Quantitative Reasoning Test
QRT – Test Number 51

Time limit: 45 minutes
(An electronic calculator will be available for the QRT section of the DAT at the test center)

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1. Evaluate the expression $5 \times 10^{-3} \times 3 \times 10^{7}$.

A. 1.5×10^{-10}
B. 1.5×10^{-4}
C. 1.5×10^{4}
D. 1.5×10^{5}
E. 1.5×10^{10}

2. The perimeter of a square is 20. Which represents the area?

A. 5
B. 10
C. 20
D. 25
E. 100

3. What is the approximate value of

$$\frac{(.01)^2\left(\sqrt{.16} + 4.5\right)}{.003} \; ?$$

A. 1.6
B. 0.16
C. 0.016
D. 0.0016
E. 0.00016

4. Which is the smallest?

A. 11/15
B. 4/5
C. 21/25
D. 5/6
E. 13/17

5. At a certain convention the ratio of men to women was 3 to 8. If there were 352 people there, how many were men?

A. 32
B. 96
C. 132
D. 220
E. 256

6. If $x = \frac{1}{2}$ and $z = \frac{14}{35}$, then which is equal to $\frac{1}{x} \div z$?

A. 1/5
B. 4/5
C. 5/4
D. 5/2
E. 5

7. Which is the value of $\sqrt{.00000009}$?

A. 0.003
B. 0.0003
C. 0.00003
D. 0.000003
E. 0.0000003

8. $\frac{81}{3} + \frac{42}{7} - \frac{54}{3}$ is what % of $\frac{45}{3}$?

A. 1.0
B. 15
C. 33.3
D. 100
E. 340

9. A rectangular room is 3 meters wide, 4 meters long and 2 meters high. How far is it from the northeast corner at the floor to the southwest corner at the ceiling?

A. $\sqrt{29}$ meters

B. $\sqrt{11}$ meters

C. $\sqrt{9}$ meters

D. 9 meters

E. 5 meters

10. A person travels to work at an average speed of 40 mph, and returns home at 60 mph. What, in mph, is the average speed for the entire trip?

A. 45
B. 46
C. 48
D. 52
E. 54

11. If [b (c + d) + e]a = 135, then which variable cannot be zero?

A. a
B. b
C. c
D. d
E. e

12. Which is the equation of the line that contains the point (3, -1) and is perpendicular to the line y = 3x + 3?

A. y = 3x - 8
B. y = 3x - 10
C. y = (-1/3)x + 2
D. y = (-1/3)x - 2
E. y = (-1/3)x

13. 10 is to 2y as 25x is to

A. 5x.
B. 5xy.
C. 5x/y.
D. x/5y.
E. 5y/x.

14. If 3 liters of 40% orange juice and 1 liter of 50% orange juice are mixed, which is the percentage of orange juice in the mixture?

A. 90
B. 85
C. 47.5
D. 45
E. 42.5

15. If 2x - 3 > 3x + 7, then which must be true?

A. x >
B. x > -4
C. x > -10
D. x < -4
E. x < -10

16. Which represents 5% of 2% of 0.4?

A. 4
B. 0.04
C. 0.004
D. 0.0004
E. 0.00004

17. One pump can fill a vat in 10 minutes. Another pump can fill the vat in 15 minutes. How many minutes does it take to fill the vat if both pumps are operating at the same time?

A. 1/6
B. 6
C. 12
D. 12.5
E. 25

18. If 1 inch equals 2.5 centimeters, then 25 meters equal how many inches?

A. 0.01
B. 0.1
C. 10
D. 62.5
E. 1,000

19. In a given course a student receives preliminary examination grades of 81, 85, and 95. The final examination is weighed for one-third and the average of the preliminary grades is weighed as 2/3 of the final grade. What should the final examination grade be for a semester average of 90?

A. 99
B. 96
C. 93
D. 88
E. 87

20. If $f(z) = 3z^2 - 2z$, then $f(-1)$ equals

A. 1.
B. 4.
C. 5.
D. 7.
E. 11.

21. Mary took 9 minutes to walk 3/8 of a mile. At this rate, how many minutes will it take to walk the rest of the mile?

A. 11
B. 12
C. 15
D. 18
E. 24

22. What is the distance on a two-dimensional graph between (7, 6) and (2, -6)?

A. 5
B. 9
C. 13
D. 17
E. $\sqrt{153}$

23. In a right triangle ABC with right angle at C and AB = 6, BC = 3, find AC.

A. 3
B. 6
C. 27
D. 33
E. $3\sqrt{3}$

24. When each of the sides of a square is increased by 1 yard, the area of the new square is 53 square yards more than that of the original square. What is the length of the sides of the original square?

A. 25
B. 26
C. 27
D. 52
E. 54

25. A mother's age is three times her daughter's age. In twelve years the mother's age will be twice the daughter's age at that time. How old is the mother now?

A. 18
B. 20
C. 24
D. 30
E. 36

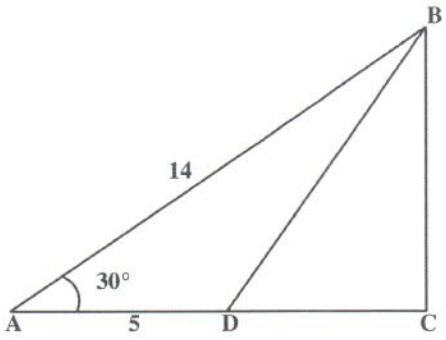
26. Find the average of the following list of three weights: 3 lb. 2oz., 4 lb. 6 oz., and 9 lb. 10 oz.

A. 5 lb. 6 oz.
B. 5 lb. 6 1/3 oz.
C. 5 lb. 11 1/3 oz.
D. 5 lb. 39 1/3 oz.
E. 8 lb. 9 oz.

27. If $x = 5$, then $x + 4$ is what percent of $x^2 + 2$?

A. 19
B. 33 1/3
C. 75
D. 300
E. 540

28. Which of the following is the length of the line segment BC, if AB = 14, AD = 5, and angle BAD = 30°?



A. 7
B. 9
C. $7\sqrt{3}$
D. $\sqrt{171}$
E. $\sqrt{221}$

29. A painting which is 4 feet wide and 5 feet long is surrounded by a rectangular frame 6-inches wide. What percent of the area of the picture and the frame is occupied by the frame?

A. 10 1/2
B. 20
C. 30
D. 33 1/3
E. 50

30. A bowl contains 7 green and 3 red marbles. What is the probability that two marbles selected at random from this bowl without replacement are both red?

A. 1/15
B. 9/100
C. 21/100
D. 47/90
E. 3/5

31. If 1 meter = 3.28 feet, 4/5 of a foot is approximately what fraction of a meter?

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

32. If $y = \frac{x+2}{x-3}$, then which of the following represents x?

A. (3y + 2)/(y - 1)
B. (3y + 2)/(y)
C. (3y - 2)/(y + 1)
D. (5y)/(y + 1)
E. (3y - 2)/(y - 1)

33. For all y, the cos y is equal to

A. sin y
B. cos $(y + \pi)$
C. sin $(-y)$
D. sin y + cos y
E. cos $(-y)$

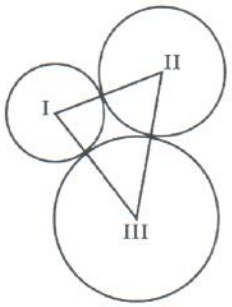
34. The value of cos $(\pi/3)$ equals the value of

A. -cos $(2\pi/3)$.
B. cos $(2\pi/3)$.
C. cos $(6\pi/3)$.
D. -cos $(5\pi/3)$.
E. cos $(4\pi/3)$.

35. What is the maximum number of 3-inch squares (squares that are three inches on a side) that can be cut from a sheet of tin 19 x 23 inches?

A. 42
B. 48
C. 49
D. 145
E. 146

36. Each of the circles I, II, and III is tangent to the other two circles. The areas of the circles are 4π, 9π, and 16π, respectively. Which represents the length of the perimeter of the triangle formed by joining the centers of three circles?



A. 3.0
B. 9.0
C. 14.5
D. 18.0
E. 29.0

37. The numbers (1, 2, 3, 6) have an average (arithmetic mean) of 3 and a variance of 3.5. What is the average (arithmetic mean) and variance of the set of numbers (3, 6, 9, 18)?

A. 9, 31.5
B. 3, 10.5
C. 3, 31.5
D. 6, 7.5
E. 9, 27.5

38. Jill has six different books. She will select one book on Monday and a different one to read on Wednesday. In how many ways can Jill select two different books?

A. 36
B. 30
C. 18
D. 15
E. 12

39. A vehicle covers 100 yards in 12.5 seconds. Find the average speed of the vehicle in feet per second.

A. 2 2/3
B. 4
C. 8
D. 12
E. 24

40. $\sqrt{6+\frac{1}{x}}=8,\ x=\ ?$

A. $\sqrt{\frac{1}{28}}$
B. 1/2
C. 1/58
D. 2
E. 58

Perceptual Ability Test
PAT - Test Number 56

Time limit: 60 minutes

PART/1

For questions 1 through 15

This visualization test consists of a number of items similar to the sample below. A three-dimensional object is shown at the left. This is followed by outlines of five apertures or openings.

In each item the task is exactly the same. First, you are to imagine how the object looks from all directions (rather than from a single direction as shown). Then, pick from the five apertures outlined, the opening through which the object could pass directly if the proper side were inserted first. Finally, mark on your answer sheet (after the number of the item) the letter corresponding to the answer you have chosen.

Here are the rules:

1. Prior to passing through the aperture, the irregular solid object may be turned in any direction. It may be started through the aperture on a side not shown.

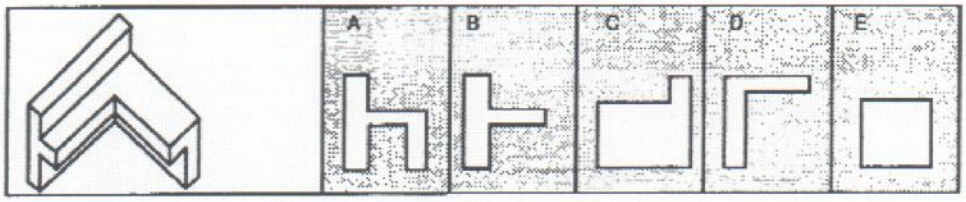
2. Once the object is started through the aperture, it may not be twisted or turned. It must pass completely through the opening. The opening is always the exact shape of the appropriate external outline of the object.

