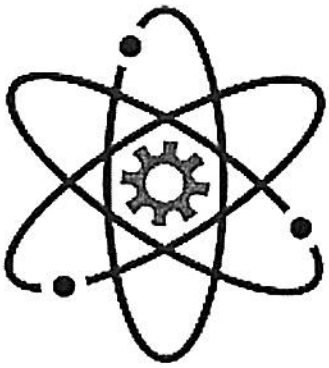


PROJECT LEAD THE WAY

PLTW

Introduction to Engineering Design

Midterm Exam
2013

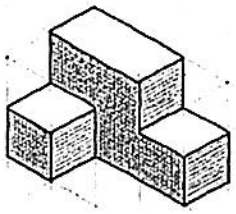
Part A – Multiple Choice

Directions: Select the letter of the response which best completes the item or answers the question. Then record your answer on the answer sheet provided for Part A.

1. Generating a large quantity of ideas for a solution to a problem is called _____.

   A. Constraining
   B. Brainstorming
   C. Ideation
   D. Implementation

2. The image at the right demonstrates _____.

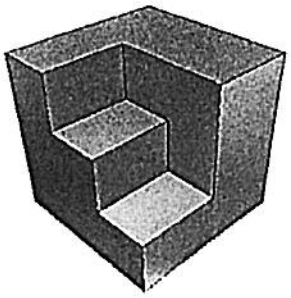


   A. Airbrushing
   B. Highlights and shadows
   C. Tonal shading
   D. Coloring

3. The image in question #2 is an example of what type of pictorial drawing?

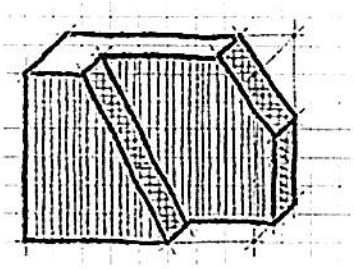
   A. Isometric
   B. Oblique
   C. 1 point perspective
   D. 2 point perspective

4. What type of pictorial drawing is pictured to the right?



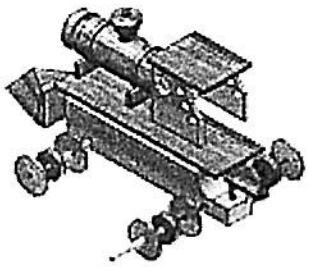
   A. Isometric
   B. Oblique
   C. Perspective
   D. Orthographic

5. What type of pictorial drawing is pictured to the right?



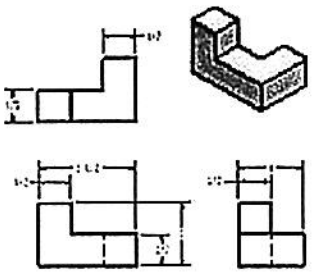
A. Isometric
B. Oblique
C. 1 point perspective
D. 2 point perspective

6. What type of drawing/view best describes the image to the right?



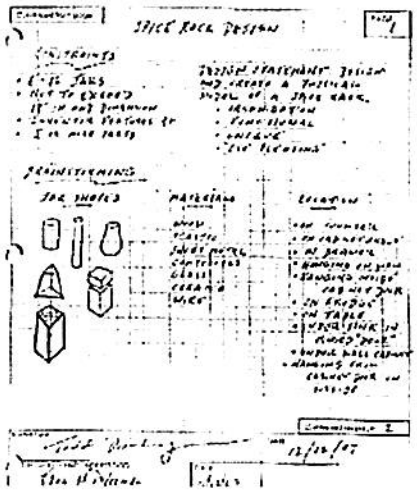
A. Multiview
B. Orthographic
C. Exploded
D. Assembly

7. What type of drawing/view best describes the image to the right?



A. Assembly presentation drawing
B. Exploded view
C. Section view
D. Detail drawing

8. The image to the right is an example of a(n) _____.



A. Project portfolio
B. Design brief
C. Engineer's notebook
D. Technical report

9. Engineers create _____ to quickly record, communicate, and investigate ideas.

A. 3D models
C. Sketches
B. Technical drawings
D. Animations

10. The most common view used in three-view, orthographic drawings are _____.

A. Front, top, left side
C. Top, front, bottom
B. Front, left side, right side
D. Front, top, right side

11. What term best describes this list of items:?

- Must be made out of 4 to 6 pieces
- Must be "interlocking"
- Part cannot extend more than 3 units in any direction
- No two parts can be the same

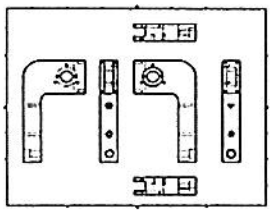
A. Client
C. Constraints
B. Deliverables
D. Problem statement

12. A full-scale working model used to test a design concept is called a(n)

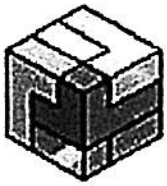
A. Prototype
C. Mock up
B. Scale model
D. Conceptual model

13. What image below contains all aspects of a working drawing?

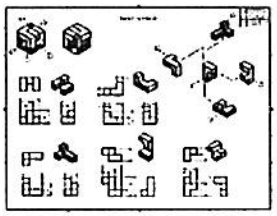
A.



