



2012 Academic Challenge

ENGINEERING GRAPHICS TEST – REGIONAL

– 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!

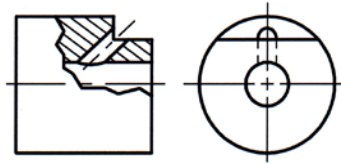
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WYSE – Academic Challenge
 Engineering Graphics Test (Regional) - 2012

1. How many different lines from the alphabet of lines are featured in this drawing?

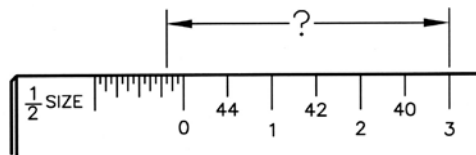


- A. 3
- B. 4
- C. 5
- D. 6
- E. 7

2. If cut properly, how many C-size sheets could be created from a 36" roll of paper 6'-0" long?

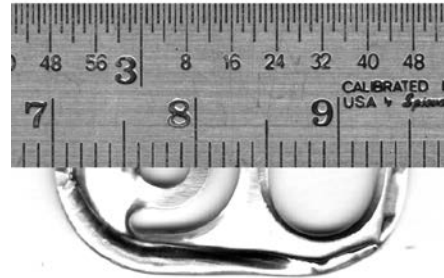
- A. 4
- B. 6
- C. 7
- D. 10
- E. 12

3. Examine the illustration below of a reduction scale for mechanical engineers. In this scenario, what is the **actual** distance on the paper?



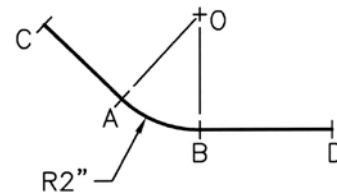
- A. 6-3/8"
- B. 3-3/16"
- C. 2-3/8"
- D. 1-19/32"
- E. 1-3/16"

4. Based on this machinist's rule, what is the approximate length of this soft drink can tab?



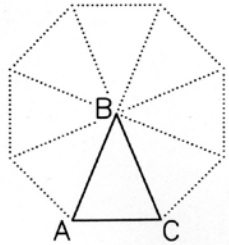
- A. 25 mm
- B. 9.5 cm
- C. 1-1/8"
- D. .48"
- E. 2.5"

5. In a CAD system, the 2" arc center point can be determined by the software with a "fillet" command. Identify the FALSE statement:



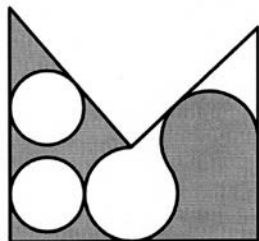
- A. Point O is 2" from B
- B. Line OB is perpendicular to BD
- C. Line OA is perpendicular to CA
- D. Point A is considered a point of tangency
- E. Point O is computed as 2" from points C & D

6. How many degrees are there in angle B-A-C?



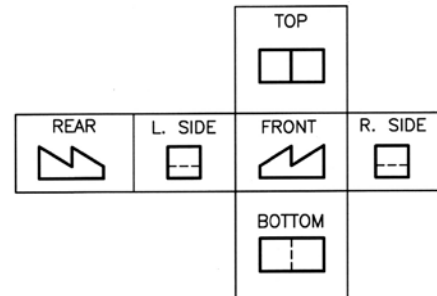
- A. 45°
 - B. 60°
 - C. 67.5°
 - D. 75°
 - E. 135°
7. Which of the following terms is the most synonymous with **engineering graphics**?
- A. Trigonometry
 - B. Geometry
 - C. Drafting
 - D. Analytics
 - E. Calculus

8. In this illustration, how many points of tangency are there?

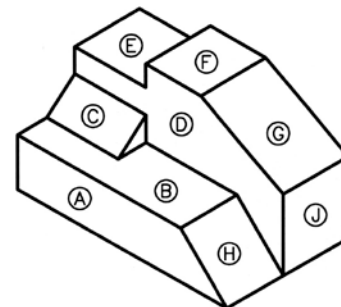


- A. 4
- B. 5
- C. 6
- D. 7
- E. 8

9. 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. Right side
 - B. Left side
 - C. Top
 - D. Bottom
 - E. Rear
10. If a front view of the object illustrated features the true size and shape of surface D, how is surface H represented in that same view?