3. Both objects and apertures are drawn to the same scale. Thus it is possible for an opening to be the correct shape but too small for the object. In all cases, however, differences are large enough to judge by eye.

4. There are no irregularities in any hidden portion of the object. However, if the figure has symmetric indentations, the hidden portion is symmetric with the part shown.

5. For each object there is only one correct aperture.

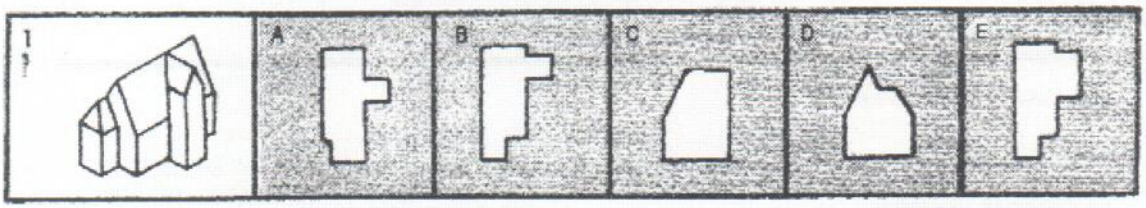
Example: (Do not mark the answer to this example on the answer sheet)

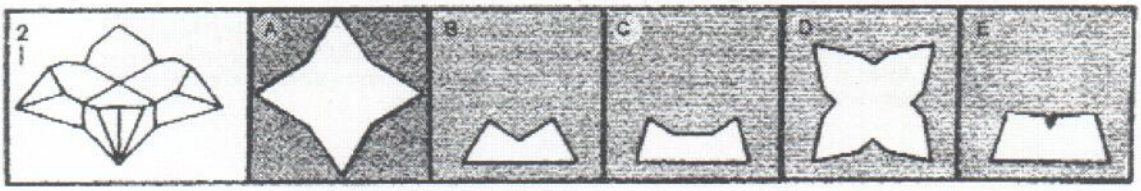


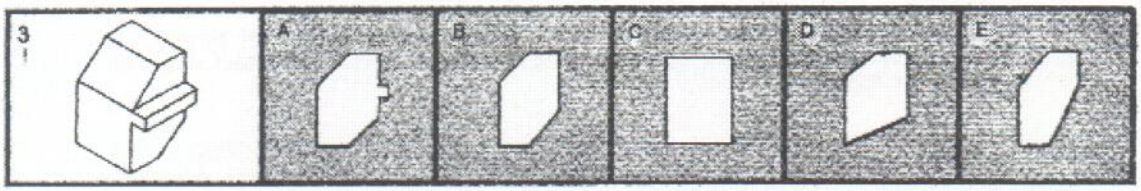
The correct answer is C since the object would pass through this aperture if the side at the left were introduced first.

