



2014 Academic Challenge

ENGINEERING GRAPHICS TEST – SECTIONAL

– This Test Consists of 40 Questions –

Engineering Graphics Test Production Team

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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 (Sectional) - 2014

1. A CAD drafter needs to create a C-size print of a drawing, but only has an A-size printer. How many sheets would need to be printed and taped together to accomplish the task?

- A. 2
- B. 4
- C. 6
- D. 8
- E. 12

2. As part of the ASME standard title block layout for a print, which of the titles would most likely be used for the chart featured in the illustration below?

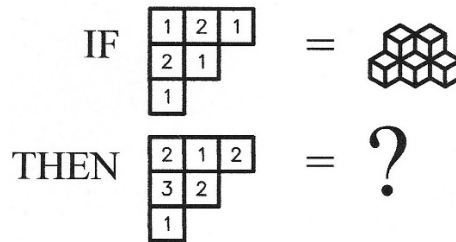
8	1	8400-356	INSTRUCTIONS
7	1	143-5321-150	LABEL, 100-200 SERIES
6	3	304-5300-101	SPRING, GUIDE
5	3	304-5300-100	PIN, GUIDE
4	1	143-5320-410	BUSHING
3	1	143-5320-407	COLLET, SELF-CENTERING
2	1	143-5321-202	HUB, 200 SERIES
1	1	143-5321-201	BASE, 200 SERIES
MARK	QTY	PART NUMBER	DESCRIPTION
		XXX	XXXXXX

- A. Fastener List
- B. Manufacturing Chart
- C. Quantity Takeoff
- D. Parts List
- E. Assembly Instructions

3. Which of the following standard UNC threads has the largest *major* diameter?

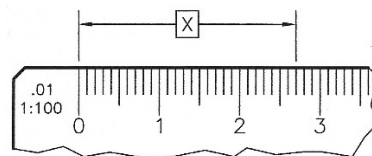
- A. 1/4-20 UNC
- B. 6-32 UNC
- C. 1/2-13 UNC
- D. 10-24 UNC
- E. 1-8 UNC

4. 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:



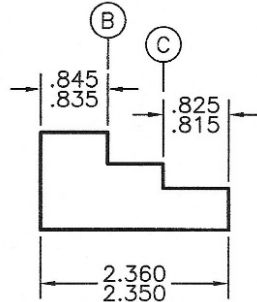
- A.
- B.
- C.
- D.
- E.

5. The illustration below is based on a triangular metric scale. This edge can be used for reducing 1 meter distances by a factor of 1:100. What *actual* distance is indicated by the X dimension?

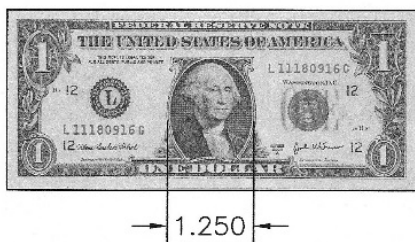


- A. .27 cm
- B. 27 cm
- C. 2.7 mm
- D. 27 mm
- E. 270 mm

6. A dimension indicating the distance from B to C would be superfluous. What are the **limits of size** for the distance from B to C based on the other dimensions?



- A. .680" to .710"
 B. .690" to .700"
 C. .700" to .720"
 D. .680" to .700"
 E. .690" to .710"
7. A game designer needs to reduce a 2.61" x 6.14" dollar bill, and make other changes, to avoid counterfeit issues. As shown, Washington's image border is about 1.25" wide. If the bill is reduced to where this measurement is 1.00", **approximately** what size will the bill then be?

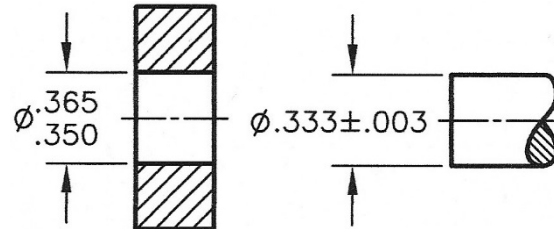


- A. 1.5" x 3"
 B. 1.75" x 4"
 C. 2" x 5"
 D. 2.25" x 5.5"
 E. 2.5" x 6"

8. With respect to CAD systems, what term is applied to the **settings** that control the sizes of dimensioning components, such as arrow size, extension past arrows, and gap around the numeral?

