



2013 Academic Challenge

ENGINEERING GRAPHICS TEST – STATE FINALS

– This Test Consists of 40 Questions –

Engineering Graphics Test Production Team

Ryan Brown, Illinois State University – Author/Team Leader

Jacob Borgerson, Independent Consultant – Reviewer

Mary Weaver, WYSE – Coordinator of Test Production

GENERAL DIRECTIONS

Please read the following instructions carefully. This is a timed test; any instructions from the test supervisor should be followed promptly.

The test supervisor will give instructions for filling in any necessary information on the answer sheet. Most Academic Challenge sites will ask you to indicate your answer to each question by marking an oval that corresponds to the correct answer for that question. One oval should be marked to answer each question. Multiple ovals will automatically be graded as an incorrect answer.

Be sure ovals are marked as  , not  ,  ,  , etc.

If you wish to change an answer, erase your first mark completely before marking your new choice.

You are advised to use your time effectively and to work as rapidly as you can without losing accuracy. Do not waste your time on questions that seem too difficult for you. Go on to the other questions, and then come back to the difficult ones later if time remains.

***** Time: 40 Minutes *****

DO NOT OPEN TEST BOOKLET UNTIL YOU ARE TOLD TO DO SO!

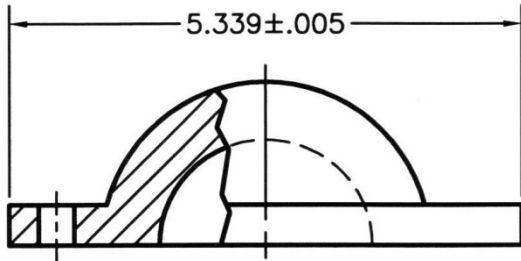
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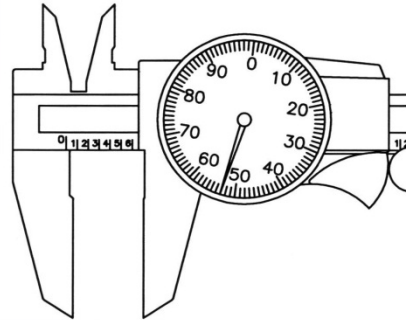
WYSE – Academic Challenge
Engineering Graphics Test (State Finals) - 2013

1. In the illustration below, there are several types of lines as found in the ASME alphabet of lines. Which line is NOT featured?



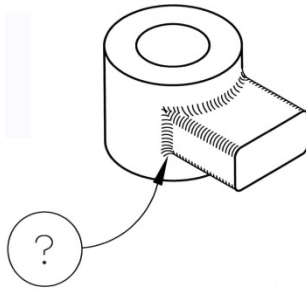
- A. Center
B. Hidden
C. Dimension
D. Short-break
E. Cutting-plane
2. Which of the following architectural scales would be suitable for measuring views created at 1/8 size?
- A. $1/8'' = 1'-0''$
B. $1/4'' = 1'-0''$
C. $1'' = 1'-0''$
D. $1-1/2'' = 1'-0''$
E. $3'' = 1'-0''$
3. Given LINE A-B at 3 units long, strike a 4-unit arc from A (radius of 4) and a 5-unit arc from B (radius of 5) to locate point C. Resulting TRIANGLE A-B-C is a(n) _____ triangle.
- A. isosceles
B. right
C. equilateral
D. obtuse
E. scalene