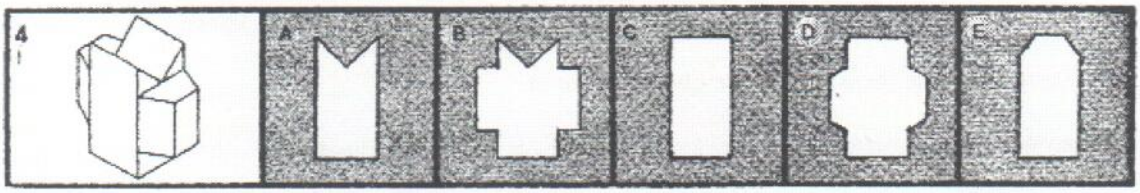
Proceed to Questions

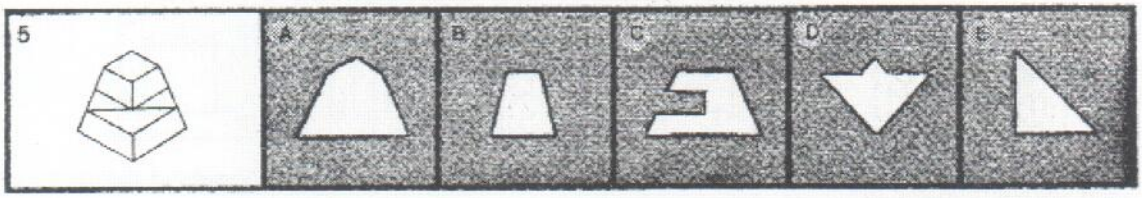
DO NOT WRITE IN OR MARK THIS BOOKLET

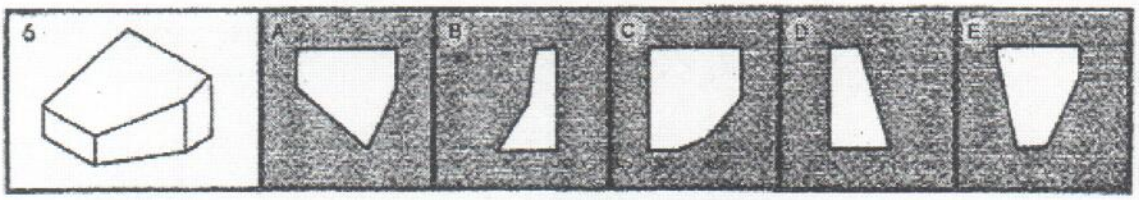


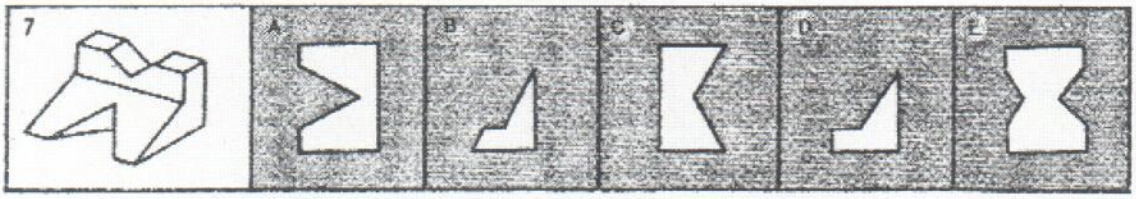


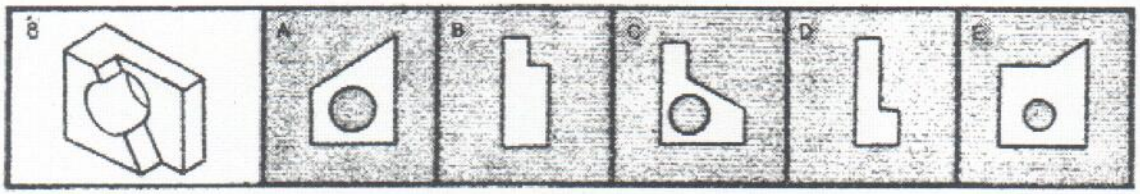


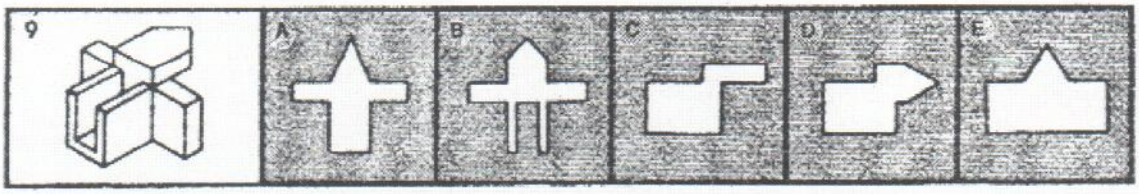


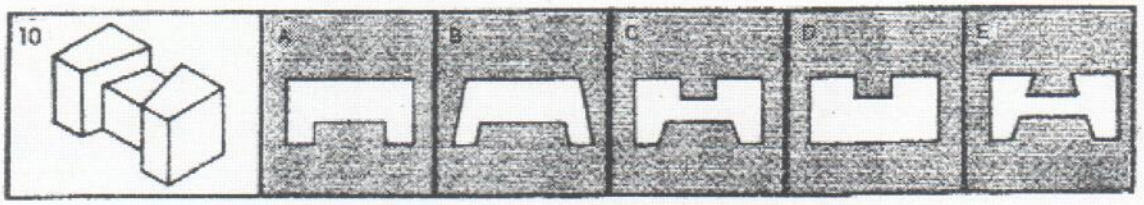


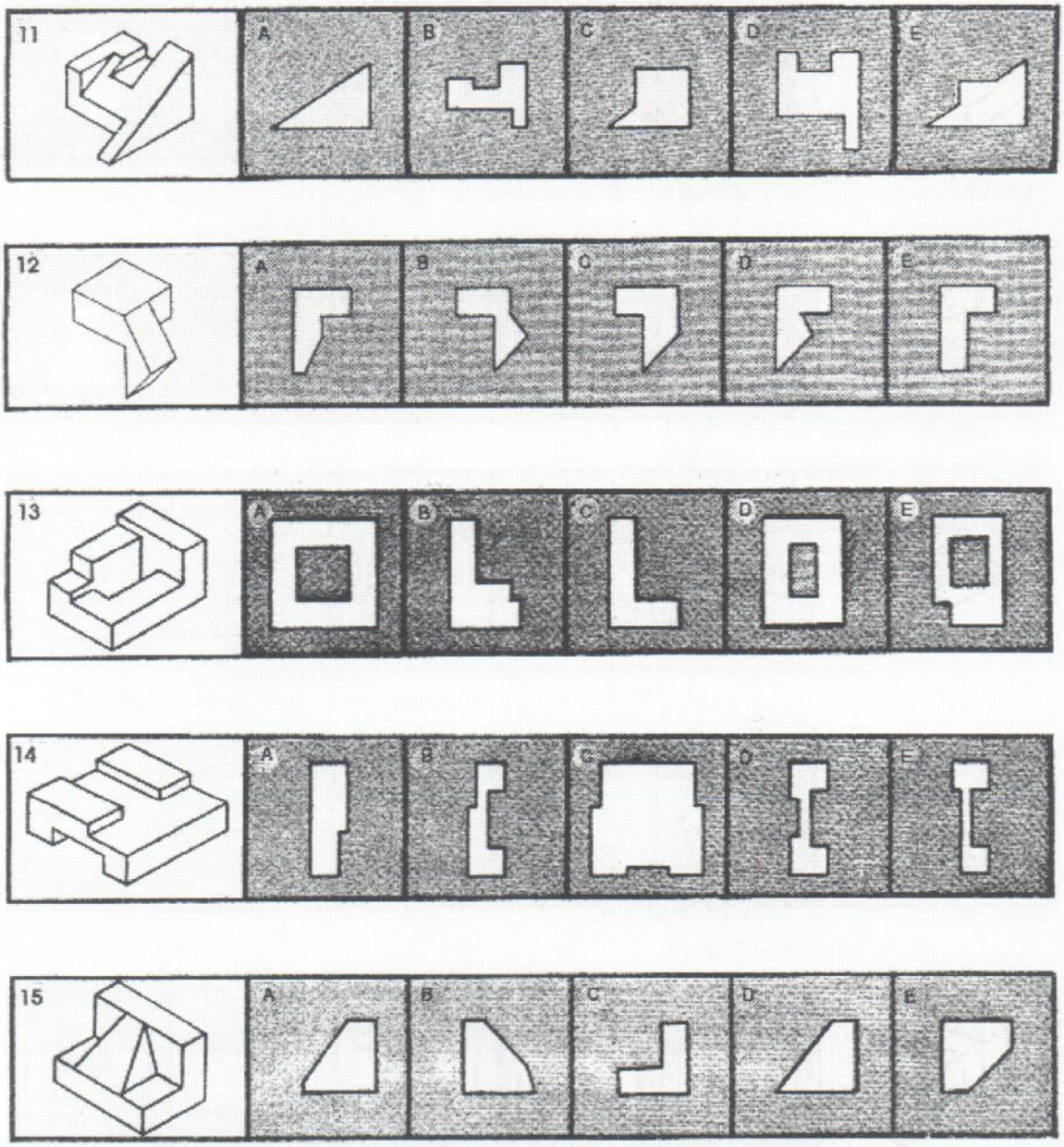










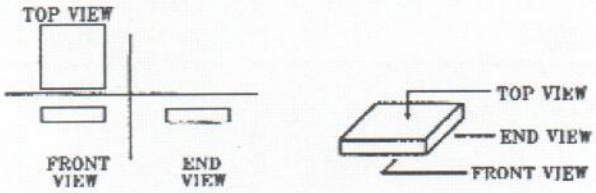


DO NOT STOP - READ DIRECTIONS FOR PART 2 AND CONTINUE

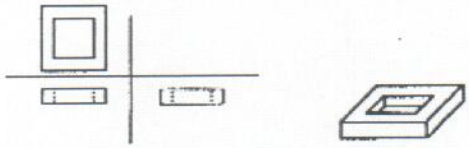
PART/2

For questions 16 through 30

The pictures that follow are top, front, and end views of various solid objects. The views are without perspective. That is, the points in the viewed surface are viewed along parallel lines of vision. The projection looking DOWN on it is shown in the upper left-hand corner (TOP VIEW). The projection looking at the object from the FRONT is shown in the lower left-hand corner (FRONT VIEW). The projection looking at the object from the END is shown in the lower right-hand corner (END VIEW). These views are ALWAYS in the same positions and are labeled accordingly.



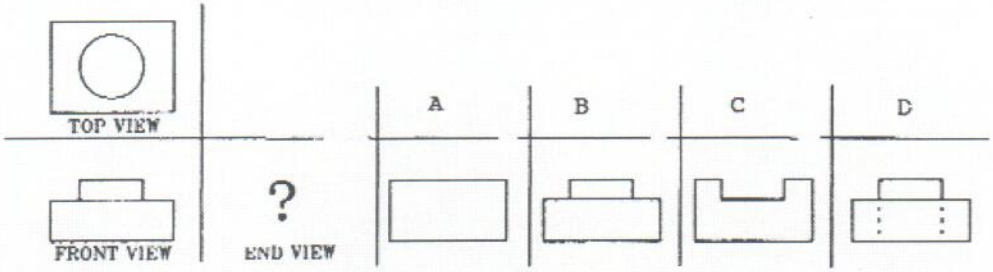
If there were a hole in the block, the views would look like this:



Note that lines that cannot be seen on the surface in some particular view are DOTTED in that view.

In the problems that follow, two views will be shown, with four alternatives to complete the set. You are to select the correct one and mark it on the answer sheet.

Example: Choose the correct END VIEW (Do not mark this on the answer sheet).

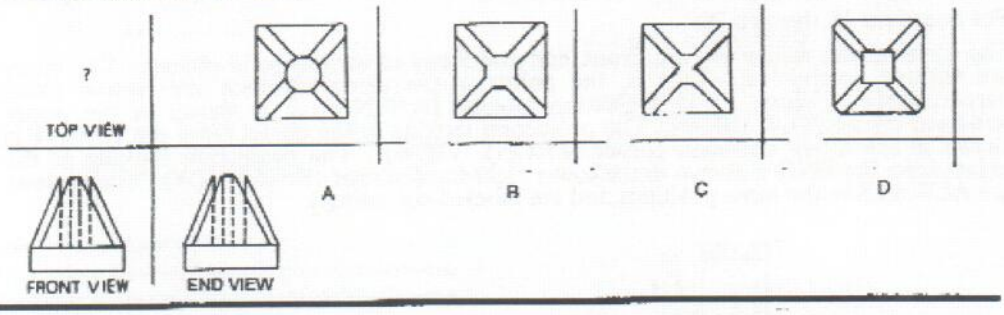


The front view shows that there is a smaller block on the base and that there is no hole. The top view shows that the block is round and in the center of the base. The answer, therefore, must be **B**.

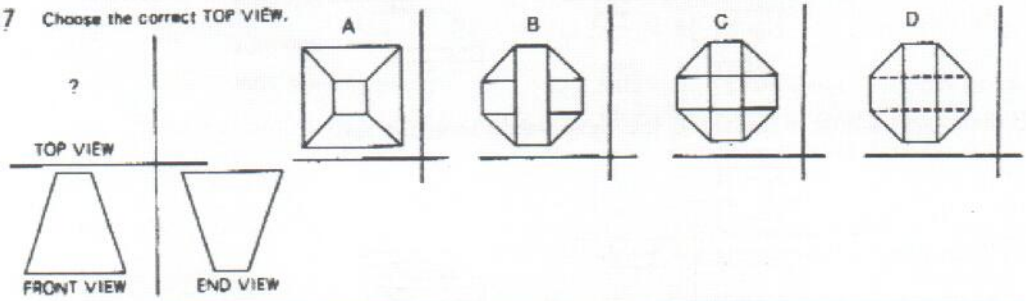
In the problems that follow, it is not always the end view that must be selected, sometimes it is the top view or front view that is missing. Now, proceed to the questions, marking the correct view on your answer sheet.

Proceed to Questions

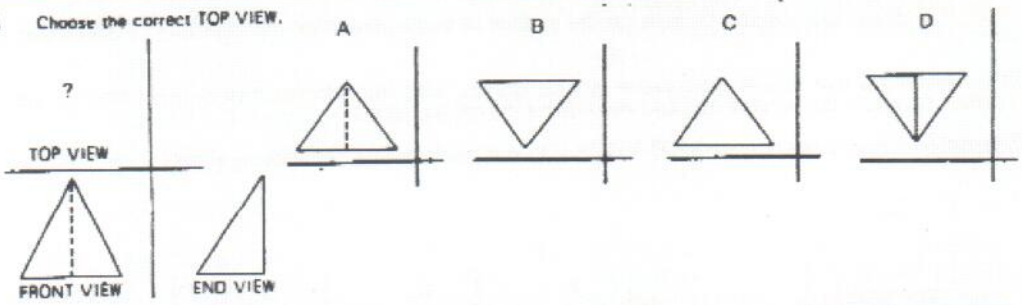
16 Choose the correct TOP VIEW.



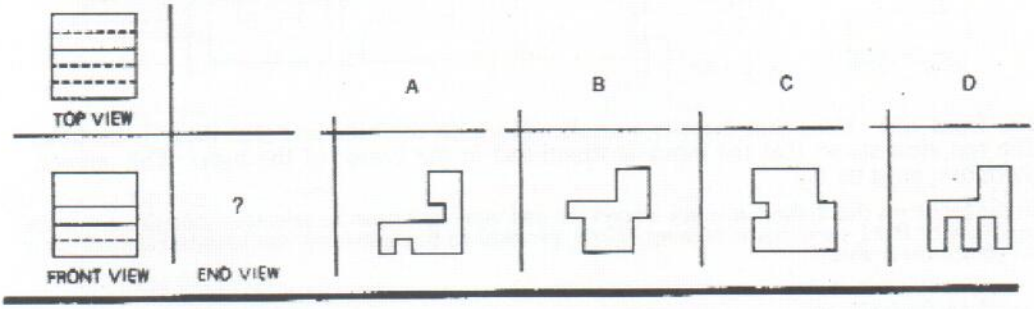
17 Choose the correct TOP VIEW.



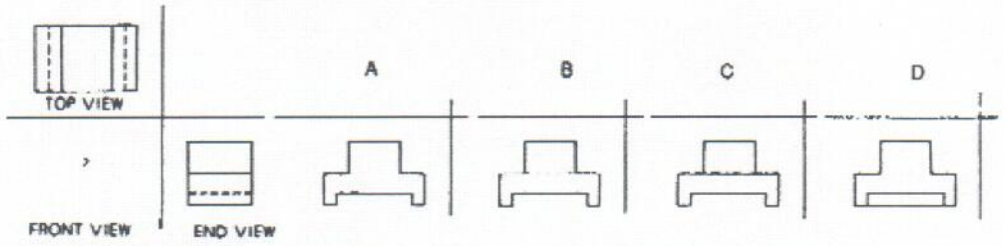
18 Choose the correct TOP VIEW.



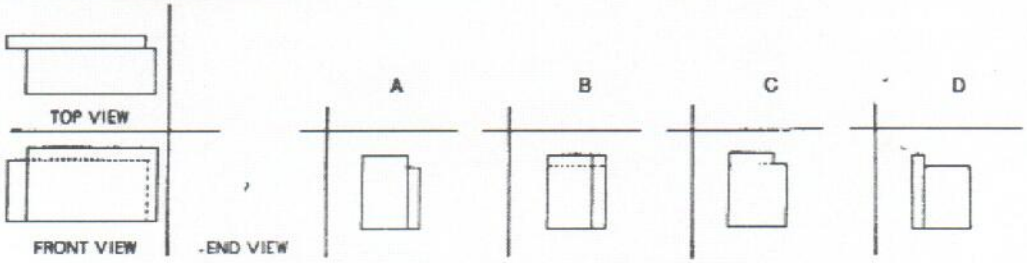
19 Choose the correct END VIEW.