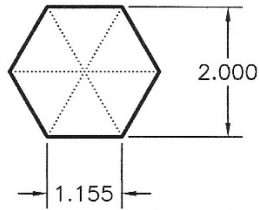
- A. factors
 B. variables
 C. components
 D. constraints
 E. coordinates

9. What is the **tightest** fit of the parts illustrated below?



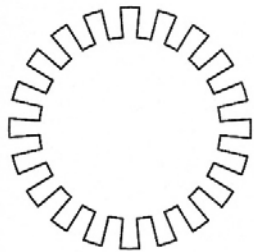
- A. .014"
 B. .017"
 C. .020"
 D. .029"
 E. .032"
10. Which of the following is a **TRUE** statement about sectional views in engineering graphics?
- A. Sectional views are always orthographic, not pictorial
 B. Auxiliary views can also be sectional views
 C. Sectional views must show the object cut in half
 D. Cylindrical parts like wheels and pulleys require sectional views
 E. Sectional views are for individual parts, not assembly drawings of many parts

11. What is the **approximate area** of the regular hexagon illustrated below?



- A. .578
- B. 1.155
- C. 3.465
- D. 6.928
- E. 10.393

12. What term applies to the **sides** of the 20 "tabs" of this gear-like design?

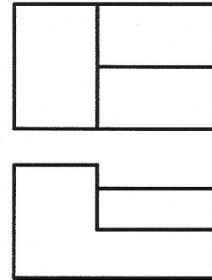


- A. radial
- B. parallel
- C. tangent
- D. concentric
- E. array

13. In addition to leader lines, why else would a **dimension line** only have one arrow?

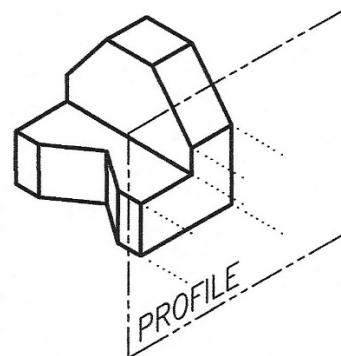
- A. Dimension for an angled surface
- B. Dimension for an arc
- C. Dimension of a small linear distance
- D. Baseline dimensioning
- E. Chain dimensioning

14. Assuming only flat planar surfaces, either **normal** or **inclined**, how many objects could exhibit a front and top view as illustrated below?



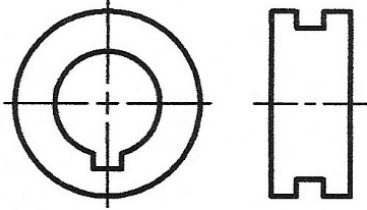
- A. 1
- B. 2
- C. 3
- D. 4
- E. More than 4

15. Considering ALL surfaces of the object illustrated below, how many of the surfaces will be represented as just a line (edge view) in the **right side** view? [i.e. How many are perpendicular to the **profile** plane?]



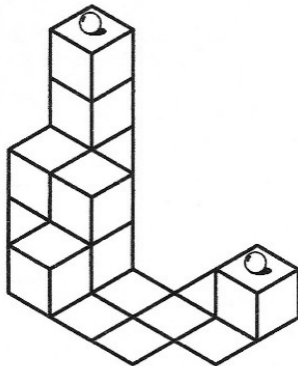
- A. 5
- B. 6
- C. 7
- D. 8
- E. 9

16. At minimum, to create a correct multiview drawing, how many **hidden** line segments will it take to complete the “missing line problem” illustrated below?



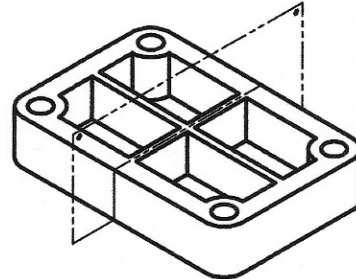
- A. 1
- B. 2
- C. 3
- D. 4
- E. 5

17. Given this isometric drawing, and assuming 1” squares or 1” cubes in normal orientation, approximately how far apart are the two marbles (center to center)?