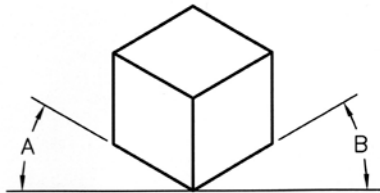


- A. Foreshortened
- B. Distorted
- C. Edge view [i.e. line]
- D. True size and shape
- E. None of the above [i.e. it can't be seen]

11. FreeDictionary.COM defines a **combining form** as “A modified form of an independent word that occurs only in combination with words, affixes, or other combining forms to form compounds or derivatives, as electro- in electromagnet or geo- in geochemistry”. What **combining form** has its roots in the Greek, where it means “straight”, “upright”, “right”, or “perpendicular”?

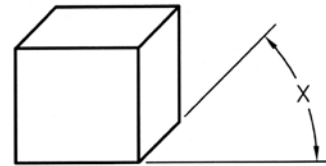
- A. Ortho-
- B. Axono-
- C. Iso-
- D. Para-
- E. Equi-

12. For an isometric pictorial sketch to be truly isometric, what angles should be used for A & B?



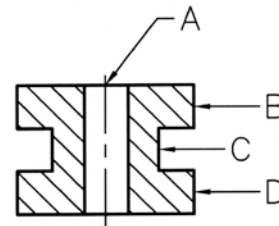
- A. $A = 32^\circ$, $B = 28^\circ$
- B. $A = 30^\circ$, $B = 30^\circ$
- C. $A = 35^\circ$, $B = 35^\circ$
- D. $A = 30^\circ$, $B = 25^\circ$
- E. $A = 25^\circ$, $B = 35^\circ$

13. What angle, or angles, should X be for a pictorial sketch to be defined as **oblique**?



- A. 45°
- B. 30° , 45° , or 60°
- C. 35°
- D. 50°
- E. Any angle is acceptable

14. Based on this full section view, what do we know for certain about the part shown?

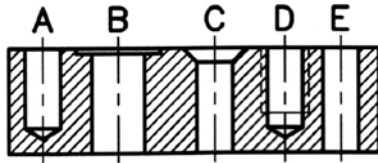


- A. A is a round hole.
- B. B is a cylindrical surface.
- C. C is a cylindrical surface.
- D. D is a cylindrical surface.
- E. None of the above can be described as certain.

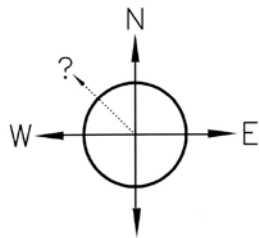
15. Which of the following types of sections is characterized by a cutting plane that does NOT penetrate entirely through the feature being cut?

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

16. While various tools can be used to create holes, which tool is uniquely illustrated in holes A & D pictured below?

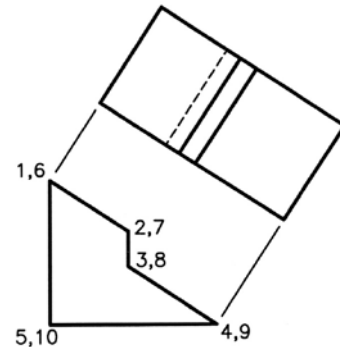


- A. Tap
 B. Broach bit
 C. Reamer
 D. Drill bit
 E. Spotface bit
17. What is a common CAD term or command related to controlling how the image is **displayed** on the monitor?
- A. Move
 B. Pan
 C. Divide
 D. Mirror
 E. Lengthen
18. In most CAD systems, which polar direction value is equivalent to northwest (see figure below)?



- A. 45°
 B. -45°
 C. 135°
 D. -135°
 E. 225°

19. Edge 3-8 appears as a **point** in the front view. How many edges appear as points in the auxiliary view?

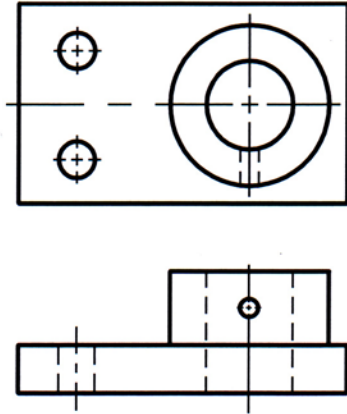


- A. 0
 B. 1
 C. 2
 D. 3
 E. 4
20. Which of the following threads has the smallest pitch?
- A. #10-32UNF-2A
 B. 5/8-11UNC-1B
 C. 1/4-32UNEF-2B
 D. #6-40UNF-1A
 E. 3/8-16UNC-3B

21. For a thread illustrated by **schematic** or **simplified** representation, the thread form is most likely identified by looking at the _____.