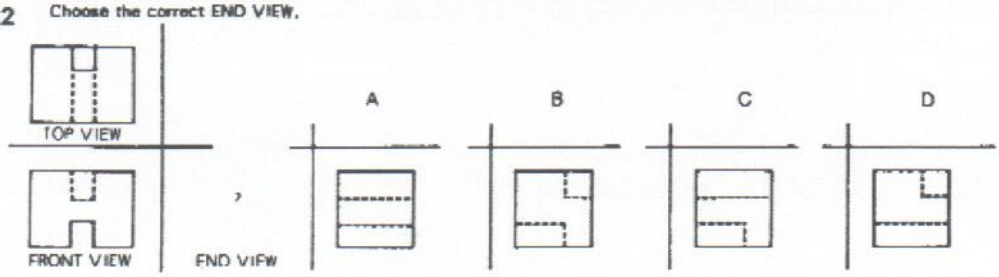
20 Choose the correct FRONT VIEW.



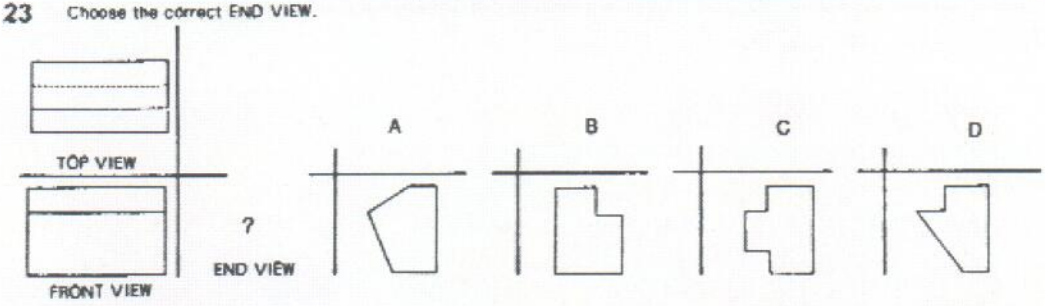
21 Choose the correct END VIEW.



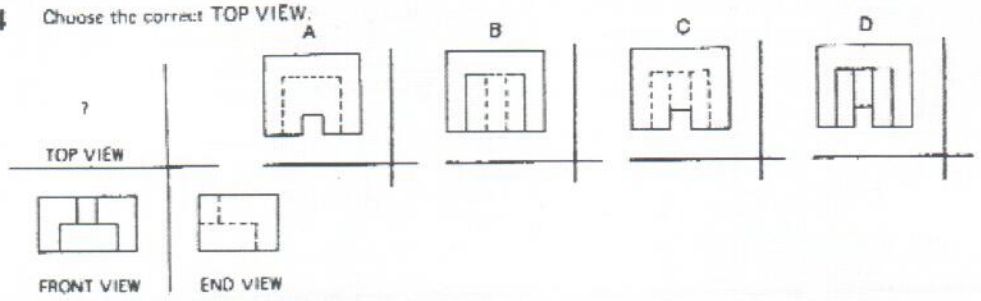
22 Choose the correct END VIEW.



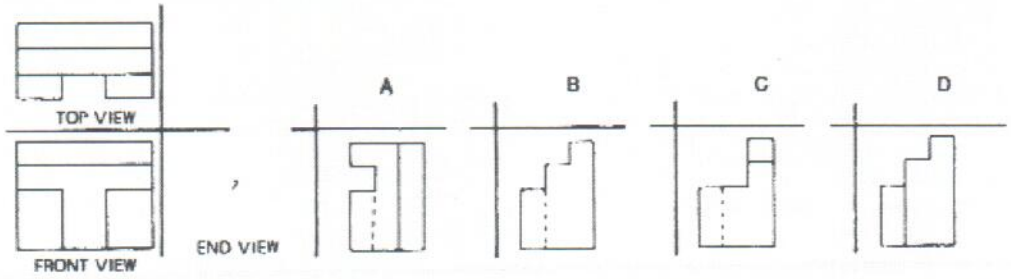
23 Choose the correct END VIEW.



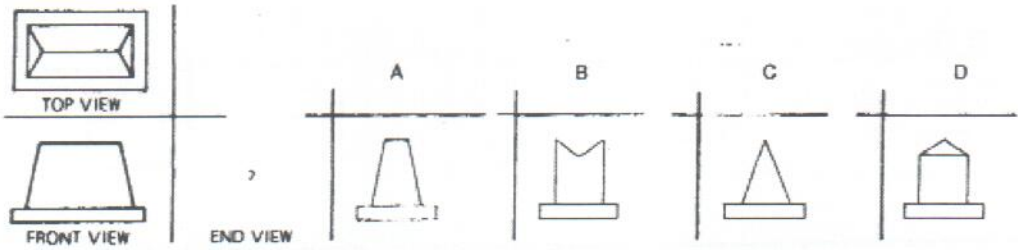
24 Choose the correct TOP VIEW.



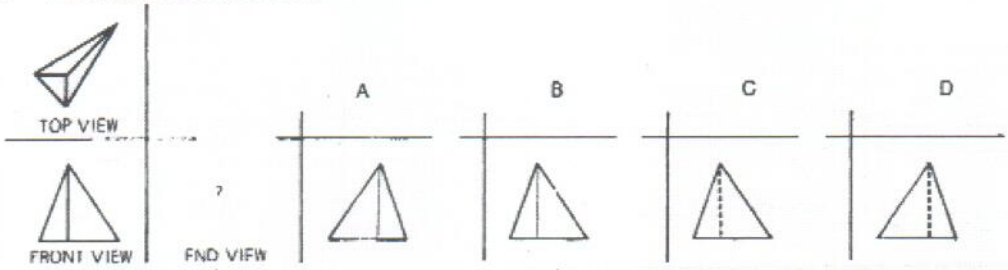
25 Choose the correct END VIEW.



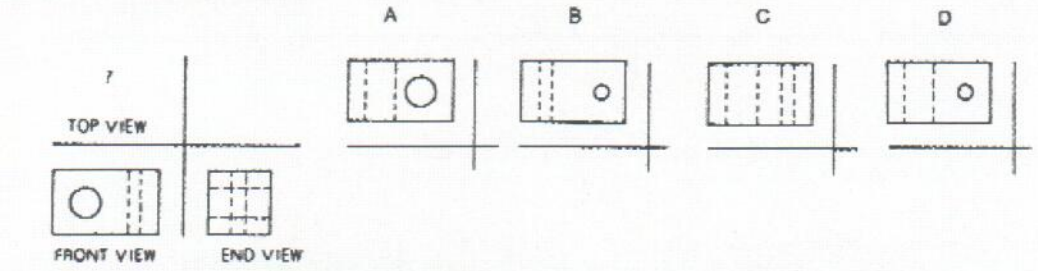
26 Choose the correct END VIEW.



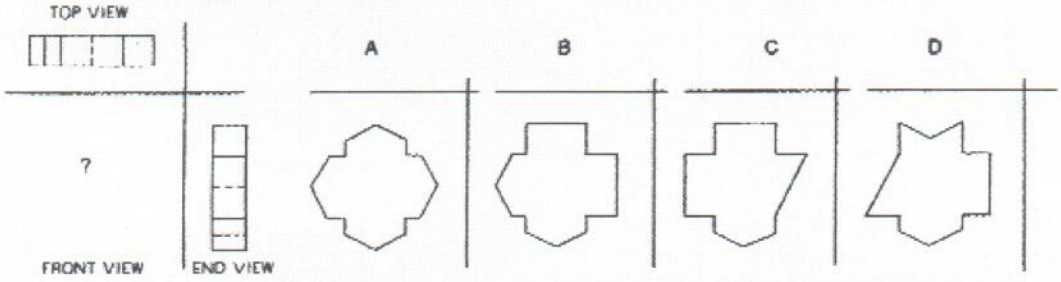
27 Choose the correct END VIEW.



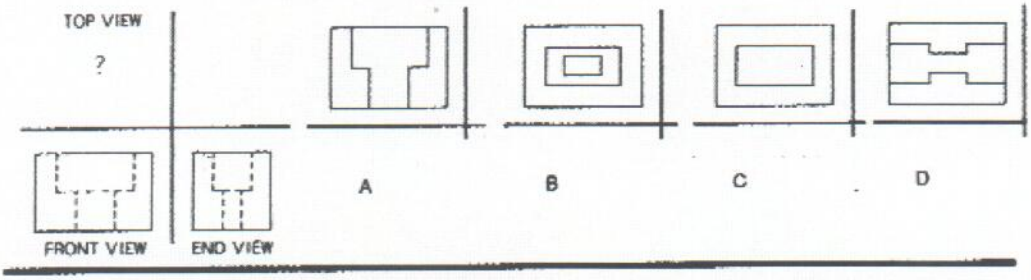
28 Choose the correct TOP VIEW.



29 Choose the correct FRONT VIEW.



30 Choose the correct TOP VIEW.

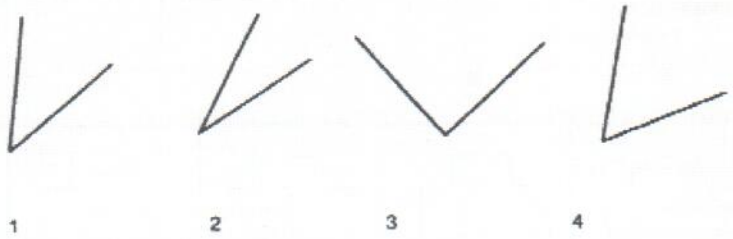


DO NOT STOP – READ DIRECTIONS FOR PART 3 AND CONTINUE

PART/3

For questions 31 through 45 you are to examine the four INTERIOR angles and rank each in terms of degrees from SMALL TO LARGE. Choose the alternative that has the correct ranking.

EXAMPLE: (Do not mark these on the answer sheet)



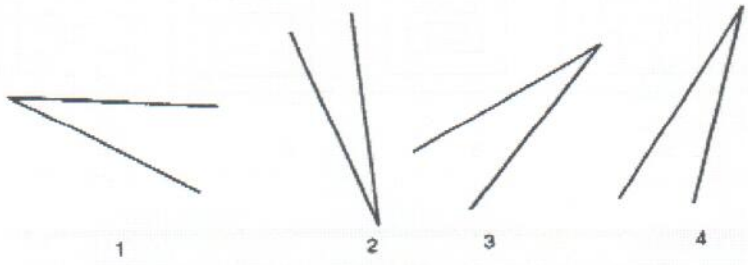
ALTERNATIVES:

(A.) 1 - 2 - 3 - 4
(B.) 2 - 1 - 4 - 3
(C.) 1 - 3 - 2 - 4
(D.) 3 - 4 - 1 - 2

The correct ranking of the angles from small to large is 2 - 1 - 4 - 3; therefore, alternative (B) is correct. Now proceed to the questions marking the correct alternative on your answer sheet.