4. What is the dial indicator reading featured in the illustration below?



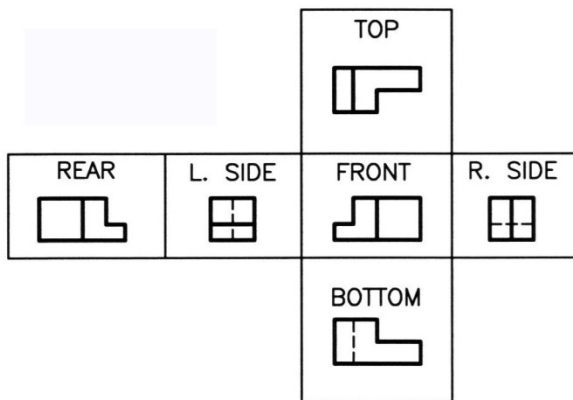
- A. .053"
B. .063"
C. .553"
D. .653"
E. .753"
5. In Euclidean geometry, there are five Platonic (regular) solids. Their names are derived from the number of faces. Therefore, which of the regular polyhedrons listed below is a cube?
- A. Tetrahedron
B. Hexahedron
C. Octahedron
D. Dodecahedron
E. Icosahedron
6. Within the realm of CAD systems, what term is applied to menus, tool buttons, ribbons, command input window, etc.?
- A. User interface
B. Drawing generation schema
C. Properties management
D. Display view control
E. Platform environment

7. In 2D views of objects with rounded edges, _____ are sometimes needed to help clarify the intersections of edges with curved surfaces.



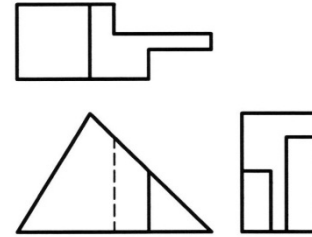
- A. convolutes
- B. runouts
- C. fillets
- D. tangents
- E. sectors

8. The illustration below features the six normal views of an object arranged in a standard orthographic glass box development. Which of the views is incorrectly represented?



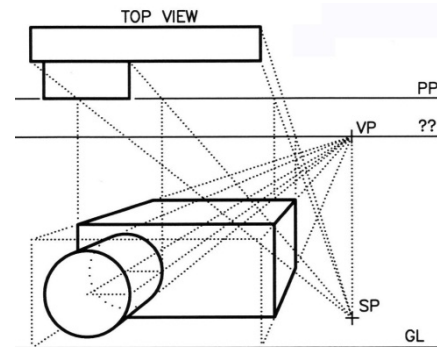
- A. Left side
- B. Right side
- C. Bottom
- D. Rear
- E. Top

9. In engineering graphics education, it is common to number all the vertices of an object to analyze the three regular views. How many vertices (corners) are there on the object shown below?



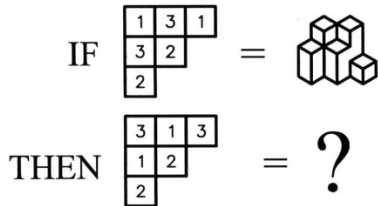
- A. 10
- B. 11
- C. 12
- D. 13
- E. 14

10. In this layout for a one-point perspective, what is the name of the horizontal line on which the vanishing point is located?



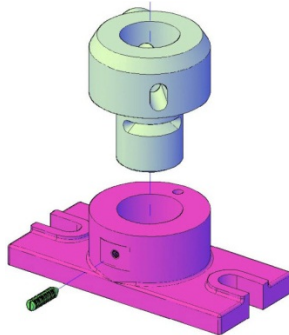
- A. Ground line
- B. Station point
- C. Horizon Line
- D. True length line
- E. Vanishing line

11. In the illustration below, a pictorial model was created to match the top view with height codes. Select the pictorial model that matches the second set of height codes:



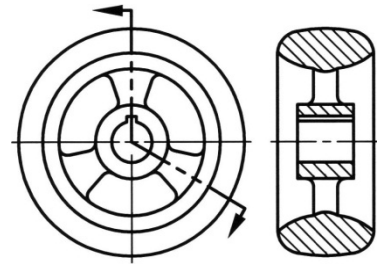
- A.
- B.
- C.
- D.
- E.

12. In the illustration below, what is the name of the fastener that functions as a "stop pin" for the cylindrical part?



- A. Machine screw
- B. Set screw
- C. Pratt & Whitney key
- D. Cap screw
- E. Rivet

13. What type of section view is being featured in the illustration below?

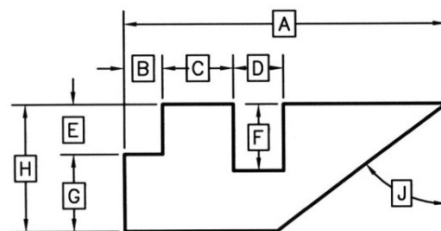


- A. Half
- B. Revolved
- C. Broken-out
- D. Aligned
- E. Offset

14. In the previous illustration (refer to Question 13), what feature is cut by the cutting plane, but is not "hatched" with section lines?

