

Academic Challenge



EASTERN ILLINOIS UNIVERSITY

2019 Academic Challenge

ENGINEERING GRAPHICS TEST – SECTIONAL

Engineering Graphics Test Production Team

Ryan Brown, Illinois State University – Author/Team Leader

Ted Branoff, Illinois State University - Reviewer

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

Number of Questions: 40

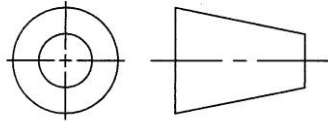
DO NOT OPEN TEST BOOKLET UNTIL YOU ARE TOLD TO DO SO!

©2019 Eastern Illinois University

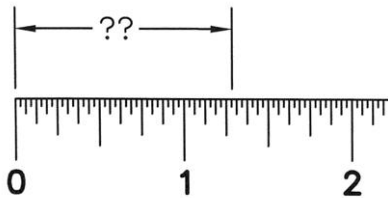
All rights reserved

Academic Challenge
Engineering Graphics Test (Sectional) – 2019

1. If the geometry illustrated below appears in the title block of an engineering print, to what does it refer?

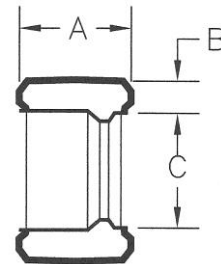


- A. Metric threads
B. Angle of projection
C. ASME dimensioning
D. Circularity tolerance
E. Countersink angle
2. What measurement is shown on the illustration below?



- A. 1-5/32"
B. 1-3/8"
C. 1-7/32"
D. 1-5/16"
E. 1-9/32"
3. A line segment with endpoints touching a circle at two points (but not going through the center) is called a _____.
- A. chord
B. ray
C. parabola
D. involute
E. quadrant

4. According to a technical drawing in a car tire handbook, a 185/55R15 rubber tire is 185mm wide (A), and the sidewall width ratio is 55%, so the sidewalls are about 102mm (B). The metal wheel rim is specified as 15" (C). In inches, what is the approximate tire diameter?



- A. 19"
B. 21"
C. 23"
D. 25"
E. 27"
5. A cylindrical sheet metal duct is sliced (truncated) at a 55° angle. A sheet metal lid to cap the duct needs to be designed. An auxiliary view of the angled opening would reveal:
- A. One of two measurements needed to calculate the shape
B. An edge view of the slice
C. An elliptical true size and shape of the opening
D. A parabolic shape that could be mirrored to create the lid shape
E. The true angle of the cut

6. Many drafting texts define a NORMAL surface as a surface that is parallel with one of the three principal planes of projection. How many NORMAL surfaces are there on a regular hexagon-based pyramid?

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

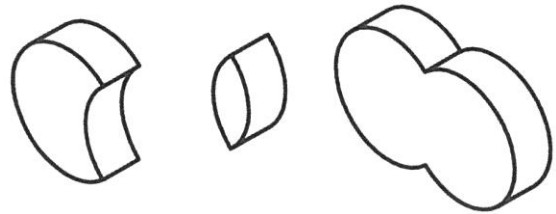
7. Which of the following is commonly used to keep a gear or pulley from spinning on a shaft?

- A. washer
- B. nut
- C. rivet
- D. key
- E. countersink

8. An inclined surface is defined as a surface that is _____ to two of the three principal projection planes, and _____ to the other one.

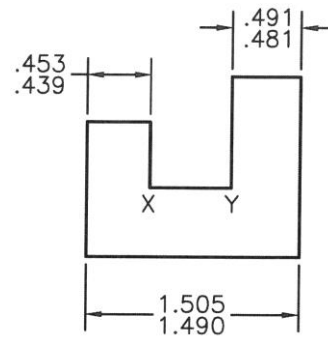
- A. inclined; parallel
- B. perpendicular; inclined
- C. oblique; inclined
- D. parallel; perpendicular
- E. inclined; perpendicular

9. What set of CAD modeling operations are illustrated by the three objects below?



- A. Booleans
- B. Annotations
- C. Arrays
- D. Primitives
- E. Parametrics

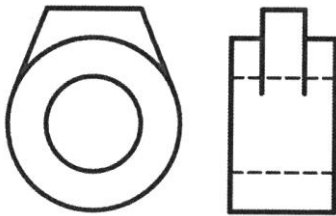
10. The object illustrated below features three width measurements. What range of size represents the distance from X to Y, based on the values given?