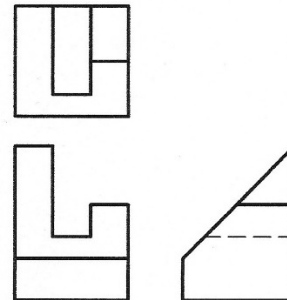
- A. 3.61
- B. 4.24
- C. 5.00
- D. 5.66
- E. 6.40

18. The part shown below could be sectioned through the center plane, but the sectional view would most likely then incorporate a(n) _____ rule for clarification.



- A. offset
- B. web
- C. align
- D. fill
- E. spur

19. For the object illustrated below in a front, top, right side view arrangement, how could the drafter or engineer create a view to show the true size and shape of the inclined surface?

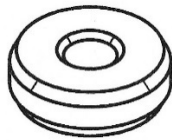


- A. Project an auxiliary view from the front view
- B. Project a left side view
- C. Project an auxiliary view from the top view
- D. Project a bottom view
- E. Project an auxiliary view from the right side view

20. A CAD system has an absolute Cartesian coordinate input syntax of "x,y". For example, a vertical 2" line can be drawn with "2,4" to "2,6" input. Which of the following would draw the "crossbar" of the letter "H", after the vertical sides have been drawn with a "3,3" to "3,6" segment, and then a "5,3" to "5,6" segment?

- A. "3,3" to "5,3"
- B. "4,3" to "6,3"
- C. "5,3" to "3,3"
- D. "3,5" to "5,5"
- E. "4,5" to "6,5"

21. What manufacturing term applies to the edges of the cylindrical part illustrated below?



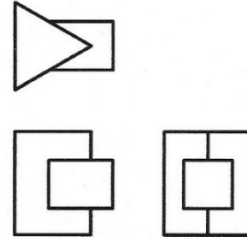
- A. Knurled
- B. Rounded
- C. Chamfered
- D. Filleted
- E. Burred

22. The designer or engineer must often incorporate springs into a mechanism or product. What term describes the type of spring illustrated below?



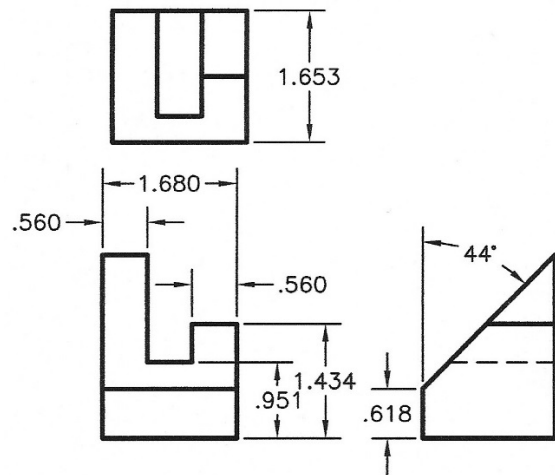
- A. Clock
- B. Tension
- C. Compression
- D. Torsion
- E. Barrel

23. The illustration below shows an intersection piece for a square duct connecting to a triangular duct, with three "open" ends. The designer will create development patterns for each surface that are each true size and shape. How many **unique** surface patterns are there within the project?