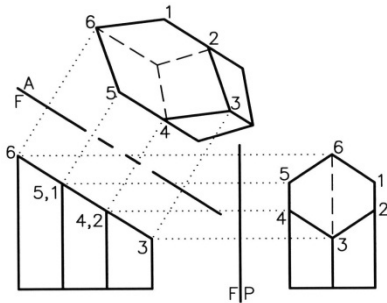
- A. Web
- B. Rib
- C. Spoke
- D. Rim
- E. Hub

15. Which of the dimensions on the drawing below could be considered superfluous?



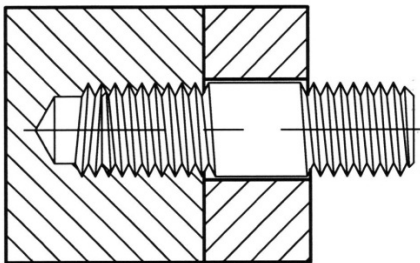
- A. A
- B. B
- C. C
- D. D
- E. E

16. With respect to the textbook auxiliary view drawing below, identify the FALSE statement:



- A. Edge 5-4 is true length in all three views
- B. The F stands for **frontal** plane
- C. The lines between the views labeled F/A and F/P represent folding lines for projection planes
- D. Edge 2-3 is only true length in the auxiliary view
- E. Since edge 2-3 is parallel with edge 6-5 in the side view, it is also parallel in the top view.

17. The illustration below features what common fastener?



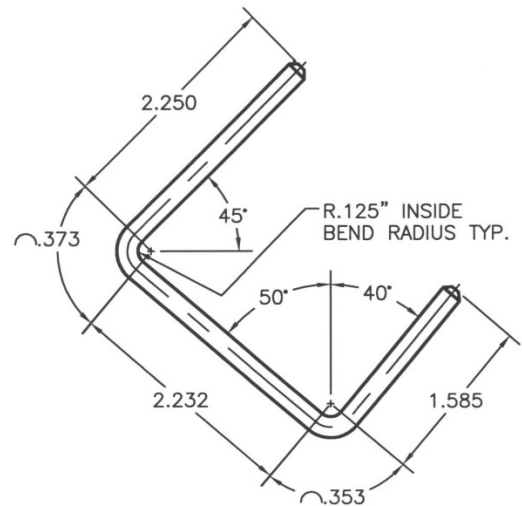
- A. stud
- B. wood screw
- C. lag bolt
- D. cotter pin
- E. set screw

18. In engineering drawings for cast parts, there are often notes dealing with the _____, a thin irregular ridge of metal on the outer face of the casting, most likely the result of seepage at the mold joints, as shown in this illustration.



- A. chamfer
- B. blast
- C. flash
- D. shift
- E. inclusion

19. Assuming the arc measurements are for the center axis of the wire, and the bend allowance is centered in the material, what length of wire would you specify for this wire bracket?



- A. 6.668
- B. 6.773
- C. 6.793
- D. 6.813
- E. 6.918

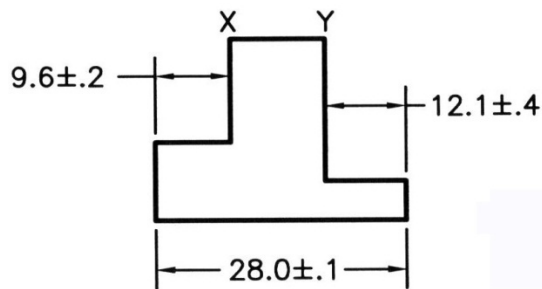
20. Which of the following is **least** likely to be controlled by a CAD system's layering or level scheme?