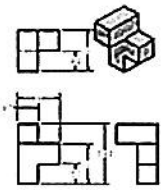
C.



B.



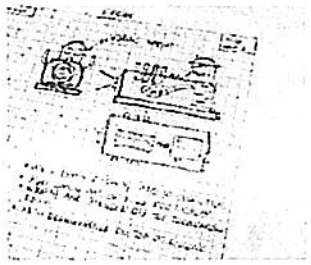
D.



14. An improvement of an existing technological product, system, or method is referred to as a(n)

A. Invention
B. Innovation
C. Serendipitous event
D. Technological change

15. A(n) _____ sketch is a sketch with text added to enhance the communication of the ideas/thoughts of the designer.



A. Thumbnail
B. Preliminary
C. Documented
D. Annotated

16. A(n) _____ is the most common method of communicating the shape and size of an object so that it can be manufactured.

A. Multi view projection
B. Exploded view
C. Auxiliary view
D. Pictorial view

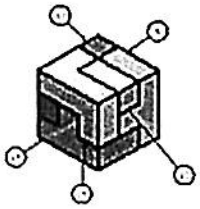
17. The basic dimension on a detail drawing that indicates the distance from front to back.

A. Width
B. Height
C. Depth
D. Length

18. Which is the first view placed or created in a three-view drawing or sketch?

A. Right side
B. Top
C. Front
D. Left side

19. What are the part indicators called on this image?



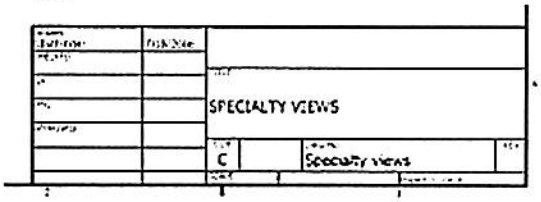
A. Nodes
B. Balloons
C. Bubbles
D. Encircled labels

20. What is the name of the item pictured to the right that is commonly found on a drawing sheet?

SPICE RACK		
ITEM	QTY	PART NUMBER
1	1	Bottom
2	16	Jar
3	1	Knob
4	1	Top
5	4	Jar holders
6	16	Jar Top
7	1	Turntable

A. Specification sheet
B. Title block
C. Histogram
D. Parts list

21. What is the name of the item pictured to the right that is commonly found on a drawing sheet?



A. Parts list
B. Heading
C. BOM - bill of materials
D. Title block

22. Never dimension to a(n)

A. Hidden line
B. Center mark
C. Centerline
D. Object line

23. The first part brought into an assembly is known as the base component. The base component is

A. Flexible
B. Adaptive
C. Non grounded
D. Grounded

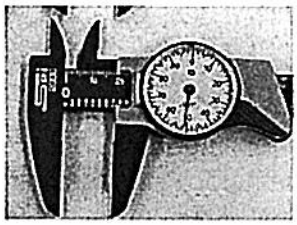
24. A(n) _____ is a person who is trained in and uses technological and scientific knowledge to solve practical problems.

A. Craftsperson
B. Technician
C. Engineer
D. Scientist

25. The organization that sets the standards for drawing symbols, line conventions, and dimensioning practices in the US is know as

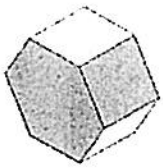
A. OSHA
B. NAFTA
C. ANSI
D. AAA

26. The precision measuring tool pictured to the right is called a(n) _____.



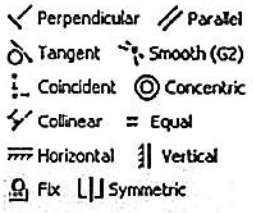
A. Engineer's scale
B. Dial caliper
C. Digital micrometer
D. Scientific ruler

27. The images pictured below are best described as _____.



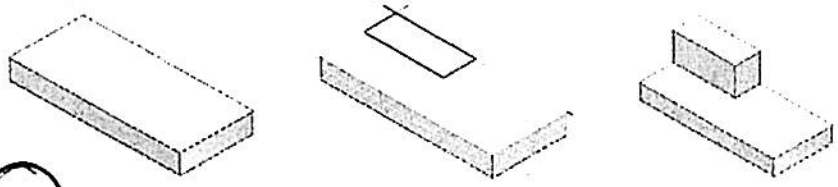
A. Shapes
B. Forms
C. Regular polygons
D. Extrusions

28. All of the icons pictured to the right represent _____ constraints and can be used to define the shape and size of sketched geometry in a CAD system.



