**Gears and Sensors Test**

*Directions: Write the best answer choice using a capital letter or using the best answer possible.*

1. Margaret's motors start at power level 75. The robot will go faster if she changes the power setting to..
   1. 100
   2. 10
   3. 50
   4. 120
2. Katrina has a box of 8-tooth gears and a box of 16-tooth gears in her workshop.  What combination of these gears on motor and wheel will make the fastest-moving Taskbot on a flat, clear surface with nothing being pushed?
   1. The 16-tooth gears should go on the motors and drive 16-tooth gears on the wheels.
   2. The 16-tooth gears should go on the motors and drive 8-tooth gears on the wheels.
   3. The 8-tooth gears should go on the motors and drive 8-tooth gears on the wheels.
   4. The 8-tooth gears should go on the motors and drive 16-tooth gears on the wheels.
3. Alastair has a box of 16-tooth gears and a box of 8-tooth gears. What combination of gears will make a Taskbot that is best able to push a heavy load from one area to another?
   1. The 16-tooth gears should go on the motors driving 16-tooth gears on the wheels.
   2. The 16-tooth gears should go on the motors driving 8-tooth gears on the wheels.
   3. The 8-tooth gears should go on the motors driving 8-tooth gears on the wheels.
   4. The 8-tooth gears should go on the motors driving 16-tooth gears on the wheels.
4. The driving gear is \_\_\_\_\_\_\_\_\_\_\_\_.
5. How do you calculate the gear ratio?
   1. Driving gear/ Driven gear
   2. Driven gear/driving gear
   3. A ratio of the gear teeth to the motor power.
   4. Driving gear teeth/number of gears.
6. What gear ratio means that speed and power are directly controlled by the motors?
   1. 1:1
   2. 1:2
   3. 2:1
   4. 1:3
7. If the driving gear has 16 teeth and the driven gear has 32 teeth, the gear ratio is
   1. The biggest gear
   2. The smallest gear
   3. Attached to the wheel
   4. Attached to the motor
8. If your measurements of the distance your robot traveled in 5 seconds were:

17.9 cm 19.0 cm 18.3 cm

What is the average distance traveled? Remember that you can use the calculator on the computer.

1. For the figures given in the above question, what is the average speed in cm/second? Just give the number, not the units. Do not round.
2. If there are 8 teeth on the driving gear, and 40 teeth on the driven gear, what will the robot do well?
   1. Climb a steep hill
   2. Go slowly
   3. Push a heavy load
   4. All of the above
3. What will this program tell the robot to do?
4. Stop when the ultrasonic sensor is enabled
5. Stop when the touch sensor is enabled
6. Stop when the touch sensor hits something
7. Stop if it hears a loud sound
8. How does the touch sensor bumper detect obstacles?
   1. When the touch sensor is pushed and then released, it triggers a stop signal
   2. When the touch sensor is pressed, it triggres the program to stop the motors.
   3. The touch sensor must be pressed more than once to stop the motors.
   4. When the touch sensor is pressed, move blocks check to see which motor is being used.
9. How does the touch sensor differ from the ultrasonic sensor when detecting obstacles?
   1. You need to set a threshold when using the ultrasonic sensor.
   2. Using the ultrasonic sensor, the robot stops before it hits an object
   3. The touch sensor will only stop the robot when it hits an object, but the ultrasonic sensor stops before it hits.
   4. All of the above.
10. The ultrasonic sensor uses
    1. Sound waves
    2. Light waves
    3. Infra-red waves
    4. Gravity waves
11. In which programming block do you change the parameters to make your sensors work?
    1. Move block
    2. Wait for block
    3. Motor block
    4. Sensor block
12. Bumpy Doggers is a company that sells Bumper cars. Customers have been complaining that the Bumper cars are slowing down before they hit the other cars,  and Bumpy Doggers is looking for a new sensor for their cars. Which sensor would be most appropriate?
    1. Light sensor
    2. Touch sensor
    3. Ultrasonic sensor
    4. None of the above
13. Large heavy robots are needed in an industrial setting where many people work among the robots. Because the people are walking around, a very reliable sensor is needed to make sure that the robots stop before they hit the people. Which of the following sensors would keep the people completely safe?
    1. Light sensor
    2. Touch sensor
    3. Ultrasonic sensor
    4. None of the above
14. A clothing store is thinking of buying robots to return clothes that have been left in the fitting rooms to the shelves. They want to install sensors that stop just before the racks where the clothing is hanging so that a robotic arm can take the hangers from the racks, then hang them up again. The sensors would be at the level of the clothing. A consultant told them that the best sensor would be an ultrasonic sensor.
    1. True
    2. False