- A. .556"-.580"
- B. .566"-.570"
- C. .561"-.575"
- D. .546"-.585"
- E. .571"-.590"

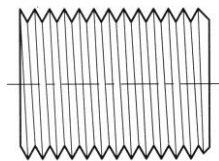
11. If two mating features have toleranced dimensions, the **allowance** between the two features can be determined by comparing the _____.
- A. basic dimension values
 - B. maximum material conditions
 - C. mean dimension values
 - D. least material conditions
 - E. largest dimensional values

12. In multiview drawings, some line segments represent the **limiting elements** (maximum contour) of a curved surface. Of the line segments in the multiview below, how many have this meaning?



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

13. Which of the choices below is something that can be determined from the illustration below?

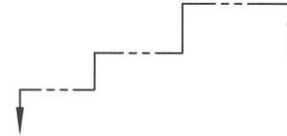


- A. The pitch is .10"
- B. The class of fit is 3
- C. It is a single thread (versus double or triple)
- D. It is a metric thread
- E. The major diameter is 1"

14. With respect to perspective projection pictorials, while it is common to have only one or two _____, perspective projections may also be constructed that have three of these.

- A. ground lines
- B. picture planes
- C. vanishing points
- D. station points
- E. horizon lines

15. What type of sectional view would be the result of a cutting plane line such as the one illustrated below?



- A. offset
- B. full
- C. removed
- D. aligned
- E. half

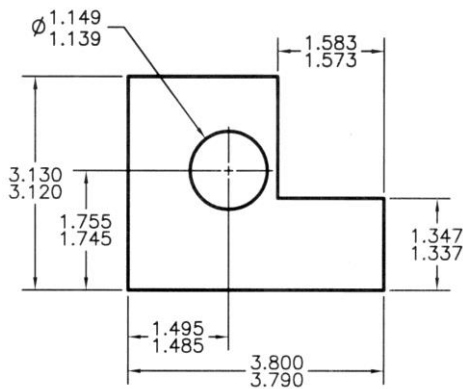
16. The development of a pyramid requires an arc as the "stretchout" line, or baseline. What other object also requires a single arc as the stretchout line?

- A. Cube
- B. Sphere
- C. Cone
- D. Cylinder
- E. Circle-to-rectangle transitional piece

17. In CAD modeling, dimensional values such as "d1=d0*.6" or "d3=d1/2" would be described as _____ values.

- A. direct
- B. historical
- C. wireframe
- D. parametric
- E. design

18. As defined by ASME Y14.2M-1992 (Line Conventions and Lettering), how many extension lines are featured in the dimensioned drawing below?

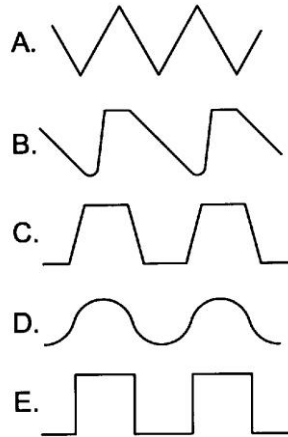


- A. 6
- B. 7
- C. 8
- D. 9
- E. 10

19. Of the lines used in dimensioning, which one indicates the direction and extent of the dimension?

- A. Stretch line
- B. Dimension line
- C. Extension line
- D. Leader line
- E. Construction line

20. Which of the following thread forms is **least likely** to be used for screw jacks and other "power-exerting" applications?



21. The paragraph below appears in Wikipedia™. What one word fills in both blanks?

A _____ **reference** or just _____ is some important part of an object—such as a point, line, plane, hole, set of holes, or pair of surfaces—that serves as a reference in defining the geometry of the object and (often) in measuring aspects of the actual geometry to assess how closely they match with the nominal value, which may be an ideal, standard, average, or desired value.

- A. block
- B. baseline
- C. datum
- D. mate
- E. center

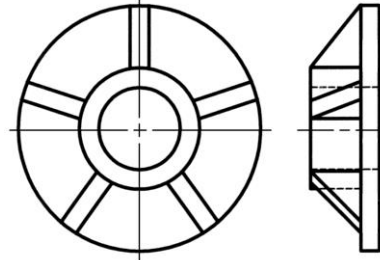
22. Identify the common textbook terms for the three principal projection planes upon which the three regular views are projected:

- A. Frontal - Horizontal - Profile
- B. Normal - Inclined - Oblique
- C. Front - Top - Right Side
- D. Height - Width - Depth
- E. Primary - Secondary - Tertiary

23. A bolt circle that has a diameter of 2.750" is the circle of centers for six equally spaced holes. What is the distance between the holes?

