    (b) ___ A rational agent must behave as if it possesses a utility function whose expected value it tries to maximize.

    (c) ___ An agent that senses only partial information about the state cannot be perfectly rational.

    (d) ___ Every agent is rational in an unobservable environment.

    (e) ___ There exist pure reflex agents that do not behave rationally in some task environments.

    (f) ___ There exists a task environment in which every agent is rational.

    (g) ___ A perfectly rational poker-playing agent never loses.

    (h) ___ In general, an agent's choice of action at any given instant can depend on its built-in knowledge and on the entire percept sequence observed to date.

    (i) ___ The agent function is an abstract mathematical description; the agent program is a concrete implementation, running within some physical system.

    (j) ___ Every agent function is implementable by some program/machine combination.

    (k) ___ Suppose an agent selects its action uniformly at random from the set of possible actions. There exists a deterministic task environment in which this agent is rational.

    (l) ___ It is possible for a given agent to be perfectly rational in two distinct task environments.

    (m) ___ The "transition model" of the world depends on how the world evolves independently of the agent. It does not consider the affects of the agent's action on the world.

2. (3 points) Consider a simple thermostat that turns on a furnace when the temperature is at least 3 degrees below the setting, and turns off a furnace when the temperature is at least 3 degrees above the setting. Is a thermostat an instance of a simple reflex agent, a model-based reflex agent, or a goal-based agent?

    ☐ simple reflex agent

    ☐ model-based reflex agent

    ☐ goal-based agent

3. (4 points) How would you characterize the task environment of a crossword puzzle?

    ☐ fully observable

    ☐ partially observable

    ☐ unobservable

4. (4 points) An behavior (action) of an agent is described by which of the following?

    ☐ Perception sequence

    ☐ Agent function

    ☐ Sensors and Actuators

    ☐ Environment in which agent is performing