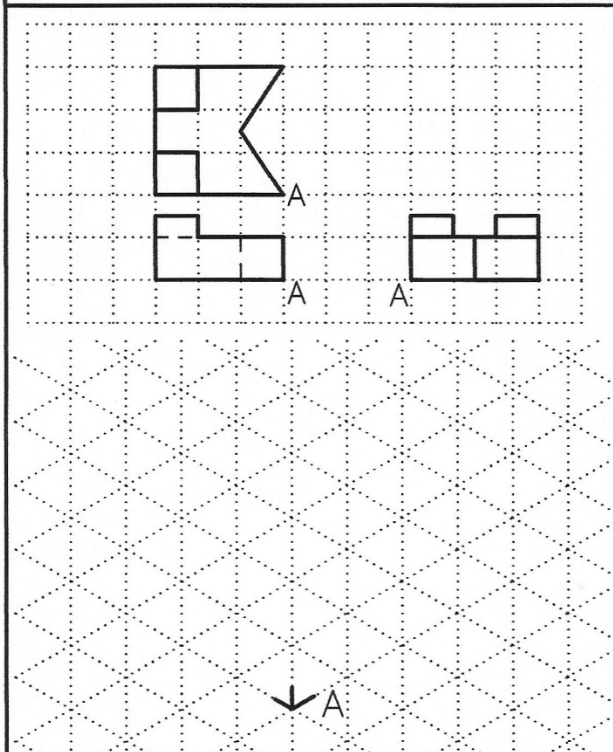
- A. 3
- B. 4
- C. 5
- D. 6
- E. 7

24. How many additional dimensions are required to fully dimension the part illustrated below?

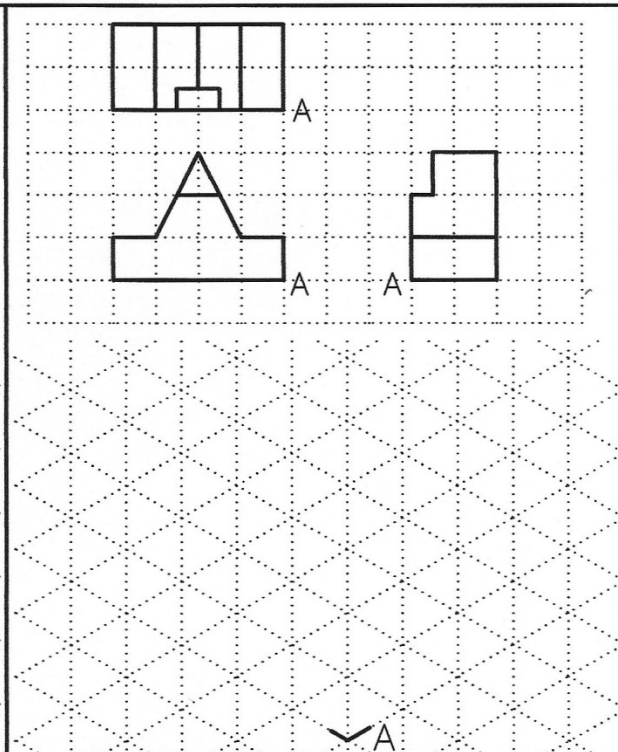


- A. 0
- B. 1
- C. 2
- D. 3
- E. 4

PROBLEMS 25 & 26: CREATE ISOMETRIC SKETCHES.
 SELECT AN ANSWER THAT REPRESENTS THE NUMBER OF SEGMENTS REQUIRED

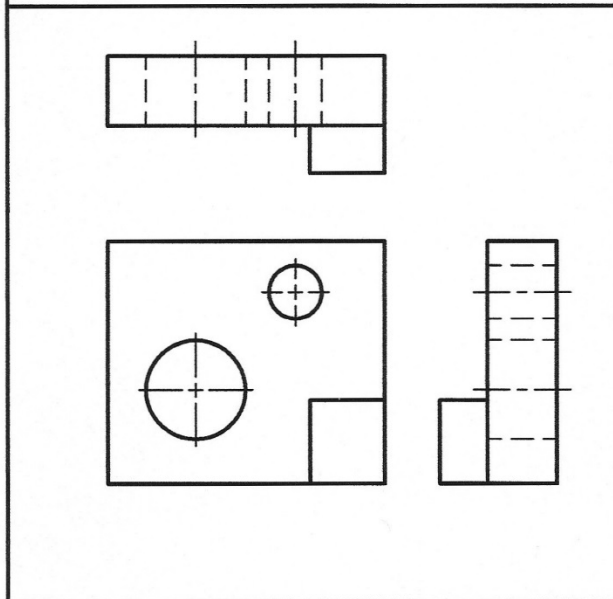


25. NUMBER OF LINE SEGMENTS:
 A. 24 B. 25 C. 26 D. 27 E. 28

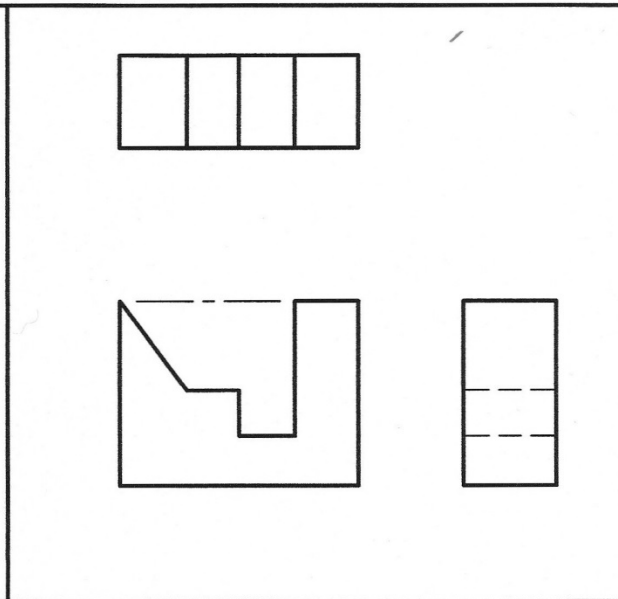


26. NUMBER OF LINE SEGMENTS:
 A. 20 B. 21 C. 22 D. 23 E. 24

PROBLEMS 27 & 28: DIMENSION THE MULTIVIEW DRAWINGS
 SELECT AN ANSWER THAT REPRESENTS THE MINIMUM DIMENSIONS REQUIRED

