1. __________ is the modification of an existing product or process.
   A. Invention  C. Recreation
   B. Innovation  D. Enhancement

2. __________ During which step of the design process would a design brief be written?
   A. Development and Implementation  C. Problem Identification
   B. Conceptualization  D. Design Analysis

3. __________ Which of the following is a rule in brainstorming?
   A. Limit your options.  C. Decide on a solution
   B. Work alone  D. List lots of ideas

4. __________ Which step in the design process involves research, data collection, brainstorming, and sketching?
   A. Optimization  C. Problem Identification
   B. Design Analysis  D. Conceptualization

5. The principal of design that offers consistent use of line, color, and texture is called ____________.
   A. Unity  C. Emphasis
   B. Opposition  D. Creativity

6. __________ Is the detailed examination of something in order to understand it better or draw conclusions from it.
   A. Problem Identification  C. Solution
   B. Design Analysis  D. Brainstorming

7. A portfolio is _________________.
   A. an organized collection of your best original work  C. a list of constraints on a product
   B. A log of day to day actions  D. a booklet of refinements and alterations on a design

8. Plagiarism is _________________.
   A. the sharing of ideas and thoughts in a group  C. a list of rules to follow when composing a document
   B. a means of communication  D. the use of ideas, writings, etc. without giving credit
9. What visual aid would a designer typically use during the initial stages of the design process?
   A. Technical drawing  
   B. Parts list  
   C. Free-hand sketch  
   D. Prototype

10. A(n) ________ sketch provides additional written information to clarify the details of a design.
    A. pictorial  
    B. isometric  
    C. annotated  
    D. perspective

11. What technique would be used in sketching to increase clarity and improve artistic appearance?
    A. Painting  
    B. Detailing  
    C. Exploding  
    D. Rendering

12. Two points that share the same location on a 2D sketch are said to be ________.
    A. coincident  
    B. collinear  
    C. concentric  
    D. coplanar

13. ________ and/or dimensions are necessary to fully constrain a sketch when creating solid models.
    A. 2D geometric constraints  
    B. Formulas  
    C. Parameters  
    D. Offsets

14. A__________ is a full-size, functional model of a design that allows the object to be tested and analyzed before production begins.
   A. mock up  
   B. scale model  
   C. concept model  
   D. prototype

15. In 3D solid modeling software, hole, chamfer, fillet and shell are all examples of
    A. profiles.  
    B. placed features  
    C. extrusions  
    D. paths

16. Tangent, offset, and angled ________ can be created to provide a sketch surface where geometry does not currently exist.
    A. work points  
    B. work axes  
    C. work planes  
    D. work spaces

17. The first part brought into an assembly is called the ________.
    A. base component  
    B. initial component  
    C. internal component  
    D. external component

18. What three-dimensional point would be used to design a product that needs to be balanced?
   A. Center of gravity  
   B. Surface area  
   C. Volume  
   D. Work point
19. What is the allowance of an axle, 1” O.D., inserted into the center of a wheel, 1.125”?
   A. .125”  C. 1.125”
   B. 1”      D. 2.125”

20. Which is the correct hole note for the counter bored holes below?
   A. 2 X 1.00
   1.50 .25
   1.00 .25
   B. 2 X 1.00
   1.50 .25
   D. 2 X 1.50
   1.00 .25

21. What is the drawing dimension for a 1-inch slot on a part, if the scale of the drawing is 1:2?
   A. .5”
   C. 1.5”
   B. 1.0”
   D. 2.0”

22. What technique can be used to enhance an oral presentation in a small classroom?
   A. The use of visual aids
   C. Reading from a cue card
   B. The use of a microphone
   D. Limiting the presentation to one minute

23. The process of designing or engineering a product that can be produced by available machining techniques is referred to as ________________.
   A. CE – Concurrent Engineering  C. ED – Engineering Design
   B. PDD – Product Design and Development  D. DFM – Design for Manufacturability

24. The process of involving all branches of manufacturing in the initial design of a product is referred to as ________________.
   A. Concurrent Engineering  C. Engineering Design
   B. Product Design & Development  D. Reverse Engineering

25. A limit to a design process, _____________ may be such things as appearance, funding, space, materials, and human capabilities. 2. A limitation or restriction.
   A. Constraint  C. Coincidence
   B. Assessment  D. Iterative