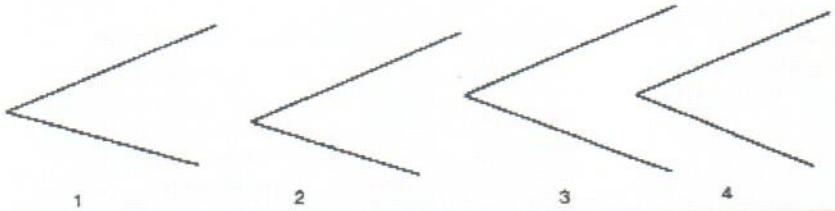
PROCEED TO QUESTIONS

31



(A.) 2 - 1 - 3 - 4
(B.) 2 - 1 - 4 - 3
(C.) 1 - 2 - 3 - 4
(D.) 2 - 4 - 3 - 1

32

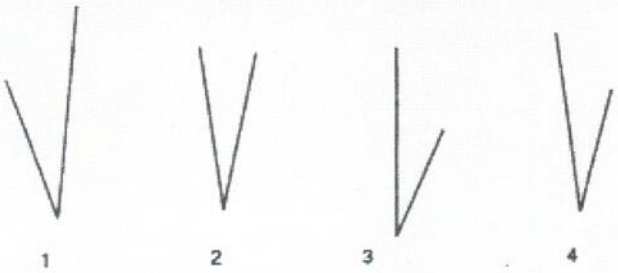


(A.) 2 - 4 - 1 - 3
(B.) 4 - 3 - 2 - 1
(C.) 1 - 2 - 3 - 4
(D.) 3 - 2 - 1 - 4

33

(A.) 3 - 1 - 4 - 2
(B.) 1 - 3 - 4 - 2
(C.) 1 - 3 - 2 - 4
(D.) 3 - 2 - 1 - 4

34

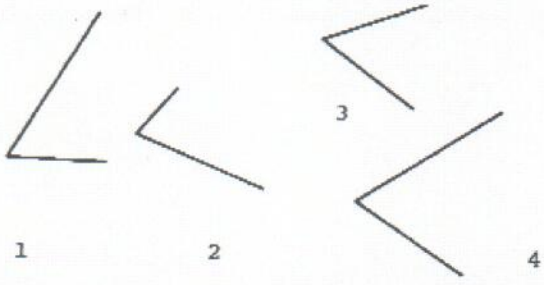


(A.) 4 - 3 - 2 - 1
(B.) 2 - 4 - 1 - 3
(C.) 2 - 4 - 3 - 1
(D.) 4 - 2 - 3 - 1

35

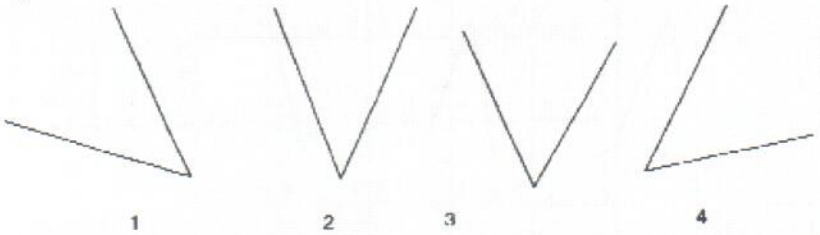
(A.) 3 - 1 - 4 - 2
(B.) 1 - 4 - 3 - 2
(C.) 3 - 4 - 2 - 1
(D.) 3 - 1 - 2 - 4

36



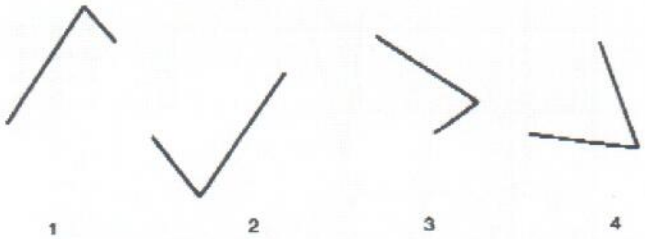
(A.) 3 - 1 - 2 - 4
(B.) 1 - 3 - 2 - 4
(C.) 3 - 1 - 4 - 2
(D.) 1 - 3 - 4 - 2

37



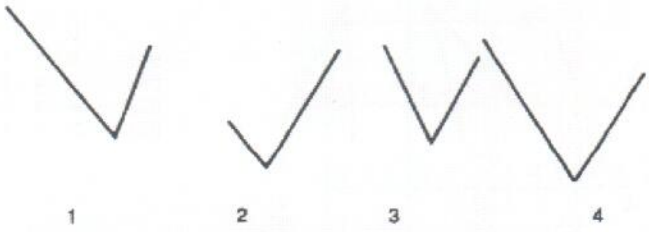
(A.) 2 - 1 - 3 - 4
(B.) 2 - 1 - 4 - 3
(C.) 1 - 2 - 3 - 4
(D.) 2 - 4 - 3 - 1

38



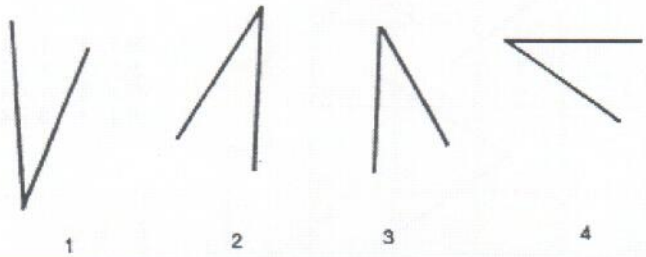
(A.) 3 - 2 - 4 - 1
(B.) 4 - 3 - 2 - 1
(C.) 3 - 4 - 1 - 2
(D.) 4 - 1 - 3 - 2

39



(A.) 3 - 1 2 - 4
(B.) 1 - 3 - 2 - 4
(C.) 3 - 1 - 4 - 2
(D.) 1 - 3 - 4 - 2

40



(A.) 3 - 1 - 4 - 2
(B.) 1 - 3 - 4 - 2
(C.) 1 - 2 - 3 - 4
(D.) 3 - 1 - 2 - 4

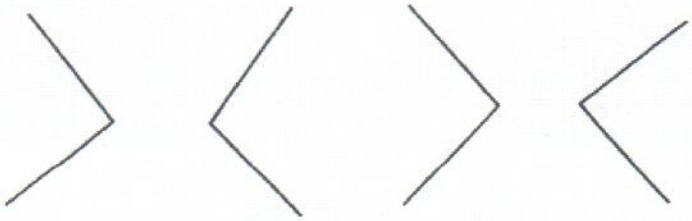
41

(A.) 3 - 1 - 4 - 2
(B.) 1 - 3 - 4 - 2
(C.) 1 - 3 - 2 - 4
(D.) 3 - 2 - 1 - 4

42

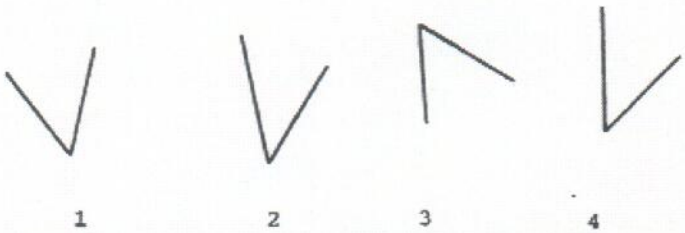
(A.) 2 - 1 - 3 - 4
(B.) 2 - 3 - 1 - 4
(C.) 2 - 1 - 4 - 3
(D.) 2 - 3 - 4 - 1

43



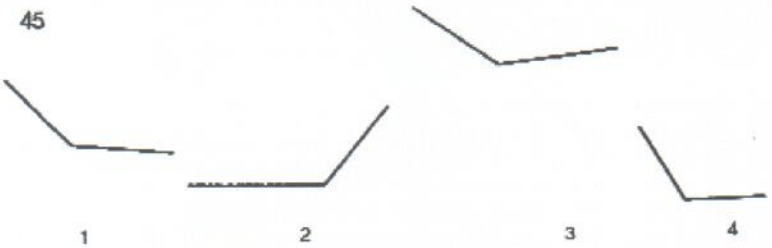
(A.) 4 - 1 - 2 - 3
(B.) 1 - 4 - 3 - 2
(C.) 4 - 1 - 3 - 2
(D.) 1 - 4 - 2 - 3

44



(A.) 4 - 3 - 2 - 1
(B.) 2 - 4 - 1 - 3
(C.) 2 - 4 - 3 - 1
(D.) 4 - 2 - 3 - 1

45



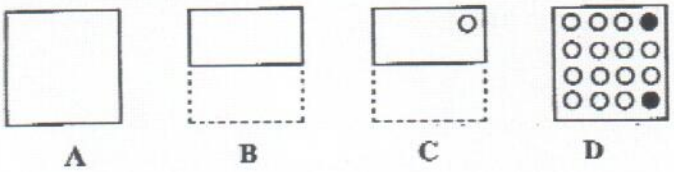
(A.) 4 - 2 - 1 - 3
(B.) 2 - 4 - 1 - 3
(C.) 2 - 4 - 3 - 1
(D.) 4 - 2 - 3 - 1

DO NOT STOP – READ DIRECTIONS FOR PART 4 AND CONTINUE

PART /4

For questions 46 through 60 a flat square of paper is folded one or more times. The broken lines indicate the original position of the paper. The solid lines indicate the position of the folded paper. The paper is never turned or twisted. The folded paper always remains within the edges of the original square. There may be from one to three folds in each item. After the last fold a hole is punched in the paper. Your task is to mentally unfold the paper and determine the position of the holes on the original square. Choose the pattern of black circles that indicates the position of the holes on the original square. There is only one correct pattern for each item.