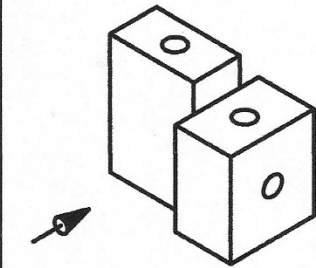


27. MINIMUM NUMBER OF DIMENSIONS:
 A. 9 B. 10 C. 11 D. 12 E. 13

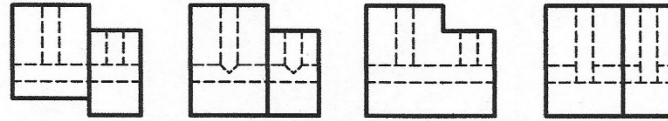


28. MINIMUM NUMBER OF DIMENSIONS:
 A. 8 B. 9 C. 10 D. 11 E. 12

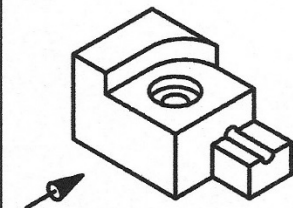
FOR EACH PROBLEM ON THIS PAGE, SELECT A FRONT VIEW
 NOTE: CENTER LINES OMITTED ON THIS TEST



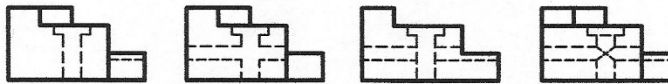
29.



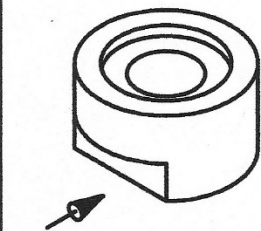
A. B. C. D. NONE OF THESE E.



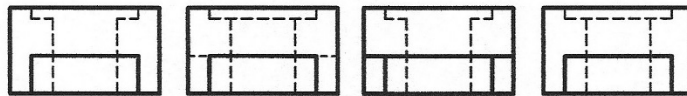
30.



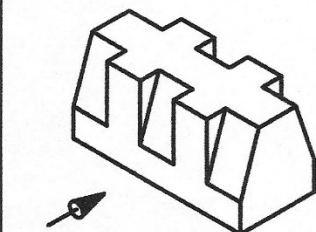
A. B. C. D. NONE OF THESE E.



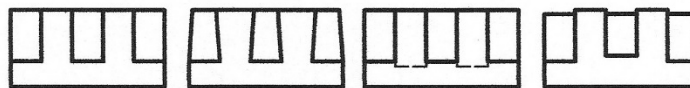
31.