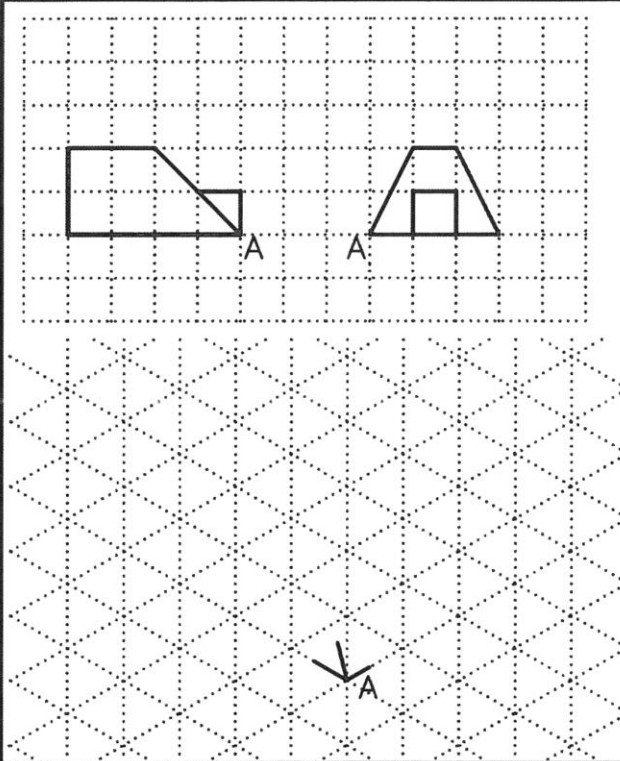
- A. 1.000"
- B. 1.375"
- C. 2.000"
- D. 2.750"
- E. 3.000"

24. A section view created for this object to replace the right side view would probably incorporate a conventional practice for _____.

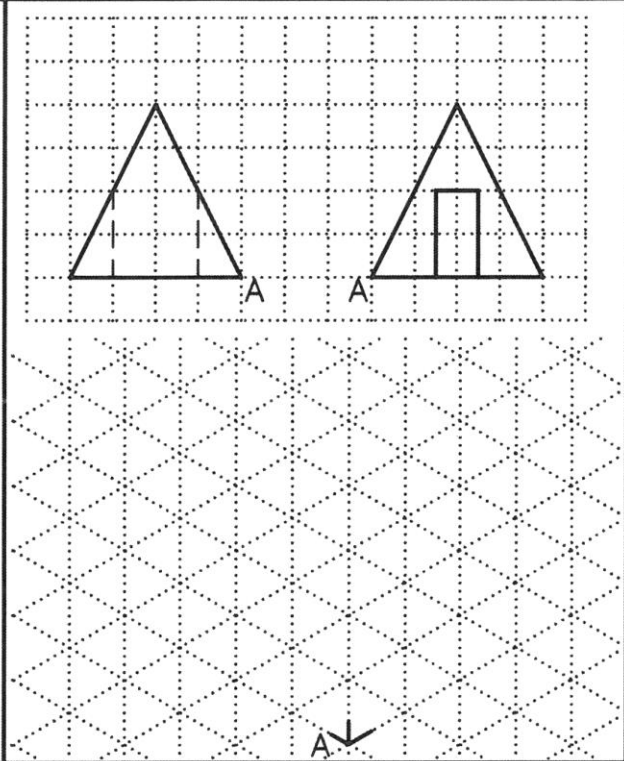


- A. broken-out sections
- B. thin elements
- C. simplified sections
- D. "s" breaks
- E. revolved sections