- A. Color of entities
- B. Line type or dash type of entities
- C. ON or OFF status of entities
- D. PRINT or NO PRINT status of entities
- E. Z-level above the X-Y plane

21. Individuals with mechanical engineering credentials might also work in the MEP industry, also known as "building services" in the UK, Canada, and Australia. In the context of mechanical engineering, what does MEP stand for?

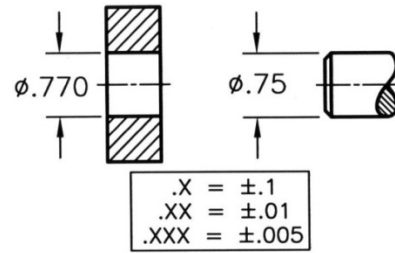
- A. Mechanical, Electrical, & Plumbing
- B. Materials, Elements, and Parts
- C. Motion, Energy, and Power
- D. Modeling, Engineering, & Planning
- E. Media, Environment, & Protection

22. If the part below is manufactured within the specified tolerances, what is the **minimum** thickness between X and Y?



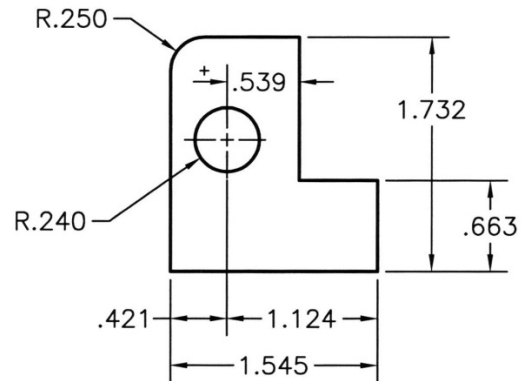
- A. 5.6
- B. 5.9
- C. 6.3
- D. 6.9
- E. 7.0

23. Based on the title block notes shown below the views, what is the tightest fit between these two features?



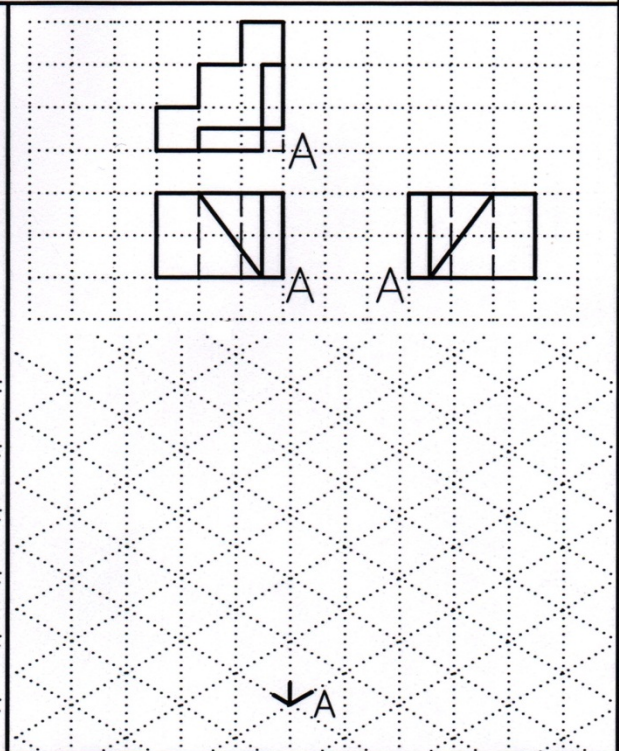
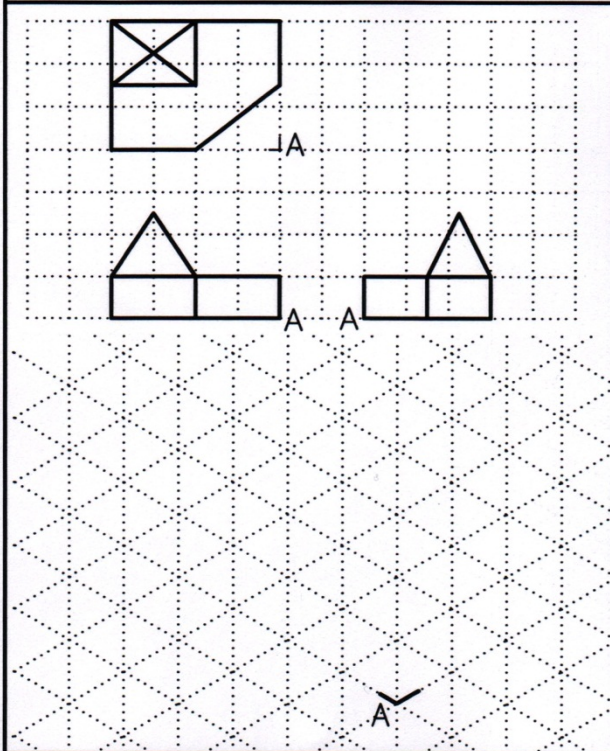
- A. .005" interference
- B. .005" clearance
- C. .010" clearance
- D. .015" clearance
- E. .020" clearance