26. An iterative decision-making process that produces plans by which resources are converted into products or systems that meet human needs and wants or solve problems. 2. A plan or drawing produced to show the look and function or workings of something before it is built or made. 3. A decorative pattern.
   A. Design  C. Invention
   B. Evolution  D. Standard
27. A written plan that identifies a problem to be solved, its criteria, and its constraints. The design brief is used to encourage thinking of all aspects of a problem before attempting a solution.
   A. Design               C. Design Brief
   B. Working Drawing      D. Solution

28. A systematic problem-solving strategy, with criteria and constraints, used to develop many possible solutions to solve a problem or satisfy human needs and wants and to winnow (narrow) down the possible solutions to one final choice.
   A. Constraint           C. Assessment
   B. Problem Identification D. Design Process

29. A person who designs any of a variety of things. This usually implies the task of creating drawings or in some ways uses visual cues to organize his or her work.
   A. Designer              C. Technician
   B. Researcher            D. Inventor

30. A person who is trained in and uses technological and scientific knowledge to solve practical problems.
   A. Engineer              C. Designer
   B. Scientist             D. Technician

31. Also referred to as an Engineer’s Logbook, a Design Notebook, or Designer’s Notebook. 1. A record of design ideas generated in the course of an engineer’s employment that others may not claim as their own. 2. An archival record of new ideas and engineering research achievements.
   A. Portfolio            C. Engineer’s Notebook
   B. Working Drawing      D. Design Brief

32. A gradual development.
   A. Constraint           C. Evolution
   B. Sequential           D. Standard

33. An improvement of an existing technological product, system, or method of doing something.
   A. Invention            C. Evolution
   B. Innovation           D. Standard

34. A new product, system, or process that has never existed before, created by study and experimentation.
   A. Invention            C. Evolution
   B. Innovation           D. Standard

35. A one-axis chart used to display past and/or future events, activities, requirements, etc., in the order they occurred or are expected to occur for the purposes of analysis and communication.
   A. Sequential            C. Time Line Chart
   B. Product               D. Engineer’s Notebook
36. A person or group for which product or service design efforts are intended.
   A. Target Consumer     C. Designer
   B. Engineer            D. Client

37. Describing a procedure or process that repeatedly executes a series of operations until some condition is satisfied. An _________ procedure may be implemented by a loop in a routine.
   A. Process     C. Brainstorming
   B. Iterative   D. Assessment

38. The recognition of an unwelcome or harmful matter needing to be dealt with.
   A. Process     C. Brainstorming
   B. Iterative   D. Problem Identification

39. Something considered by an authority or by general consent as a basis of comparison.
   A. Product     C. Standard
   B. Process     D. Solution

40. Forming or following a logical order or sequence.
   A. Sequential     C. Standard
   B. Iterative      D. Design Brief

41. Thin lines that serve as guides while sketching or drawing.
   A. Boarder Line     C. Construction Line
   B. Dimension Line   D. Extension Line

42. The measurement or extent of something from side to side.
   A. Width     C. Height
   B. Length    D. Depth

43. The distance from front to back.
   A. Width     C. Height
   B. Length    D. Depth

44. To form a mental image of; imagine.
   A. Measurement     C. Profile
   B. Visualize       D. Proportion

45. 1. The outside limit of an object, a surface, or an area. 2. The line along which two surfaces of a solid meet.
   A. Edge     C. Object Line
   B. Orthographic Projection D. Grid
46. A ____________ is a point in space, usually located on the horizon, where parallel edges of an object appear to converge.
   A. Projection Line    C. Projection Plane
   B. Vanishing Point    D. Working Drawing

46. The general effect of color or of light and shade in a picture.
   A. Shape              C. Tone
   B. Plane              D. Profile

47. A regular oval shape, traced by a point moving in a plane so that the sum of its distances from two other points is constant, or resulting when a cone is cut by an oblique plane which does not intersect the base.
   A. Profile            C. Ellipse
   B. Point              D. Poly line

48. Done manually without the aid of instruments such as rulers.
   A. Technical Working Drawing    C. Perspective
   B. Line Convention              D. Freehand Sketch

49. A network of lines that cross each other to form a series of squares or rectangles.
   A. Grid                  C. Shape
   B. Ellipse               D. Vanishing Point