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

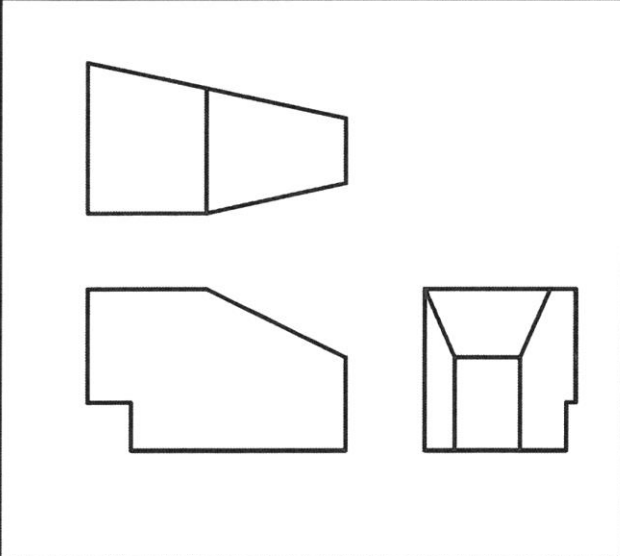


25. NUMBER OF LINE SEGMENTS:
 A. 13 B. 14 C. 15 D. 16 E. 17

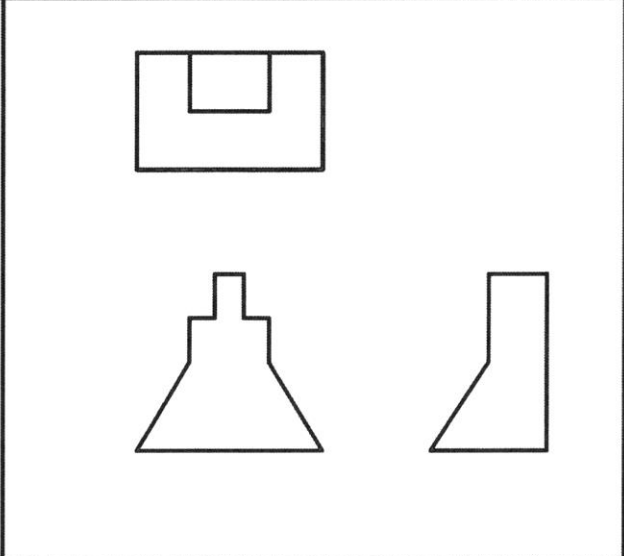


26. NUMBER OF LINE SEGMENTS:
 A. 8 B. 9 C. 10 D. 11 E. 12

PROBLEMS 27 & 28: MISSING LINE PROBLEMS: SELECT AN ANSWER THAT
 CORRESPONDS WITH THE LEAST NUMBER OF MISSING LINE SEGMENTS (VISIBLE
 AND HIDDEN) IT WILL TAKE TO CREATE A CORRECT MULTIVIEW DRAWING

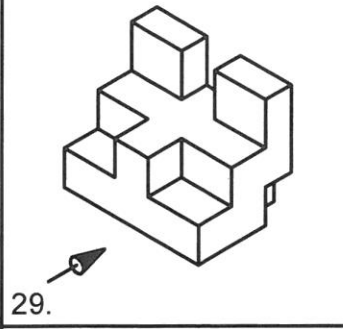


27. MINIMUM NUMBER OF LINES:
 A. 3 B. 4 C. 5 D. 6 E. 7

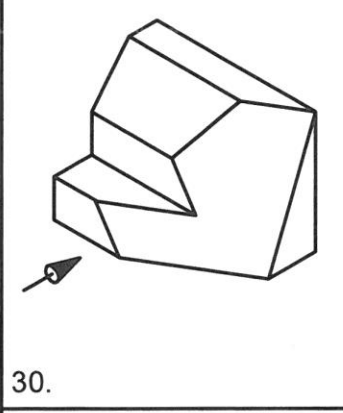


28. MINIMUM NUMBER OF LINES:
 A. 3 B. 4 C. 5 D. 6 E. 7

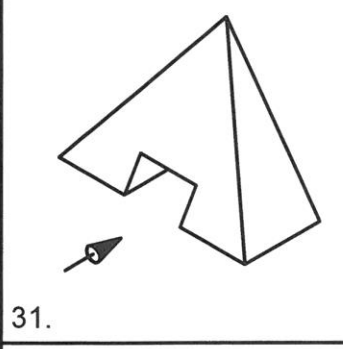
FOR EACH PROBLEM ON THIS PAGE, SELECT A FRONT VIEW
 NOTE: CENTER LINES OMITTED ON THIS TEST



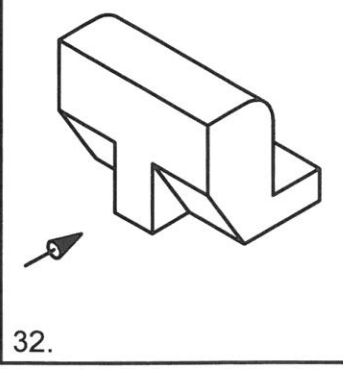
- -
 -
 -
 - NONE
OF
THESE
- A.
B.
C.
D.
E.