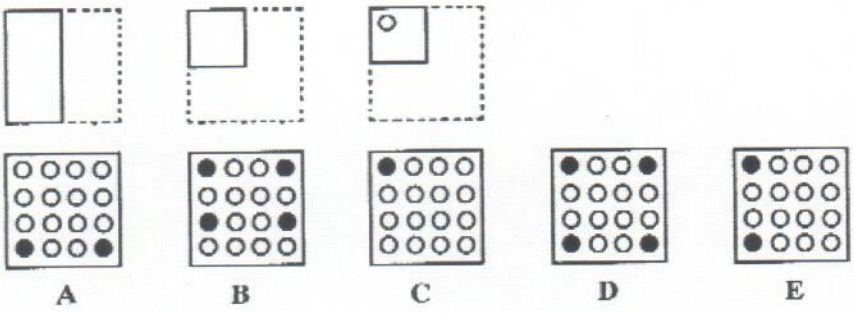
Example 1:



In Example 1 figure A shows the original paper. Figure B shows the result of the first fold. Figure C shows the position of the punched hole on the folded paper. When the paper is unfolded the pattern of the holes on the original square is shown by the dark circles in Figure D. The answer has two holes since the paper was two thicknesses when punched.

Example 2 shows an item as it appears on the test.

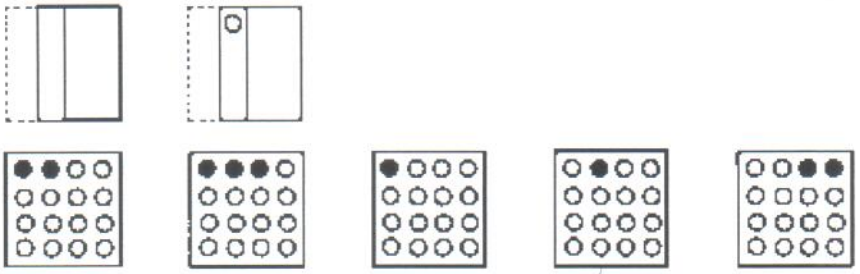
Example 2:



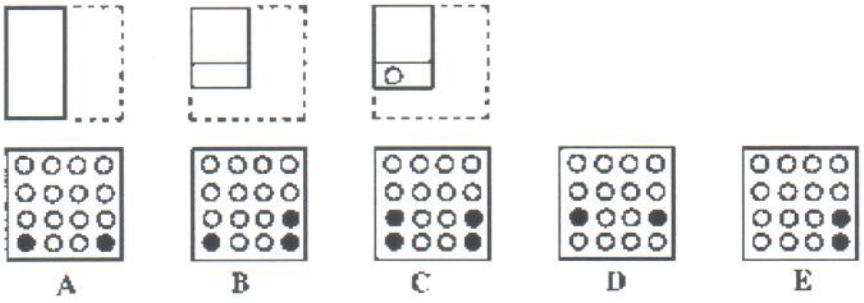
The correct answer to Example 2 is D. The paper was four thicknesses when punched and the holes are located in each of the four corners.