50. A drawing that is used to show the material, size, and shape of a product for manufacturing purposes.
   A. Sketch                C. Scale
   B. Oblique Sketch        D. Technical Working Drawing

51. The measurement of someone or something from head to foot or from base to top.
   A. Width                 C. Height
   B. Length                D. Depth

52. A line type that represents an edge that is not directly visible, because it is behind or beneath another surface.
   A. Construction Line     C. Hidden Line
   B. Projection Line        D. Edge Line

53. A form of pictorial sketch in which all three drawing axes form equal angles of 120 degrees with the plane of projection.
   A. Oblique Pictorial     C. Two Point Perspective
   B. Isometric Pictorial   D. Vanishing Point

54. Standardization of lines used on technical drawings by line weight and style.
   A. Line Conventions      C. ASME
   B. ANSI                  D. Solid
55. To make something, especially on a large scale using machinery.
   A. Prototype  C. Model
   B. Profile      D. Manufacture

56. Views of an object projected onto two or more orthographic planes.
   A. Multi-view Drawings  C. Perspective Drawings
   B. Pictorial Drawings   D. Views

57. A heavy solid line used on a drawing to represent the outline of an object.
   A. Object Line  C. Center Line
   B. Hidden Line   D. Construction Line

58. A type of sketch involving a combination of a flat, orthographic front with depth lines receding at a selected angle, usually 45 degrees.
   A. Isometric Sketch  C. Perspective Sketch
   B. Linear Sketch     D. Oblique Sketch

59. A form of pictorial sketch in which vanishing points are used to provide the depth and distortion that is seen with the human eye. __________ drawings can be drawn using one, two, and three vanishing points.
   A. Isometric Sketch  C. Perspective Sketch
   B. Linear Sketch     D. Oblique Sketch

60. A location in space. Points have no dimensions.
   A. Point  C. Plane
   B. Size    D. Line

61. An outline of something as seen from one side.
   A. Point  C. Grid
   B. Shading D. Profile

62. 1. A straight-edged strip of rigid material marked at regular intervals and used to measure distances. 2. A proportion between two sets of dimensions used in developing accurate, larger or smaller prototypes, or models of design ideas.
   A. Ruler  C. Scale
   B. Foot    D. Stick

63. The representation of light and shade on a drawing or map.
   A. Shading  C. Tone
   B. Sectional D. Contour

64. A measurable extent, such as the three principal dimensions of an object is width, height, and depth.
   A. Data Set  C. Dimension
   B. Length    D. View
65. Lines that are thin lines capped with arrowheads, which may be broken along their length to provide space for the dimension numerals.
   A. Extension Lines       C. Object Line
   B. Dimension Line        D. Center Line

66. A change or slight difference in condition, amount, or level.
   A. Size Limit            C. Allowance
   B. Tolerance             D. Variation

67. A standard quantity in terms of which other quantities may be expressed.
   A. Unit                  C. Size Limit
   B. Measurement           D. Variation

68. Also referred to as the U.S. Customary system. The measuring system based on the foot, second, and pound as units of length, time, and weight or mass.
   A. Metric System         C. English System
   B. ANSI                  D. ASME

69. Thin lines used to establish the extent of a dimension.
   A. Extension Lines       C. Center Line
   B. Dimension Line        D. Object Line

70. A unit of linear measure equal to 12 inches or 30.48 cm.
   A. Foot                  C. Yard
   B. Meter                 D. Centimeter

71. The rate at which something occurs over a particular period or in a given sample.
   A. Mode                  C. Frequency
   B. Median                D. Volume

72. A diagram showing the relation between variable quantities, typically of two variables measured along a pair of lines at right angles.
   A. Pie chart             C. List
   B. Column                D. Graph

73. A graph of vertical bars representing the frequency distribution of a set of data.
   A. Histogram             C. List
   B. Column                D. Chart

74. The average or central value of a set of quantities.
   A. Median                C. Mean
   B. Mode                  D. Data Set
75. Referring to the middle term or mean of the middle two terms of a series of values arranged in order of magnitude.
   A. Median  C. Mean  
   B. Mode  D. Data Set

76. The value that occurs most frequently in a given data set.
   A. Median  C. Mean  
   B. Mode  D. Data Set

77. A number value, or algebraic equation that is used to control the size or location of a geometric figure.
   A. Numeric Constraint  C. Variation  
   B. Data Set  D. Normal Distribution

