

**For questions 1–30, circle the letter of the correct answer.**

- 1.** What is the first step in The Design Process?
  - a. Define the Problem
  - b. Research Your Solution
  - c. Identify a Design Opportunity
  - d. Improve Your Solution. Test, Evaluate & Revise
  
- 2.** What does SCAMPER stand for?
  - a. **S**ubstitute—**C**ombine—**A**dapt—**M**agnify/Minimize—**P**ut to Other Uses—**E**liminate/Elaborate—**R**everse/Rearrange
  - b. **S**ubstitute—**C**ombine—**A**dapt—**M**odify—**P**ut to Other Uses—**E**nlarge—**R**everse/Rearrange
  - c. **S**ubstitute—**C**orrect—**A**mplify—**M**agnify/Minimize—**P**ut to Other Uses—**E**liminate/Elaborate—**R**euse
  
- 3.** A jar lid is an example of a:
  - a. Screw
  - b. Wheel & Axle
  - c. Pulley
  - d. Wedge
  
- 4.** The statement “The CD player will hold 5 CDs which will be top loaded” is a:
  - a. Design Requirement
  - b. Design Specification
  - c. User Requirement
  - d. User Specification
  
- 5.** The purpose of Product Research is to understand how to refine your design problem.
  - a. True
  - b. False
  
- 6.** The 4 classes of materials are:
  - a. Solids, Gases, Liquids, Furs
  - b. Metals, Ceramics, Plastics, Polymers
  - c. Metals, Ceramics, Polymers, Composites
  - d. Dirt, Water, Metal, Glass

- 7.** An escalator is an example of a(n):
- Lever
  - Pulley
  - Inclined Plane
  - Wedge
- 8.** Which of the following is **NOT** a step in The Design Process?
- Research the Design Opportunity
  - Brainstorm Possible Solution to the Problem
  - Build Models and Component Parts
  - Decide How to Sell the Product
- 9.** Information about the typical user of your product should be included in the Design Brief.
- True
  - False
- 10.** If you design a new product, you would protect your work by getting a:
- Patent
  - Trademark
  - Copyright
- 11.** Which of the following is **NOT** a step in The Design Process?
- Obtain Approval of the Design
  - Prepare Design Requirement and Conceptual Drawings
  - Build a Solution Prototype
  - Refine Your Solution
- 12.** If you made a two-dimensional sketch of the top, front, and side views of an object, you have made a(n):
- Orthographic Sketch
  - Isometric Sketch
  - Oblique Sketch
  - Perspective Sketch
- 13.** A model is a working representation of a product.
- True
  - False

- 14.** If an engineer designs a product well, he or she doesn't have to test it.
- True
  - False
- 15.** Which of the following is an example of Substitute?
- Scented Markers
  - Meatless Burgers
  - Big Screen Televisions
  - Running Shoes
- 16.** How many steps are there in The Design Process?
- 5
  - 10
  - 12
  - 15
- 17.** A Composite is a combination of two distinct substances with properties of each.
- True
  - False
- 18.** Potential Energy is energy being stored before being released in a machine.
- True
  - False
- 19.** The statement "The CD player will hold more than one CD at a time" is a:
- Design Requirement
  - Design Specification
  - User Requirement
  - User Specification
- 20.** Which of the following is NOT a method of conducting product research?
- Surveys
  - Internet Searches
  - Observations
  - Market Research

- 21.** Information about how to sell the product should be included in the Design Brief.
- True
  - False
- 22.** If you designed a symbol for your product, you would protect your work by getting a:
- Patent
  - Trademark
  - Copyright
- 23.** If you made a three-dimensional sketch where the horizontal axes form a 30-degree angle with the true horizontal line, you have made a(n):
- Orthographic Sketch
  - Isometric Sketch
  - Oblique Sketch
  - Perspective Sketch
- 24.** A prototype is a visual representation of a product that doesn't have to work like the real thing.
- True
  - False
- 25.** Without a test of the product, an engineer won't know how well it works.
- True
  - False
- 26.** Which of the following is an example of Put to Other Uses?
- Cordless Telephones
  - Ergonomic Keyboards
  - Clock Radios
  - Tire Swings

- 27.** The statement “The clock radio will have a blue digital readout two inches high” is a:
- a. Design Requirement
  - b. Design Specification
  - c. User Requirement
  - d. User Specification
- 28.** If you wrote a book about your product, you would protect your work by getting a:
- a. Patent
  - b. Trademark
  - c. Copyright
- 29.** If you made a sketch of the true size and shape of an object and where the top and side views are at 30-degree angles, you have made a(n):
- a. Orthographic Sketch
  - b. Isometric Sketch
  - c. Oblique Sketch
  - d. Perspective Sketch
- 30.** Models and prototypes help engineers to see how a product will look.
- a. True
  - b. False

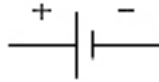
**For questions 31–33, write the correct answer on the line.**

**31.** Match the Material Property on the left with the correct definition on the right.  
Write the number of the definition on the line next to the Property.

- |                                  |  |
|----------------------------------|--|
| a. Density _____                 | 1. How easily heat passes through the material                 |
| b. Ductility _____               | 2. How easily a material withstands repeated stresses          |
| c. Strength _____                | 3. The amount of time a material can hold an object up         |
| d. Fatigue _____                 | 4. How easily light passes through the material                |
| e. Electrical Conductivity _____ | 5. How heavy objects are that occupy the same volume           |
| f. Thermal Conductivity _____    | 6. How hot a material can get without melting                  |
| g. Optical Properties _____      | 7. How easily a material stretches when force is applied       |
| h. Corrosion _____               | 8. How much weight a material can hold without breaking        |
|                                  | 9. Whether or not electricity passes through the material      |
|                                  | 10. If the material degrades easily because of the environment |

**32.** Match the electrical symbol on the left with the name for what the symbol represents on the right. Write the number of the correct answer on the line.

a. \_\_\_\_\_



b. \_\_\_\_\_



c. \_\_\_\_\_



d. \_\_\_\_\_



e. \_\_\_\_\_



1. lamp
2. wire
3. outlet
4. battery
5. speaker
6. switch

**33.** Match the simple machine in the list on the left with the correct description on the right. Write the number of the correct definition on the line.

- |                         |  |
|-------------------------|--|
| a. Lever _____          | a. Reverses the direction of a force   |
| b. Inclined Plane _____ | b. An inclined plan with either one or two sloping sides   |
| c. Wedge _____          | c. A stiff rod or plank that rotates around a fixed point, or <i>fulcrum</i>                           |
| d. Screw _____          | d. An inclined plane wrapped around a cylinder   |
| e. Wheel & Axle _____   | e. A slanted surface that decreases the force needed to move an object to a higher level               |
| f. Pulley _____         | f. When connected, a longer motion at one end is converted to a short powerful motion on the other end |
|                         | g. Turn circular motion into up and down motion  |