24. The view dimensioned below has several poor choices to fix. Which choice below is **NOT** a fix?



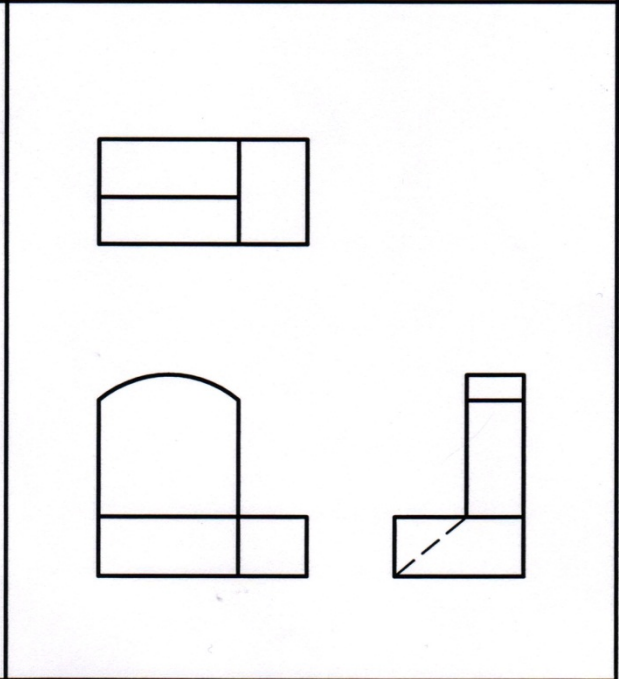
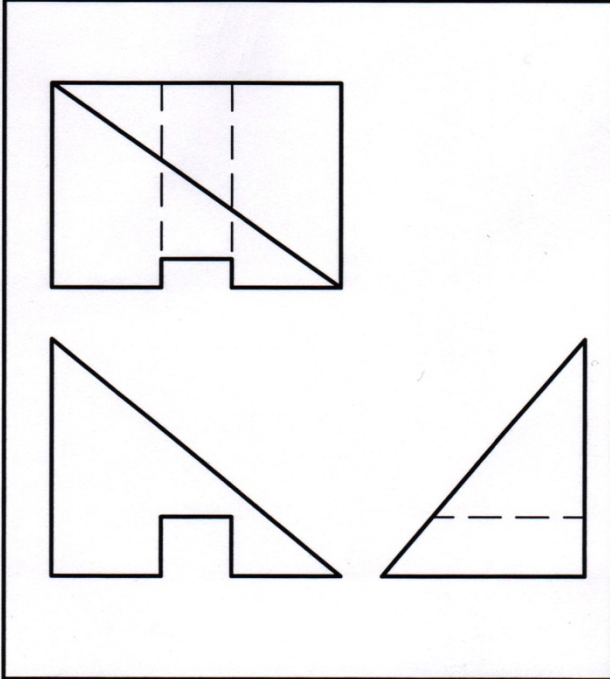
- A. Change hole size to a diameter dimension
- B. Eliminate either .421 dimension or the 1.124 dimension
- C. Move 1.732 dimension beyond the .663 dimension
- D. Move .539 dimension off the view
- E. Add location dimensions for the corner arc center point

PROBLEMS 25 & 26: CREATE ISOMETRIC SKETCHES.
 PROBLEMS 27 & 28, DIMENSION COMPLETELY, BUT NO SUPERFLUOUS.