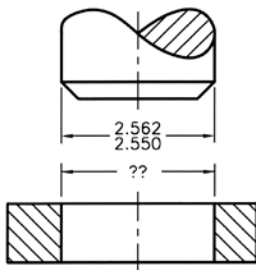
- A. crest lines
 B. root lines
 C. thread note
 D. elevation view
 E. thread table

22. Using BEST practice, for the top and front views illustrated, how many of the five **location** dimensions should be placed on the front view?



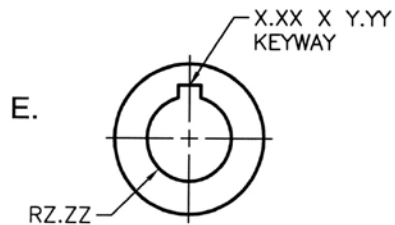
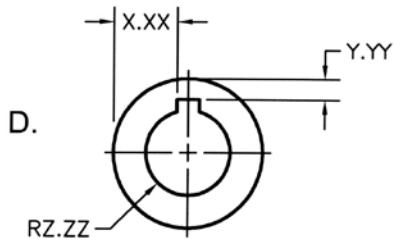
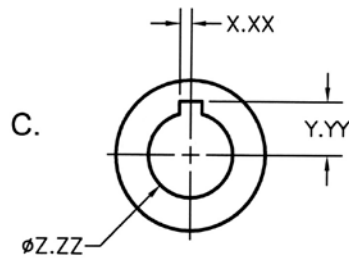
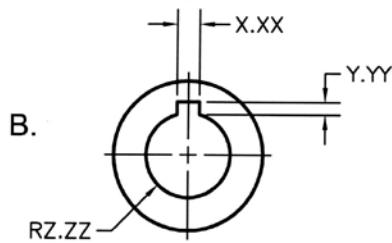
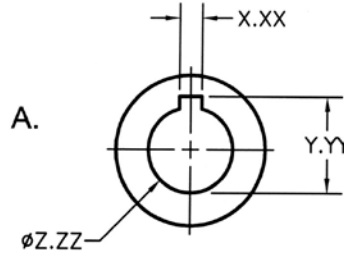
- A. 0
- B. 1
- C. 2
- D. 3
- E. 4

