
Student Name: _____

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Date: _____

District: Wake County

Assessment: 9_12 Tech Ed TE11 - Technology Engineering and Design Test 1

Description: Test 3 Form A

Form: 501

- 1. A focus group usually consists of groups of 5-7 people that are surveyed. The data collected from a focus group should be considered:**
 - A. factual.**
 - B. opinion.**
 - C. biased.**
 - D. fair.**

- 2. There are many scientific concepts that are used by engineers and designers. Which of the following would NOT be one of these concepts?**
 - A. Melting point of steel**
 - B. Tensile strength of a wood beam**
 - C. Mass of an aluminum bolt**
 - D. Colors that match green**

- 3. A new office building has been planned and will be built in sunny, Phoenix, AZ. The roof will have a three foot overhang and the exterior walls will be constructed using twelve inch adobe brick. The design features of this building have been established based on:**
 - A. financial conditions.**
 - B. environmental conditions.**
 - C. enterprise conditions.**
 - D. usage conditions.**

4. A linear (straight forward) approach to develop a product will predict which of the following outcomes?
- A. Each phase is addressed independently, one step at a time.
 - B. The phases overlap and are addressed at the same time.
 - C. There is no organized process.
 - D. Each phase is optional wherein the sequence of the process changes each time.
5. The advancement of scientific knowledge is promoted by using:
- A. the tools of technology and engineering.
 - B. mythology as a starting point for explaining the natural world.
 - C. traditions handed down from past generations.
 - D. aesthetics and its effect on the marketability of the product.
6. A group of students are developing ideas for a new video game console system. At which point in the design process should they discuss regarding each design before making a prototype?
- A. Selecting the best solution
 - B. Conducting a problem analysis
 - C. Brainstorming and research
 - D. Creating technical drawings.
7. When solving design problems it is important to clearly understand the problem. To accomplish this it is important to:
- A. solve the problem.
 - B. define the problem.
 - C. classify the problem.
 - D. select the problem.
8. What is the last step in the design process?
- A. Developing a working prototype
 - B. Patenting the product
 - C. Reporting the progress of the project
 - D. Presenting the solution

9. A technology club completed an entry for the video promotional competition, and is required to present it to the judges to explain the process used to create it. Which design process step will the club complete?

- A. Brainstorming
- B. Make a prototype
- C. Define the problem
- D. Communicate the results

10. The process used to make a design or system as effective or efficient as possible.

- A. Optimization
- B. Complex systems
- C. Nuclear Energy
- D. Divergent thinking

11. Many airplanes are constructed largely out of aluminum even though steel is a stronger material. This is an example of:

- A. choosing a more economical solution.
- B. designing for recycling.
- C. optimizing design trade-offs.
- D. developing a simple manufacturing system.

12. A design team finally developed a new product that will have significant impacts on the safety of space travel. The best way for them to communicate their findings is to:

- A. put an article in the newspaper.
- B. produce a commercial on the radio.
- C. write an article for a "science" journal.
- D. purchase space on a billboard.

13. Before a design solution can be refined, it should first be:

- A. processed.
- B. sketched.
- C. marketed.
- D. tested.

14. While testing a prototype of a wheelchair lift, Tonya discovers a performance error before it swings the wheelchair inside the door. What is her next step to solve the problem?
- A. Communicate results
 - B. Choose another idea
 - C. Modify the prototype
 - D. Research materials used
15. Which activity occurs first in the design process?
- A. Applying for a patent and marketing
 - B. Researching similar products
 - C. Building the prototype
 - D. Communicating test results
16. Designing a vehicle within its given budget, the design team eliminated several features based on the original design. What is the relationship between criteria and constraints?
- A. Enhancing
 - B. Competing
 - C. Eliminating
 - D. Complimenting
17. Part of the design process is to select an approach to use when choosing a final product to produce. Which approach is LEAST important to make a reliable decision?
- A. Ask experts what they think
 - B. Randomly choose the best three ideas
 - C. Build prototypes of the final ideas
 - D. Run a test on the computer
18. When refining a design, which method would yield information to improve the efficiency of the design?
- A. Computer simulations
 - B. Working drawings
 - C. Design constraints
 - D. Consumer preference