78. A triangle that contains only angles that are less than 90 degrees.
   A. Obtuse Triangle  C. Acute Triangle  
   B. Equilateral Triangle  D. Scalene Triangle

79. Drawings that convey all of the information needed to manufacture and assemble a design.
   A. Isometric Pictorial  C. Oblique Pictorial  
   B. Working Drawings  D. Projections

80. Having the dimensions of height and width, height and depth, or width and depth only.
   A. Three Dimensional  C. One Point Projection  
   B. Two Dimensional  D. Quadrilateral

81. Gradual diminution of width or thickness in an elongated object.
   A. Taper  C. Parallel  
   B. Countersink  D. Counter bore

82. Having the dimensions of height, width, and depth.
   A. Three Dimensional  C. One Point Projection  
   B. Two Dimensional  D. Quadrilateral

83. The sum of all the areas of all the faces or surfaces that enclose a solid.
   A. Area  C. Volume  
   B. Mass  D. Surface Area

84. A regular polygon with four equal sides and four 90 degree angles.
   A. Rectangle  C. Cube  
   B. Square  D. Prism
85. A type of 3D CAD modeling that represents the volume of an object, not just its lines and surfaces. This allows for analysis of the object’s mass properties.
   A. Solid Modeling   C. Word Processor
   B. Design   D. Orthographic

86. Turning around an axis or center point.
   A. Turning   C. Rotation
   B. Revolution   D. Auxiliary.

87. A number value, or algebraic equation that is used to control the size or location of a geometric figure.
   A. Numeric Constraint   C. Geometric Constraint
   B. Extrusion   D. Vertex

88. A straight line from the center to the circumference of a circle or sphere.
   A. Diameter   C. Circumference
   B. Chord   D. Radius

89. The numerical value of the ratio of the circumference of a circle to its diameter of approximately 3.14159.
   A. Diameter   C. Circumference
   B. Pi   D. Radius

90. A triangle with one angle that is greater than 90 degrees.
   A. Right Triangle   C. Obtuse Triangle
   B. Acute Triangle   D. Equilateral

91. A system of dimensioning which requires all numerals, figures, and notes to be aligned with the dimension lines so that they may be read from the bottom (for horizontal dimensions) and from the right side (for vertical dimensions).
   A. Unidirectional Dimension   C. Aligned Dimension
   B. English System   D. Metric System

92. A dimensioning system which requires all numerals, figures, and notes to be lettered horizontally and be read from the bottom of the drawing sheet.
   A. Unidirectional Dimension   C. Aligned Dimension
   B. English System   D. Metric System

93. A tolerance in which variation is permitted in both directions from the specified dimension.
   A. Unilateral tolerance   C. Limits of Size
   B. Bilateral tolerance   D. Allowance
94. Also known as point-to-point dimensioning where dimensions are established from one point to the next.
   A. Chain Dimensioning  
   B. Bilateral Dimensioning  
   C. Unilateral Dimensioning  
   D. Aligned Dimensioning

95. A theoretically exact point, axis, or plane derived from the true geometric counterpart of a specific datum feature. The origin from which the location, or geometric characteristic of a part feature, is established.
   A. Vertex  
   B. Edge  
   C. Origin  
   D. Datum

96. Where alternate units are displayed within the same dimension (both metric and standard dimensions can shown at the same time).
   A. Standards  
   B. Datum Dimension  
   C. Datum  
   D. Dual Dimension

97. Notes placed separate from the views; relate to the entire drawing.
   A. Local Note  
   B. Leader  
   C. General Note  
   D. Variation

98. Lines that are thin and used to connect a specific note to a feature.
   A. Extension Line  
   B. Leader Line  
   C. Center Line  
   D. Object Line

99. Connected to specific features on the views of the drawing. Also known as annotations.
   A. Local Note  
   B. Leader  
   C. General Note  
   D. Dual Dimension

100. A _____________ defines the relationship of features of an object.
     A. Leader  
     B. Center Line  
     C. Location dimension  
     D. Datum dimension

101. ___________ are used to indicate the end of a dimension line or leader.
     A. Leader  
     B. Extensions  
     C. Arrowheads  
     D. General Note