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


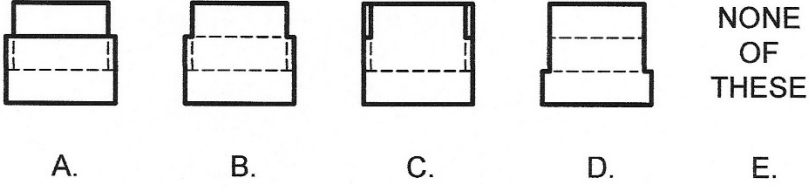
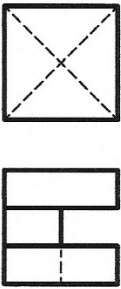
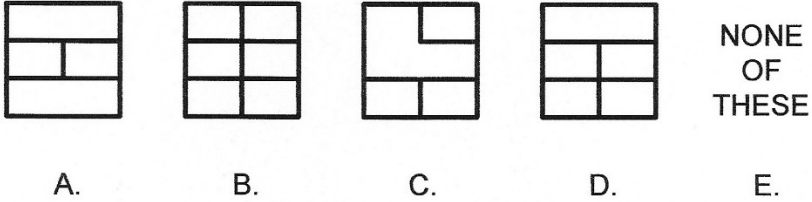
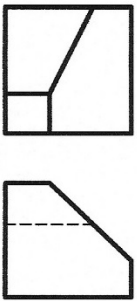
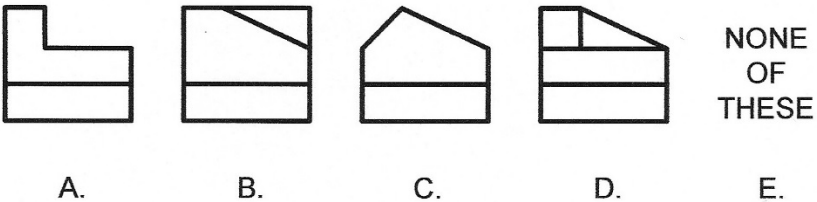
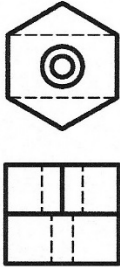
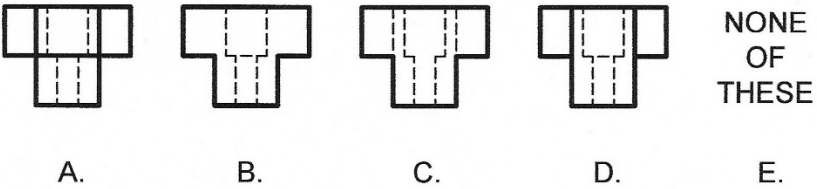


32.



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

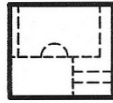
FOR EACH PROBLEM ON THIS PAGE, SELECT A SIDE VIEW
 NOTE: CENTER LINES OMITTED ON THIS TEST

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

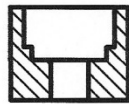
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 NOTE: CENTER LINES OMITTED ON THIS TEST



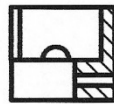
?



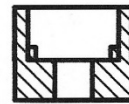
37.



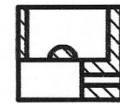
A.



B.



C.



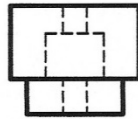
D.

NONE OF THESE

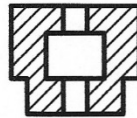
E.



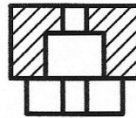
?



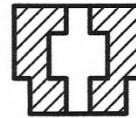
38.



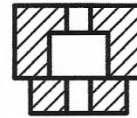
A.



B.



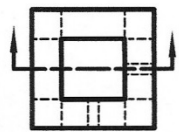
C.



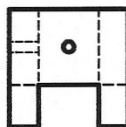
D.

NONE OF THESE

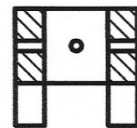
E.



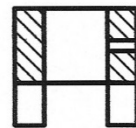
?



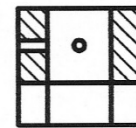
39.



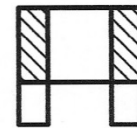
A.



B.



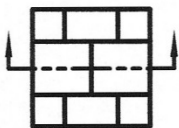
C.



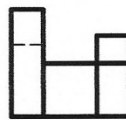
D.

NONE OF THESE

E.



?



40.



A.



B.



C.



D.

NONE OF THESE

E.