23. Which of the hole dimension solutions has a tolerance of .010" with an allowance of .010"?

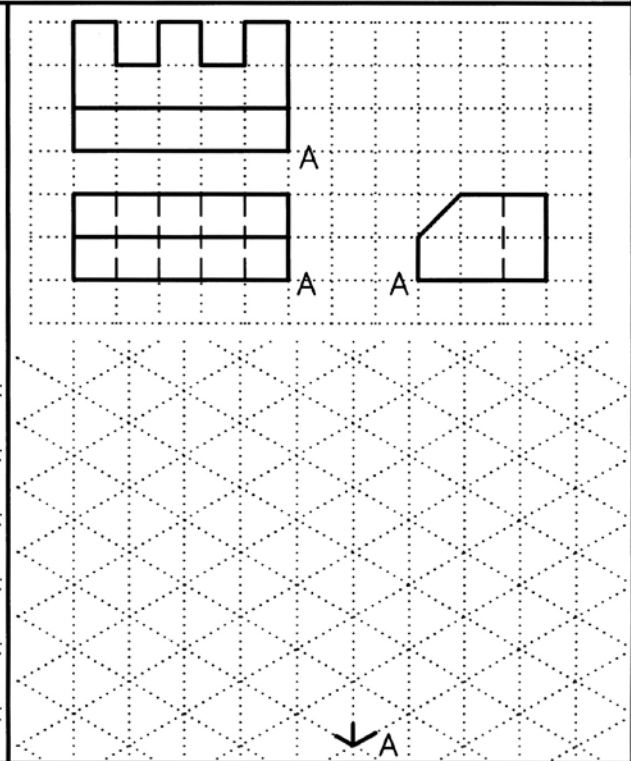
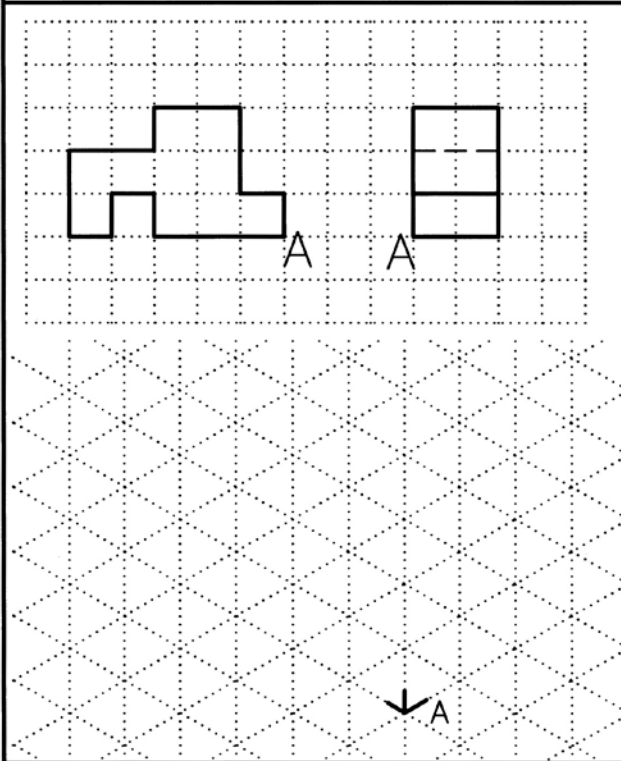


- A. $\begin{array}{|c|} \hline 2.582 \\ \hline 2.572 \\ \hline \end{array}$
- B. $\begin{array}{|c|} \hline 2.572 \pm .005 \\ \hline \end{array}$
- C. $\begin{array}{|c|} \hline 2.562 + .010 \\ \hline \end{array}$
- D. $\begin{array}{|c|} \hline 2.560 \pm \begin{array}{l} .010 \\ -.000 \end{array} \\ \hline \end{array}$
- E. $\begin{array}{|c|} \hline 2.750 \\ \hline 2.650 \\ \hline \end{array}$

24. Which of the following keyways is dimensioned according to ASME standards, as that method represents the dimensions most easily measured without calculations or tables?

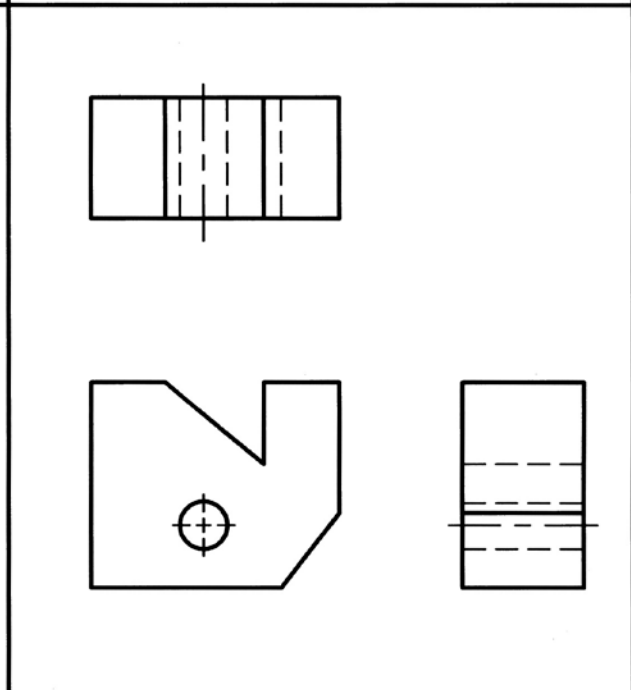
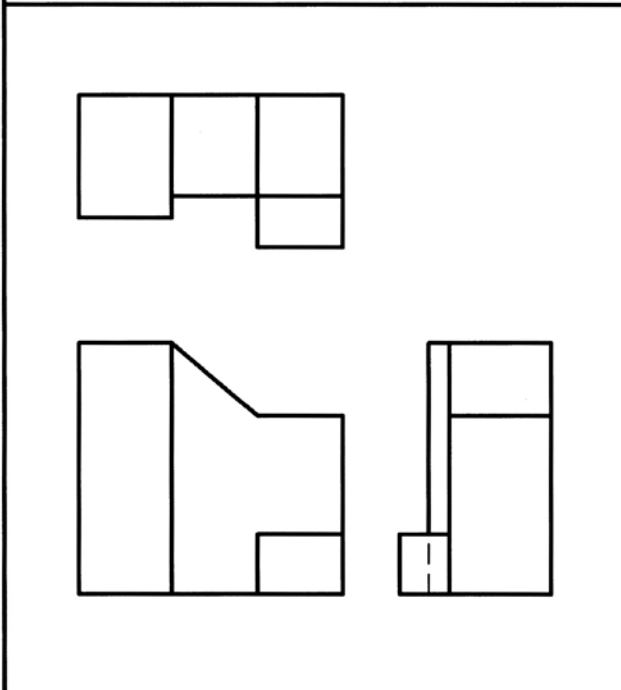