19. Which of the following must be clearly defined?

- A. Design problems**
- B. Product test results**
- C. Product research**
- D. Product drawings**

20. The process used to maximize the function, market appeal, and safety of a new technology is referred to as:

- A. risk analysis**
- B. optimization**
- C. specifications**
- D. transfer**

21. The engineering design process is a series of steps that are:

- A. critical.**
- B. linear.**
- C. optional.**
- D. iterative.**

22. A problem-solving process that is used to generate ideas, model, test, and communicate new products and processes is called a:

- A. engineering design process.**
- B. marketing design process.**
- C. assessing design process.**
- D. research design process.**

23. High school students are developing a Technology Education website to educate the local community about the school's Engineering Design program. Which question is most likely to be asked in the problem analysis phase of the engineering design process?

- A. Who will be viewing the web site?**
- B. How will the success of the web site be measured?**
- C. What does the community need to know about the program?**
- D. Are both sides of an issue included in the website?**

24. When making a design proposal it is critical to explain all of the following EXCEPT:

- A. function of the product.**
- B. purpose of the product.**
- C. drawings of the final product.**
- D. original brainstorming list.**

25. The requirements for a product to function efficiently is called:

- A. the trade-offs**
- B. the impacts**
- C. the collaborations**
- D. the criteria**

26. A newly constructed bridge was inspected to evaluate the load capacity of the bridge. During the inspection, fatigue cracks and stress fractures were discovered on the deck and supports. After reviewing the original plans, it was discovered the bridge was not built to original specifications (requirements). What did the engineers most likely ignore when designing the bridge?

- A. Planning and developing**
- B. Criteria and constraints**
- C. Testing the bridge**
- D. Safety procedures**

27. If a product does not meet the established criteria during production, issues related to its:

- A. designs must be investigated.**
- B. ergonomics must be investigated.**
- C. quality control must be investigated.**
- D. regulations must be investigated.**

28. A design challenge is given that says, "create a bird house, but do not let it cost more than \$20.00 in materials". The cost of the birdhouse would be considered a:

- A. criteria**
- B. constraint**
- C. requirement**
- D. example**

29. Considering the given criteria and constraints, competing factors that will jeopardize the product's efficiency will require a:

- A. budget.**
- B. specification.**
- C. spin-off.**
- D. trade-off.**

30. Identifying both desired elements and limitations of a product or system is called:

- A. requirements.**
- B. resources.**
- C. recommendations.**
- D. risks.**

31. A design team is making a new container for milk, and the customer needs the container to be 9" tall exactly. The size specification is considered a:

- A. criteria**
- B. constraint**
- C. limitation**
- D. function**

32. A speed boat is not permitted to go faster than 100 knots in a lake. Therefore, the company decides to redesign the throttle so it can only go 95 knots. This would be an example of a:

- A. constraint.**
- B. criteria.**
- C. trade-off.**
- D. design challenge.**

33. The general requirements and limitations that are incorporated into the design of a structure are known as:

- A. creativity and innovation.**
- B. form and function.**
- C. criteria and constraints.**
- D. marketability and safety.**

34. The purpose of a case study when conducting problem-solving research is to:

- A. select an appropriate solution to a problem.**
- B. document where and how others have made mistakes in solving a problem.**
- C. make sure the designer has not stolen other's solutions or ideas.**
- D. assess the current understanding of a problem.**

35. The criteria and constraints of a product or system and the determination of how they affect the final design and development are called:

- A. requirements.**
- B. resources.**
- C. recommendations.**
- D. risks.**

36. An engineer designing a laptop is told the device should be convenient to carry. This is likely to affect the design process, creating constraints on:

- A. size and weight**
- B. handle features**
- C. processor speed**
- D. applications and functions**

37. Which design constraints are likely to compete with each other when designing a fuel cell for a rocket?

- A. Color and material choice**
- B. Programming and ease of use**
- C. Weight and power output**
- D. Warranty and radioactivity**

38. When looking at the front view of a visual object in an orthographic drawing, the missing dimension from the view would be the:

- A. thickness.**
- B. width.**
- C. depth.**
- D. height.**

39. The exchange of information in visual form, such as words, drawings, photographs, or a combination of these is:

- A. linear logo.**
- B. conceptual/graphic communication.**
- C. mathematical modeling.**
- D. virtual design.**

40. If Fred were to design a new type of cell phone and he builds a replica of what the case would look like, he would be constructing a(n):

- A. duplicate.**
- B. mock-up.**
- C. prototype.**
- D. experiment.**

41. Which type of design project would testing a design using computer-based simulation be required?

- A. Truss bridge**
- B. Rocking chair**
- C. Screen door**
- D. Baseball glove**

42. What type of conceptual drawing would best illustrate how to put an entertainment center together?

- A. Pictorial drawing**
- B. Orthographic drawing**
- C. Systems drawing**
- D. Design drawing**

43. Shirley and Bob are testing three mathematical models to see which one is best for modeling the power consumption of their school. They should determine which model is best by choosing the one that:

- A. uses information that is easiest to obtain.**
- B. reports the lowest power consumption.**
- C. most closely matches the current power consumption.**
- D. uses variables most important to the study of power consumptions.**

44. When designing a roof for a greenhouse a variety of angles must be measured and cut accurately. What tool should be used to measure the angles?

- A. French curve**
- B. Laser**
- C. Protractor**
- D. Ruler**

45. The productivity of a design may be established by testing a:

- A. prototype.**
- B. working drawing.**
- C. mock-up.**
- D. conceptual model.**

46. Which step in the design process utilizes information gathered during the testing of products to present findings to stakeholders?

- A. Developing a working prototype**
- B. Patenting the product**
- C. Planning the presentation**
- D. Communicating the results**

47. When testing electric motors, students discovered that when the input power increased, the speed of the motor shafts (rpm) increased. Which graphical representations would best enable the students to systematically examine this relationship?

- A. Bar Chart**
- B. Line Graph**
- C. Pie Chart**
- D. Scatter Plot**

48. A working model used to test a design during development is called a:

- A. prototype.**
- B. constraint.**
- C. product.**
- D. master design.**

49. Three-dimensional models are typically used for:

- A. simulating and testing design ideas.**
- B. small batch production.**
- C. a technical drawing.**
- D. optimizing the manufacturing process.**

50. The class races their electric cars that they built. A tape measure is glued to the floor between the lanes. Ali videotapes the races. Whitney looked at the videos and recorded the position, by the tape, of each car in each frame, so she could plot their speed on a graph. What program should she use to record the data?

- A. Word**
- B. PowerPoint**
- C. Excel**
- D. Publisher**

51. Which step of the engineering design process would use a graph to communicate the results?

- A. Defining a problem**
- B. Exploring possibilities**
- C. Making a prototype**
- D. Evaluating the design**

52. Dr. Sandy, an engineer at Handy and Associates, is working on a project. To communicate procedures, flow charts, drawings, graphics, symbols, spreadsheets, graphs, time charts, and webpages will be included in her:

- A. Company Newsletter.**
- B. Engineering Design Journal.**
- C. Personal Diary.**
- D. Facebook Page.**

53. What is the best choice for communicating information about the design process that will be used to develop a plan for a new mass transit system?

- A. A three-dimensional model of a bus that runs on ethanol**
- B. Drawings of different mass transit routes**
- C. A list of ideas about mass transit problems**
- D. A flow chart showing steps in coming up with the plan**