Chapter 25 | Questions

1. Active sensors usually provide more information than passive sensors but what are their two limitations?

    Answer Hints: a) increased power consumption, and b) danger of interference when multiple active sensors are used at the same time

2. What does a GPS device transmit?

    Answer Hint: Nothing

3. Which type of optical range finder sensor captures full 3D at once?

    Answer Hint: Time of Flight cameras

4. List any two disadvantages of Time of Flight cameras.

    Answer Hints:
    1. Multiple reflections produced by corners and concave shapes create noises
    2. High intensity ambient light confuses the sensors
    3. Lights from multiple cameras can disturb each other
    4. Accuracy is only around 1 cm in optimal setup

5. How many degrees of freedom does a rigid autonomous underwater vehicle have? How?

    Answer Hint: 6 - three for its (x, y, z) location in space and three for its angular orientation

6. "Many industrial manipulators have seven degree of freedom, not six." Why?

    Answer Hint: Manipulators that have extra degrees of freedom are easier to control than robots with only the minimum number of DOFs

7. Give an advantage and a disadvantage of a holonomic robot.

    Answer Hint: Holonomic robots are easier to control - it would be much easier to park a car that could move sideways as well as forward and backward - but holonomic robots are also mechanically more complex

8. Give a limitation of the "Potential-field control" method for robot movement.

    Answer Hint: Gets trapped in local minima, does not consider robot's velocity

9. When is the "Reactive control" method for robot movement more appropriate?

    Answer Hint: When model of the environment may not be available - especially in complex or remote environments, such as the surface of Mars

10. A policy π is a function that maps states to actions. What does "Reinforcement learning control" method for robot movement search?

    Answer Hint: Policies