25. NUMBER OF LINE SEGMENTS:
 A. 15 B. 16 C. 17 D. 18 E. 19

26. NUMBER OF LINE SEGMENTS:
 A. 20 B. 21 C. 22 D. 23 E. 24



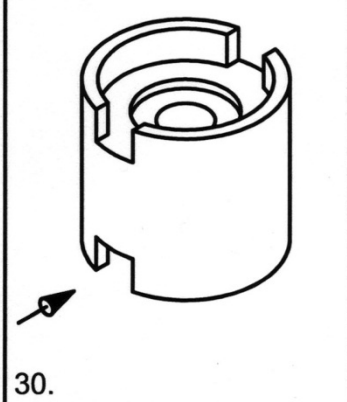
27. MINIMUM NUMBER OF DIMENSIONS:
 A. 5 B. 6 C. 7 D. 8 E. 9

28. MINIMUM NUMBER OF DIMENSIONS:
 A. 7 B. 8 C. 9 D. 10 E. 11

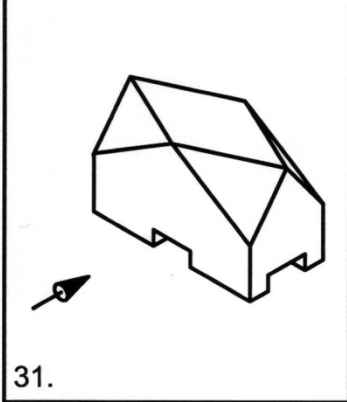
FOR EACH PROBLEM ON THIS PAGE, SELECT A FRONT VIEW
 NOTE: CENTER LINES OMITTED ON THIS TEST



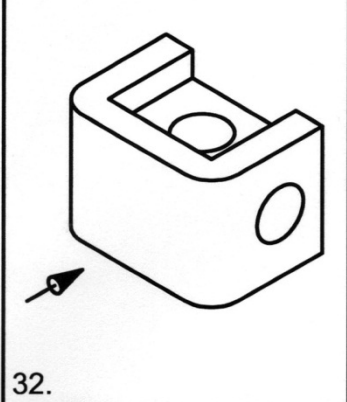
- A. B. C. D. E. NONE OF THESE



- A. B. C. D. E. NONE OF THESE


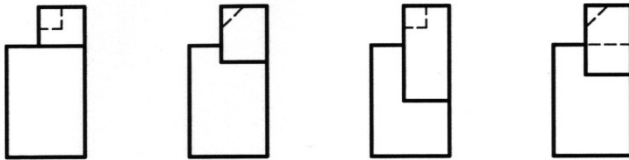
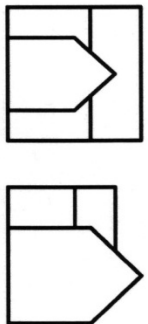
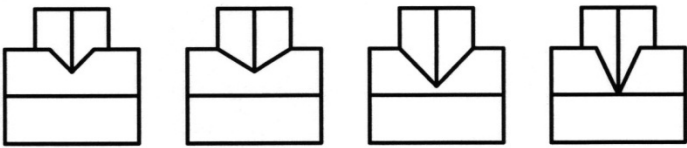
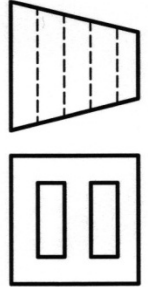
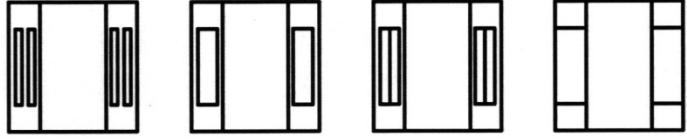
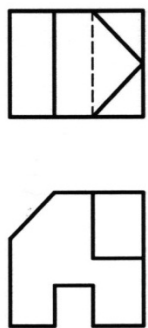
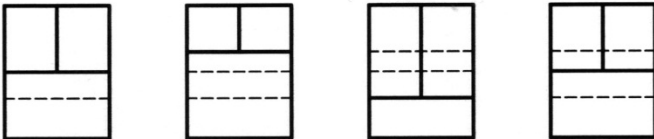