Proceed to Questions

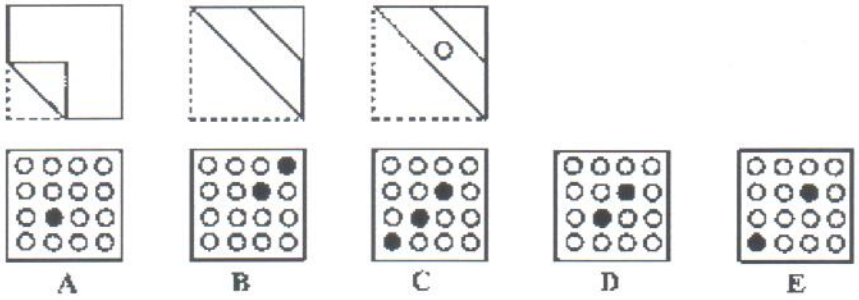
46



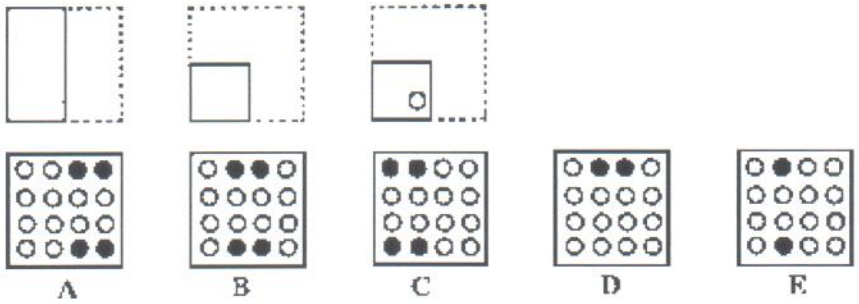
47



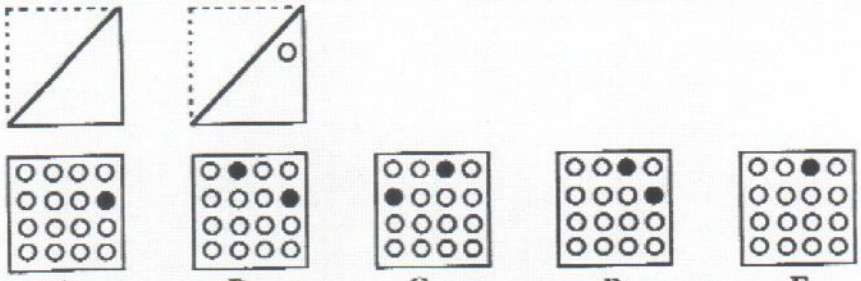
48



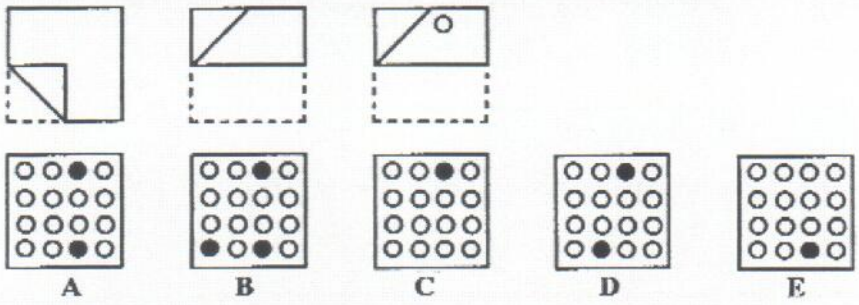
49



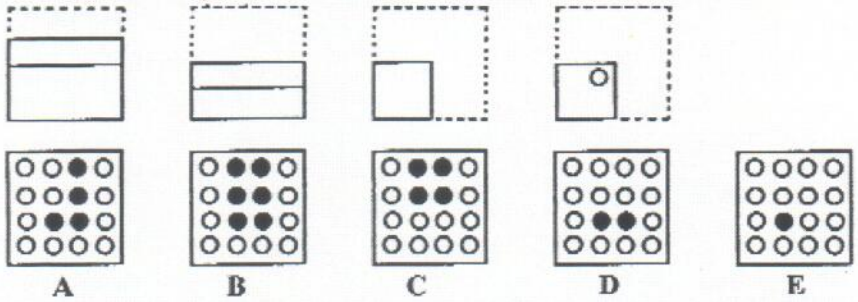
50



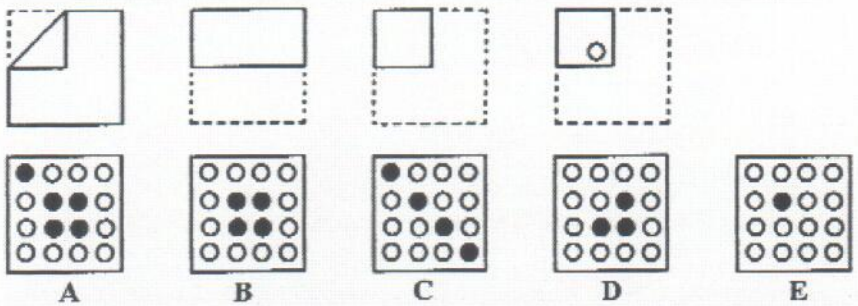
51



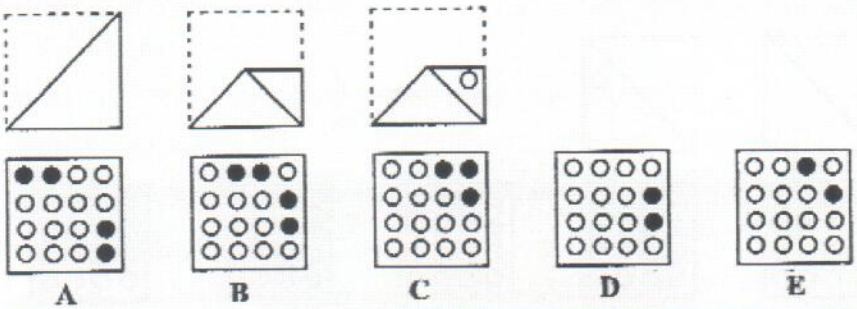
52



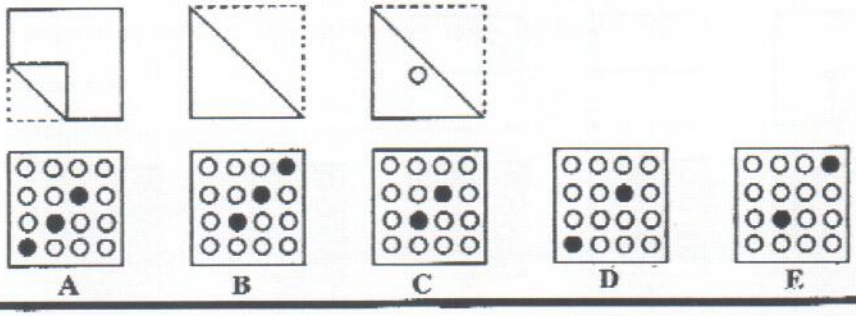
53



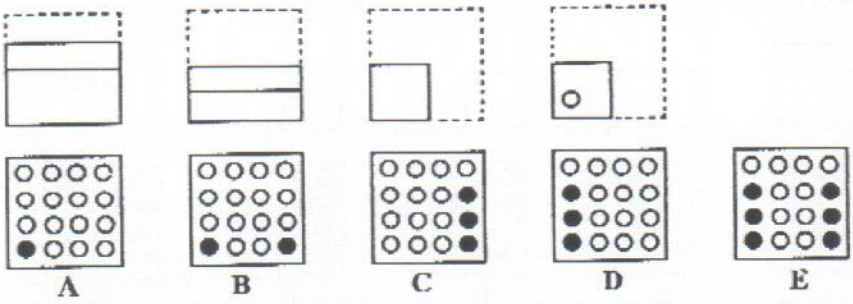
54



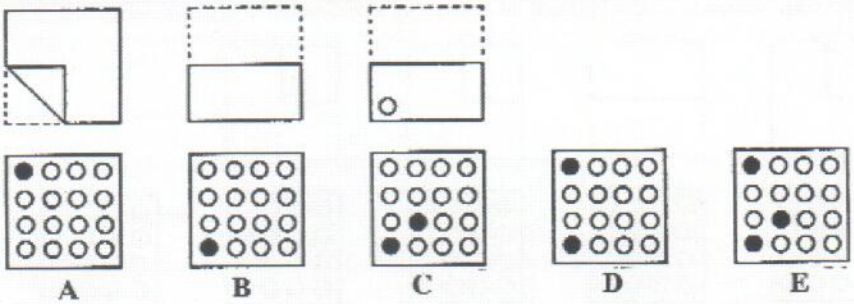
55



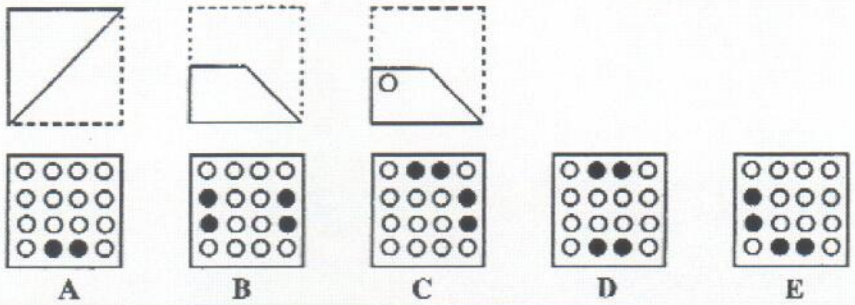
56



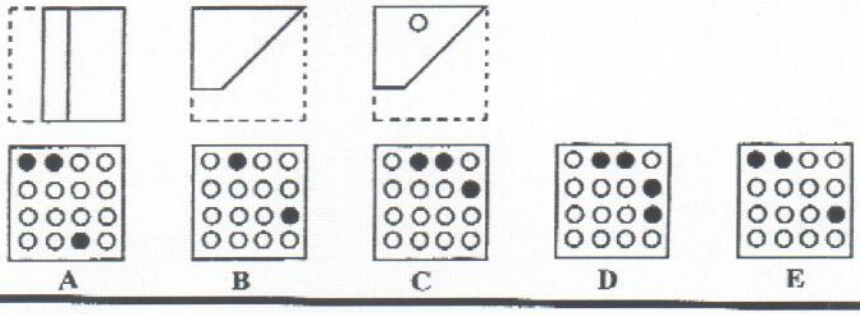
57



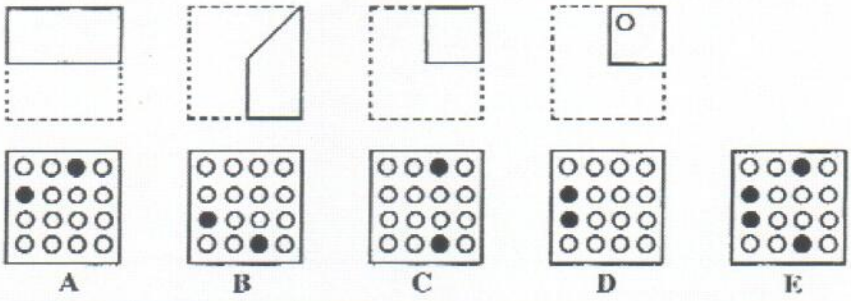
58



59



60



DO NOT STOP - READ DIRECTIONS FOR PART 5 AND CONTINUE

PART/5

Each figure has been made by cementing together cubes of the same size. After being cemented each group was painted on all sides EXCEPT FOR THE BOTTOM ON WHICH IT IS RESTING. The only hidden cubes are those required to support other cubes.

For questions 61 to 75 you are to examine each figure closely to determine how many cubes have:

only **one** of their sides painted.
only **two** of their sides painted.
only **three** of their sides painted.
only **four** of their sides painted.
all **five** of their sides painted.

Note: There are no problems for which zero (0) is the correct answer.

Example: (Do not mark the answers to this example on your answer sheet)

PROBLEM Z

In Figure Z how many cubes have two of their exposed sides painted?

A. 1 cube — ANSWER
B. 2 cubes
C. 3 cubes
D. 4 cubes
E. 5 cubes

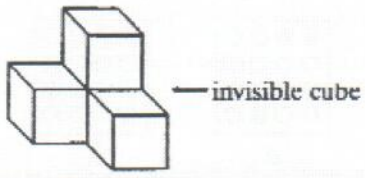


FIGURE Z

There are four cubes in Figure Z. Three that are visible and one supporting the top cube that is invisible. The invisible cube has only two sides painted. The top cube has five sides painted. The remaining two cubes have four sides painted.

Now, proceed to the questions. Darken the circle on your answer sheet that corresponds to the number of cubes that have the different numbers of sides painted. Remember, after being cemented together, each figure was PAINTED ON ALL EXPOSED SIDES EXCEPT THE BOTTOM.

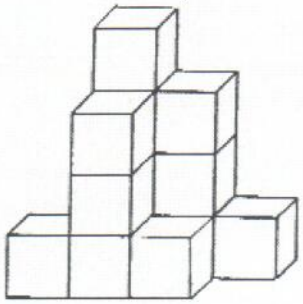
Proceed to Questions

PROBLEM A

61 In Figure A, how many cubes have one of their exposed sides painted?

A. 1 cube
B. 2 cubes
C. 3 cubes
D. 4 cubes
E. 5 cubes

FIGURE A



62. In Figure A, how many cubes have two of their exposed sides painted?

A. 1 cube
B. 2 cubes
C. 3 cubes
D. 4 cubes
E. 5 cubes

63. In Figure A, how many cubes have three of their exposed sides painted?

A. 1 cube
B. 2 cubes
C. 3 cubes
D. 4 cubes
E. 5 cubes

64. In Figure A, how many cubes have four of their exposed sides painted?

A. 1 cube
B. 2 cubes
C. 3 cubes
D. 4 cubes
E. 5 cubes

PROBLEM B

65. In Figure B, how many cubes have two of their exposed sides painted?

A. 1 cube
B. 2 cubes
C. 3 cubes
D. 4 cubes
E. 5 cubes

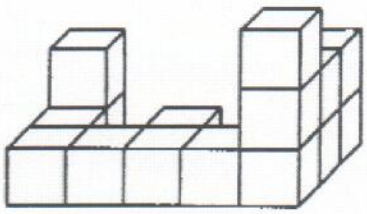


FIGURE B

PROBLEM B

66. In Figure B, how many cubes have four of their exposed sides painted?

A. 1 cube
B. 2 cubes
C. 3 cubes
D. 4 cubes
E. 5 cubes

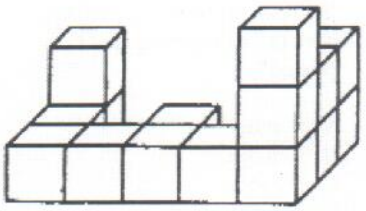


FIGURE B

PROBLEM C

67. In Figure C, how many cubes have two of their exposed sides painted?

A. 1 cube
B. 2 cubes
C. 3 cubes
D. 4 cubes
E. 5 cubes

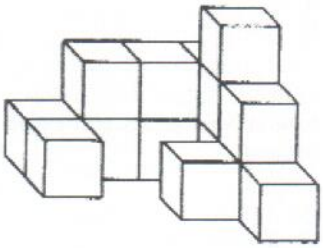


FIGURE C

68. In Figure C, how many cubes have three of their exposed sides painted?

A. 1 cube
B. 2 cubes
C. 3 cubes
D. 4 cubes
E. 5 cubes

69. In Figure C, how many cubes have four of their exposed sides painted?

A. 1 cube
B. 2 cubes
C. 3 cubes
D. 4 cubes
E. 5 cubes

PROBLEM D

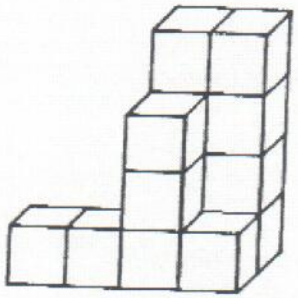


FIGURE D

70. In Figure D, how many cubes have one of their exposed sides painted?

A. 1 cube
B. 2 cubes
C. 3 cubes
D. 4 cubes
E. 5 cubes

71. In Figure D, how many cubes have two of their exposed sides painted?

A. 1 cube
B. 2 cubes
C. 3 cubes
D. 4 cubes
E. 5 cubes

72. In Figure D, how many cubes have three of their exposed sides painted?

A. 1 cube
B. 2 cubes
C. 3 cubes
D. 4 cubes
E. 5 cubes

PROBLEM E

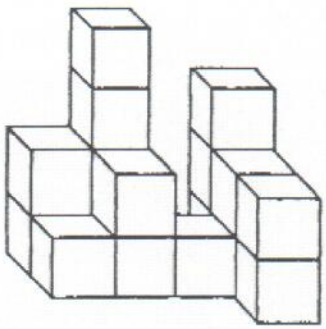


FIGURE E

73. In Figure E, how many cubes have one of their exposed sides painted?

A. 1 cube
B. 2 cubes
C. 3 cubes
D. 4 cubes
E. 5 cubes

PROBLEM E

74. In Figure E, how many cubes have two of their exposed sides painted?

A. 1 cube
B. 2 cubes
C. 3 cubes
D. 4 cubes
E. 5 cubes

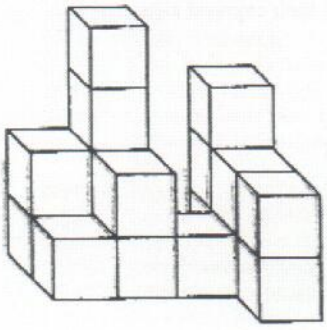


FIGURE E

75. In Figure E, how many cubes have four of their exposed sides painted?

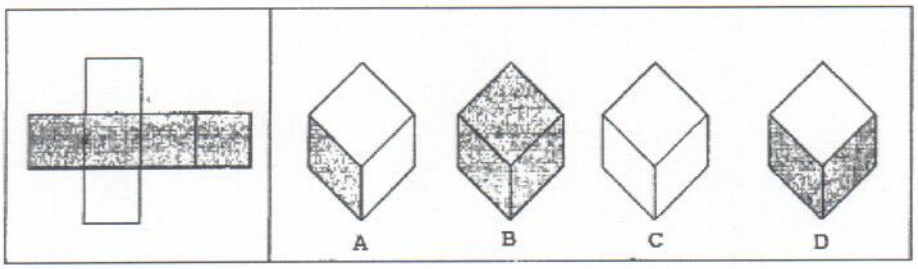
A. 1 cube
B. 2 cubes
C. 3 cubes
D. 4 cubes
E. 5 cubes

DO NOT STOP -
READ DIRECTIONS FOR PART 6 AND CONTINUE

PART/6

In questions **76** through **90** a flat pattern will be presented. This pattern is to be folded into a three dimensional figure. The correct figure is one of the four given at the right of the pattern.There is only one correct figure in each set. The outside of the pattern is what is seen at the left.