A. Assembly
B. Numeric
C. Design
D. Geometric

29. Study the steps used to create the solid model below. What method did the designer use to create this part?



A. Additive
B. Skeletal
C. Subtractive
D. Assembly

30. Many times a small assembly is created and then brought into a larger assembly. The small assembly is commonly referred to as a(n) _____.

A. Micro assembly
B. Component cluster
C. Subassembly
D. Parts pod

31. If all of the dimensions on a part have the same precision as the dimensions below, which part would cost the most to machine?

A. 3.98 in.
B. 4.102 in.
C. 3.9 in.
D. 4.00 in.

32. How many degrees of freedom (DOF) remain on an ungrounded part after a single mate **and** single flush constraint have been applied?

A. 0
B. 1
C. 2
D. 3

33. Ø3/8 THRU
Ø3/4 X 82° is a callout for what type of hole?

A. Blind hole
B. Counterbore
C. Spotface
D. Countersink

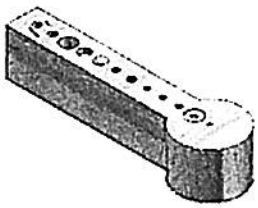
34. What type of hole should be modeled if the hole is to have a bolt tightened into it?

A. Blind hole
B. Countersink hole
C. Tapped hole
D. Clearance

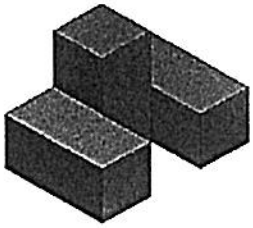
35. What part below would require a section view for manufacture?

A.

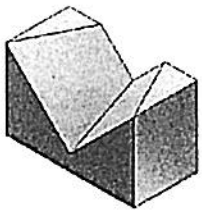
B.



C.



D.



36. What type of document includes the following section headings?

- Client
- Problem statement
- Design statement
- Constraints
- Deliverables

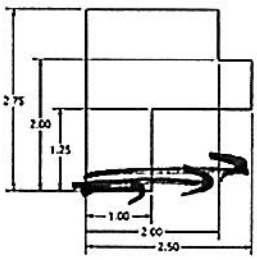
A. Specification sheet
B. Title block
C. Design brief
D. Parts list

37. What tool used during the design process is pictured to the right?

	cost	complexity	Development Time	Total
Idea #1	3	2	1	6
Idea #2	1	1	2	4
Idea #3	4	2	4	10
Idea #4	2	3	4	9
Idea #5	4	1	3	8
Idea #6	3	4	4	11

A. Parts list
B. Bill of materials
C. Decision matrix
D. Specification sheet

38. What type of dimensioning technique is pictured on the view to the right?

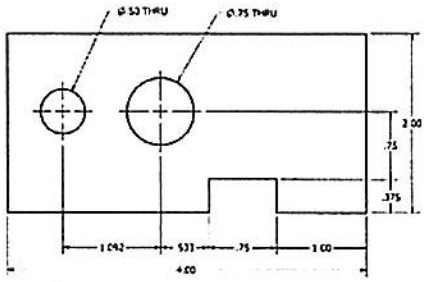


A. Chain
B. Baseline/Datum
C. Aligned
D. Alternate units

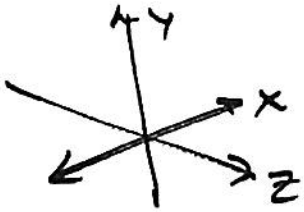
39. Setting the side of a rectangle to 3 in. is considered what type of constraint?

~~A. Assembly~~
B. Numeric
C. Geometric
~~D. Design~~

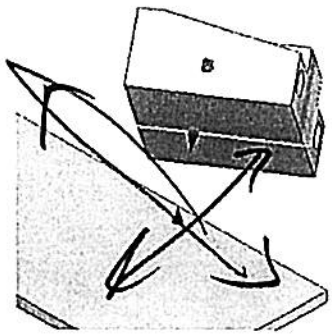
40. What type of dimensioning technique is pictured on the view to the right?



A. Chain
~~B. Baseline~~
~~C. Reference~~
~~D. Datum~~



41. After a single mate assembly constraint has been applied between Part B and the grounded part, how many degrees of freedom (DOF) remain on Part B?



A. 1
B. 2
C. 3
D. 4

42. Calculate the mean of the following data set: 21, 55, 34, 27, 41, 43, 34, 22

A. 277 B. 34.63 C. 39.57 D. 34

Wow