- A. B. C. D. E. NONE OF THESE

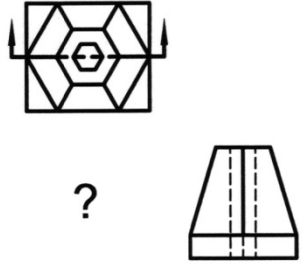
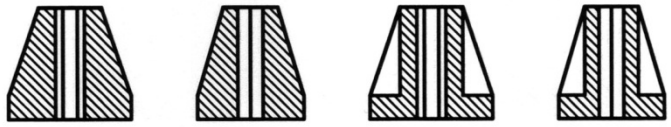
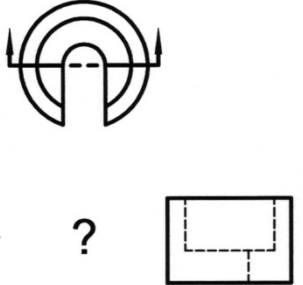

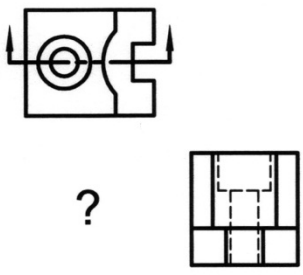
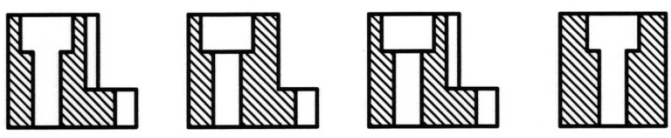
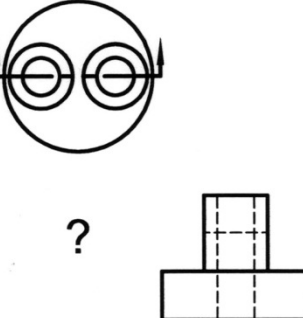
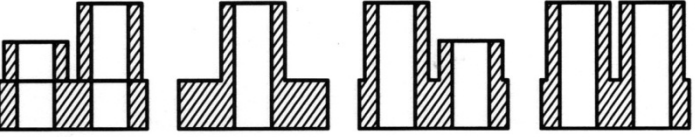


- A. B. C. D. E. NONE OF THESE

FOR EACH PROBLEM ON THIS PAGE, SELECT A SIDE VIEW
 NOTE: CENTER LINES OMITTED ON THIS TEST

<p>33.</p>  <p>?</p>	 <p>A. B. C. D.</p> <p>NONE OF THESE</p> <p>E.</p>
<p>34.</p>  <p>?</p>	 <p>A. B. C. D.</p> <p>NONE OF THESE</p> <p>E.</p>
<p>35.</p>  <p>?</p>	 <p>A. B. C. D.</p> <p>NONE OF THESE</p> <p>E.</p>
<p>36.</p>  <p>?</p>	 <p>A. B. C. D.</p> <p>NONE OF THESE</p> <p>E.</p>

FOR EACH PROBLEM ON THIS PAGE, SELECT A FRONT SECTIONAL VIEW
 NOTE: CENTER LINES OMITTED ON THIS TEST

<p>37.</p> 	 <p>A. B. C. D. E. NONE OF THESE</p>
<p>38.</p> 	 <p>A. B. C. D. E. NONE OF THESE</p>
<p>39.</p> 	 <p>A. B. C. D. E. NONE OF THESE</p>
<p>40.</p> 	 <p>A. B. C. D. E. NONE OF THESE</p>