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

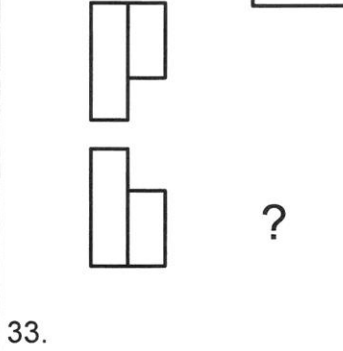


- -
 -
 -
 - NONE
OF
THESE
- A.
B.
C.
D.
E.

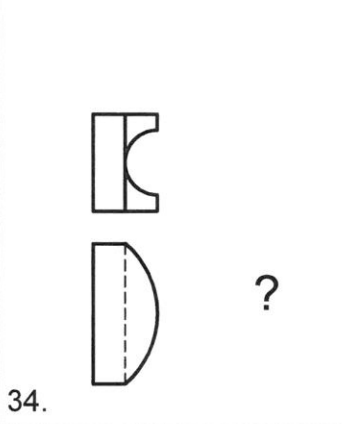


- -
 -
 -
 - NONE
OF
THESE
- A.
B.
C.
D.
E.

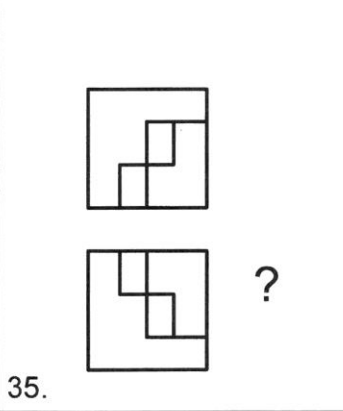
FOR EACH PROBLEM ON THIS PAGE, SELECT A SIDE VIEW
 NOTE: CENTER LINES OMITTED ON THIS TEST



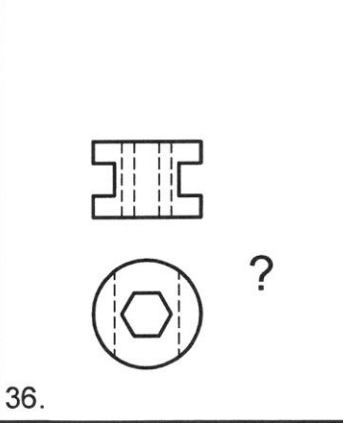
- A. B. C. D. E. NONE OF THESE



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

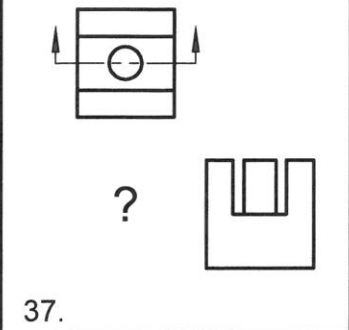


- A. B. C. D. E. NONE OF THESE



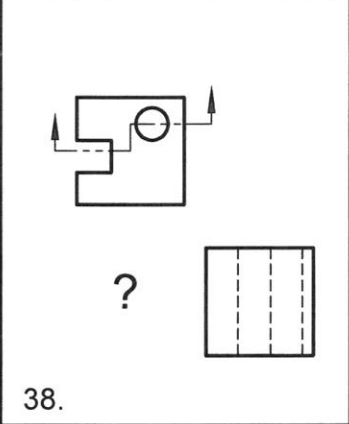
- A. B. C. D. E. NONE OF THESE

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



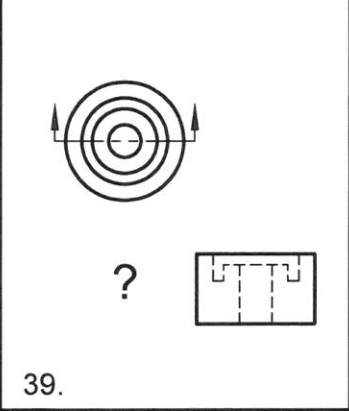
- A.
- B.
- C.
- D.
- NONE
OF
THESE

E.



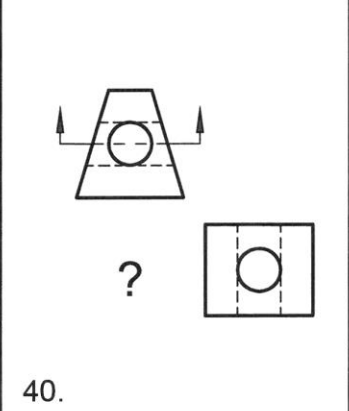
- A.
- B.
- C.
- D.
- NONE
OF
THESE

E.



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

E.



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

E.