**PROBLEMS 25 & 26: CREATE ISOMETRIC SKETCHES.
PROBLEMS 27 & 28, DIMENSION COMPLETELY, BUT NO SUPERFLUOUS.**



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

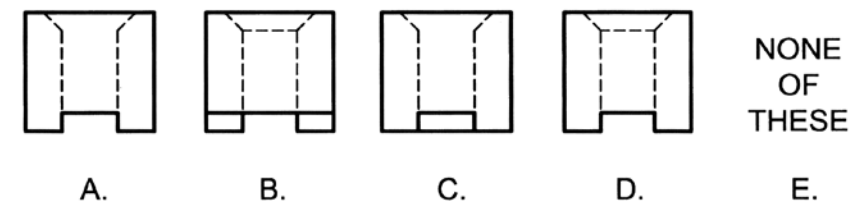
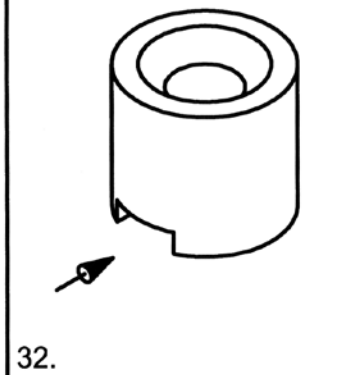
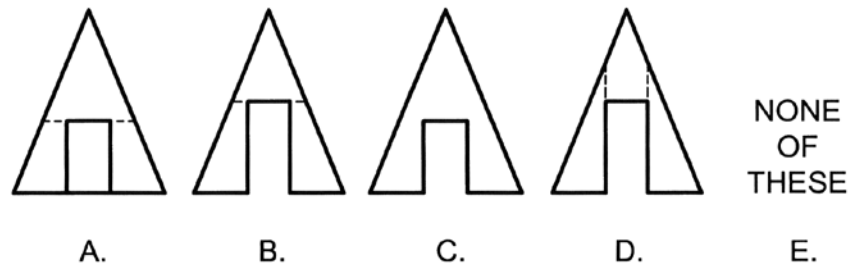
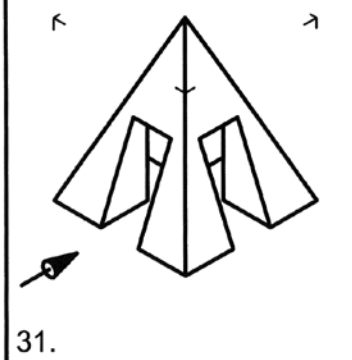
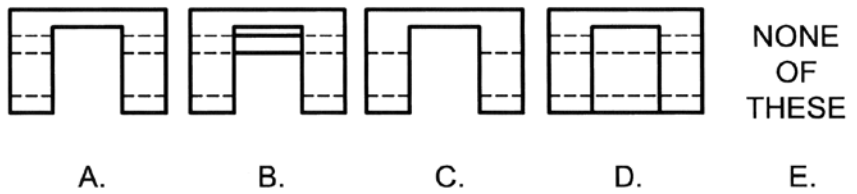
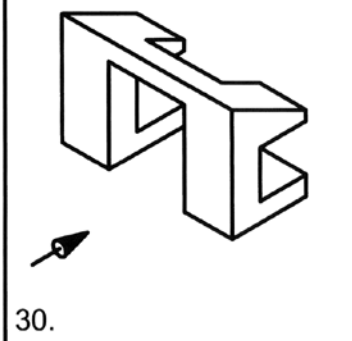
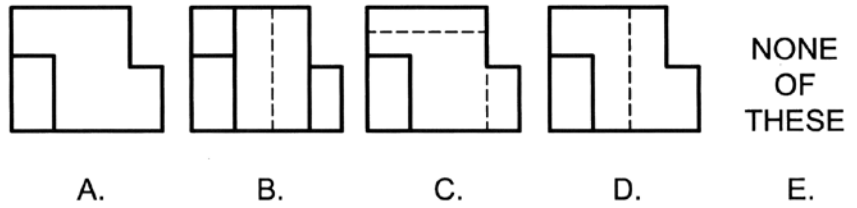
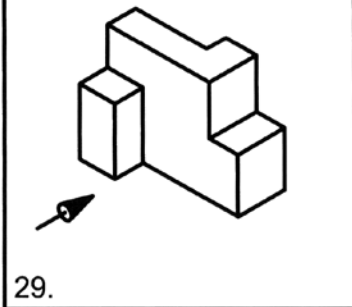
26. NUMBER OF LINE SEGMENTS:
A. 20 B. 21 C. 22 D. 23 E. 24



