Name _____ Date _____

Engineering Design Process Quiz #3

1. Kaleb and Justin are having a discussion about the definition of the words "constraint" and "specifications". Justin states that constraints are things that you can use when making a new product. Kaleb disagrees and says that constraints have nothing to do with making a new product.

   Which of the following statements best describes the term "constraints"?
   a. Constraints are restrictions of items which can't be used, limitations on time, and limitations of design.
   b. Constraints are the required materials, design, and the amount of time needed to develop a product.
   c. Constraints are examples of prototypes.
   d. The research which is done to determine information that should be used in the development of new products.

2. Explain what it means to troubleshoot a problem. Be sure to use complete sentences and punctuation. _____

   _____

   _____

3. Provide the name of the first three steps of the Engineering Design Process in the correct order.
   Step 1 - _____
   Step 2 - _____
   Step 3 - _____

4. You power-on the controller for your robot. After the controller powers-on, you hear a series of sounds but the LCD display is not illuminated.

   Which of the following statements best represents what should be done by the student to troubleshoot the problem?
   a. Read the manual to determine how to adjust the brightness of the LCD display screen.
   b. Give the controller to Mr. Hicks to determine the solution.
   c. Order a new display screen.
   d. Put the robot away because you will need to purchase a new robot due to the high cost of developing a solution will be too high.

Read the following scenario and answer questions 5 – 9.

Your aunt Laura, the "candy connoisseur" and "part-time scientist" has innovated a new way to make candy that has different flavors. For example, she has discovered a way to make candy that taste like chocolate ice cream, hot dogs with ketchup, and peanut butter and jelly. She would like to share her new type of candy with the public by offering them free samples in stores. She hopes that by offering free samples, they will like them so much that they will go out and buy them by the jars and make her rich and famous. However, she needs someone to "invent" for her a candy dispenser.

Challenge:

In this small group activity, your team is to design and develop (invent) a prototype (working model) of a small candy dispenser.

Criteria and Constraints:

- ✓ Your candy dispenser must be made with at least 7 different items.
- ✓ You must decide on a name for your candy dispenser.
- ✓ The candy dispenser must be able to hold at least 4 ounces of candy and be able to dispense a small "free sample" of approximately 4-8 pieces of candy.
- ✓ You may not use glass.
- ✓ You may not use any materials which pose a safety problem

Tools, Materials and Equipment Needed:

- 3 straws
- 1 bowl
- 1 CD
- Tape
- 2 paper clips
- 1 cup
- 2 pipe cleaners
- 2 rubber bands
- 1 file folder

5. Which statement best describes the problem in the scenario?

   a. Your candy dispenser must be made with at least seven different items.
   b. Aunt Laura has made several different flavors of candy.
   c. Your Aunt Laura needs someone to invent a candy dispenser for her.
   d. None of these

6. Which of the following best represents what will occur during step three of the Engineering Design Process as you develop the candy dispenser?

   a. List the criteria for the candy dispenser.
   b. Research different candy dispensers using the internet.
   c. Draw various sketches of possible solutions of the candy dispenser.
   d. Develop the prototype for the candy dispenser.

7. Which of the following best represents what will occur during step four of the Engineering Design Process as you develop the candy dispenser?
    a. List the criteria for the candy dispenser.
    b. Research different candy dispensers using the internet.
    c. Draw various sketches of possible solutions of the candy dispenser.
    d. Develop the prototype for the candy dispenser.

8. Which of the following best represents what will occur during step six of the Engineering Design Process as you develop the candy dispenser?
    a. List the criteria for the candy dispenser.
    b. Research different candy dispensers using the internet.
    c. Draw various sketches of possible solutions of the candy dispenser.
    d. Develop the prototype for the candy dispenser.

9. Determine which of the following will be a constraint and which will be a specification. Use "C" to represent constraint and "S" to represent specification.

____ 3 straws	____ 2 paper clips
____ 1 bowl	____ 1 cup
____ 1 bowl	____ 2 pipe cleaners
____ 1 CD	____ dispense free sample
____ glass	____ 2 rubber bands
____ Tape	____ 1 file folder

____ name of dispenser

____ must be made with at least seven different items

____ items which create a safety hazard

10. Explain the purpose of the Universal Systems Model. _____

_____

11. Name the five elements which define the Universal Systems Model.
    a. _____
    b. _____
    c. _____
    d. _____
    e. _____

12. Match each term in the middle column with the correct definition in the right column.

Answer	Term	Definition
	Feedback	a. The work that is done in a system.
	Subsystem	b. A series of interconnected parts
	Input	c. The point where the work comes out of a system
	Simple machine	d. Has many functions and parts
	Output	e. The beginning of a process or system.
	System	f. A smaller part of a larger system
	Process	g. is the return of information to the information giver about the result of a process or activity
	Complex machine	h. has one function and very few moving parts