27. MINIMUM NUMBER OF DIMENSIONS:
A. 9 B. 11 C. 13 D. 15 E. 17

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



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

33.

?

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

E.

34.

?

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

E.

35.

?

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

E.

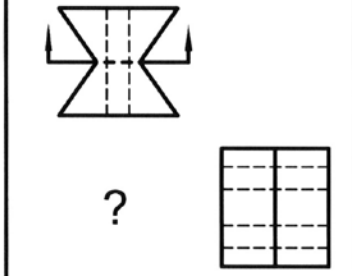
36.

?

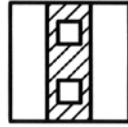
- A.
- B.
- C.
- D.
- NONE
OF
THESE

E.

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



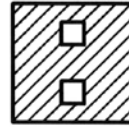
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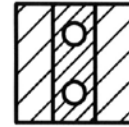
A.



B.



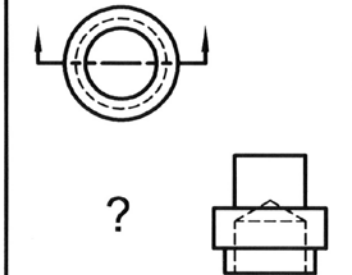
C.



D.

NONE OF THESE

E.



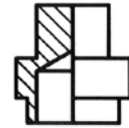
38.



A.



B.



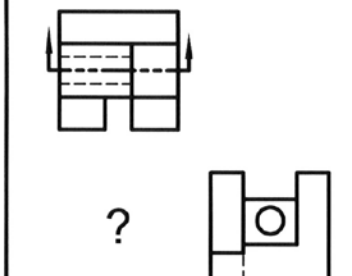
C.



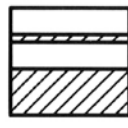
D.

NONE OF THESE

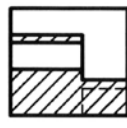
E.



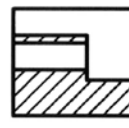
39.



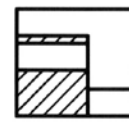
A.



B.



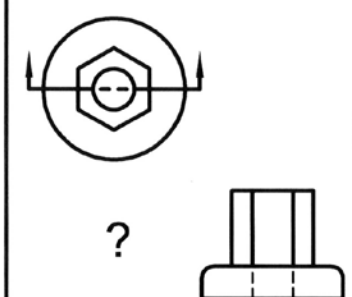
C.



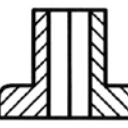
D.

NONE OF THESE

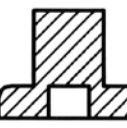
E.



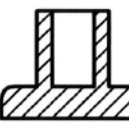
40.



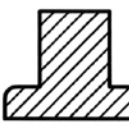
A.



B.



C.



D.

NONE OF THESE

E.