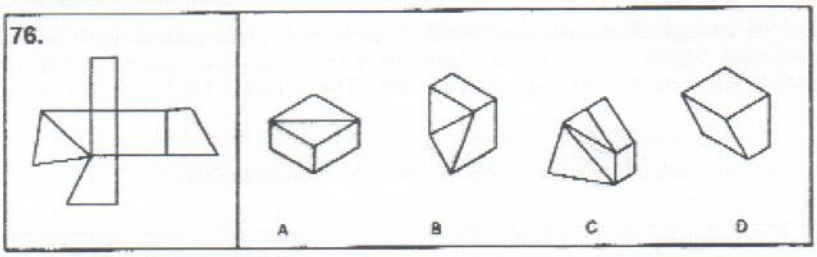
Example: (Do not mark the answer to this example on the answer sheet.)



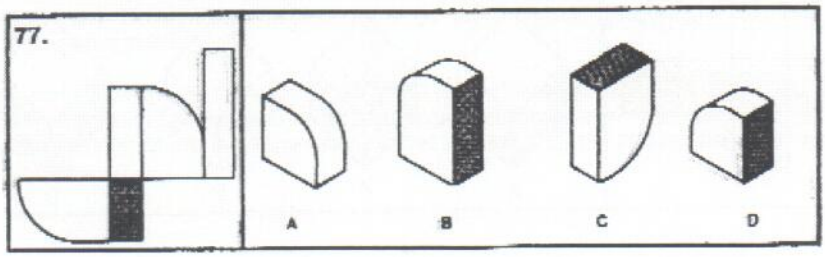
One of the above figures (A, B, C, or D) can be formed from the flat pattern given at the left. The only figure that corresponds to the pattern is D. If the shaded surfaces are looked at as the sides of the box, then all four sides must be shaded, while the top and bottom are white.

Proceed to Questions

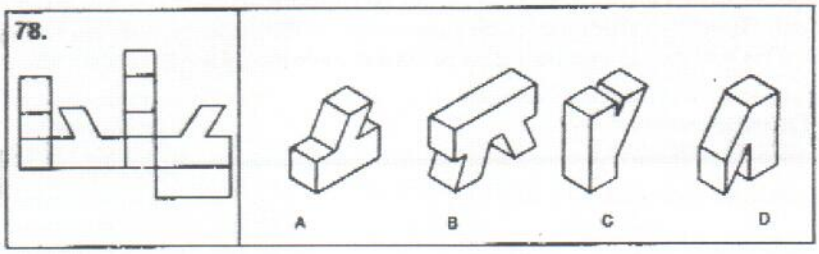
76.



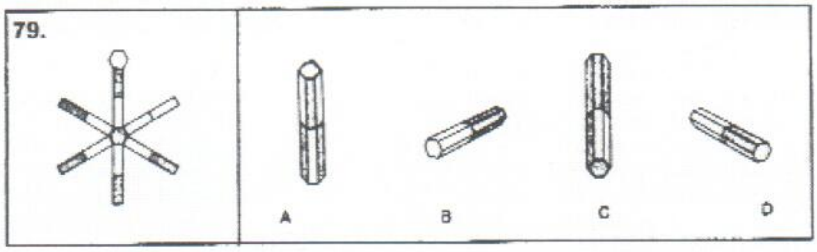
77.



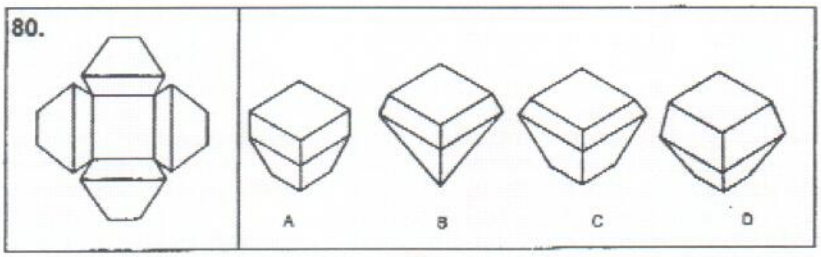
78.



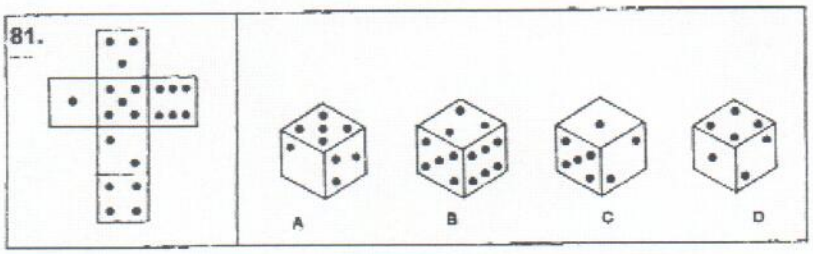
79.



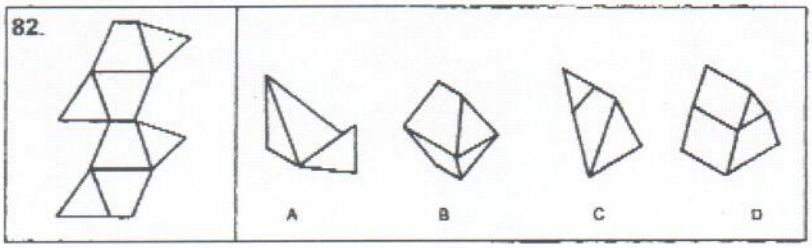
80.



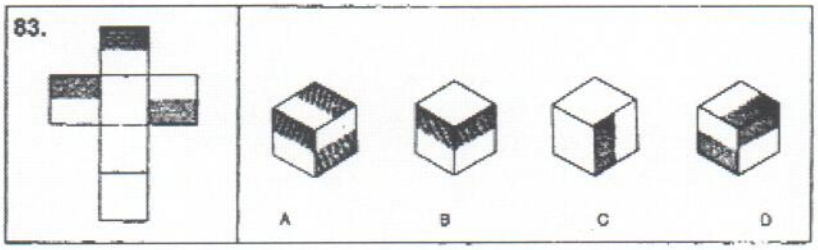
81.



82.



83.



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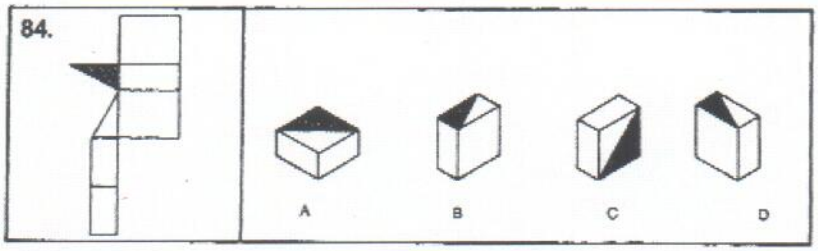

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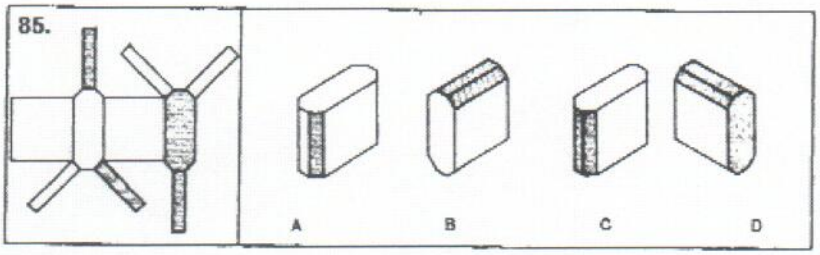

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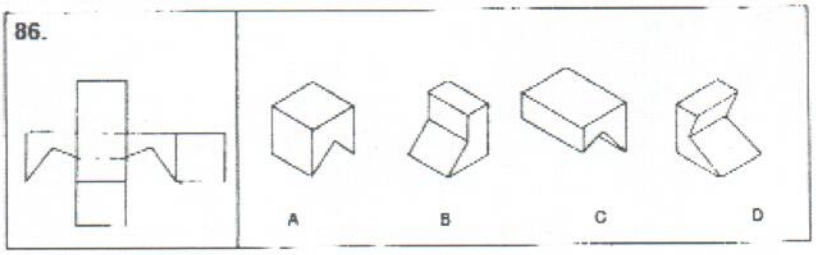

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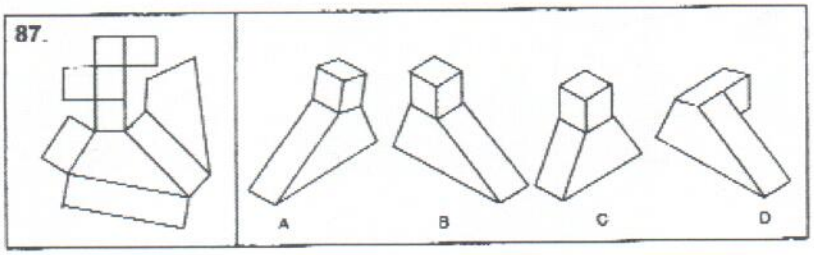

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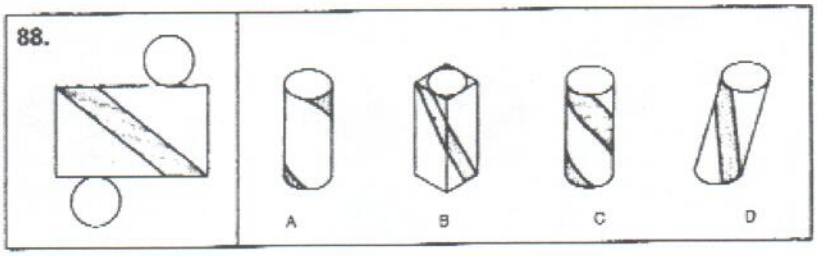

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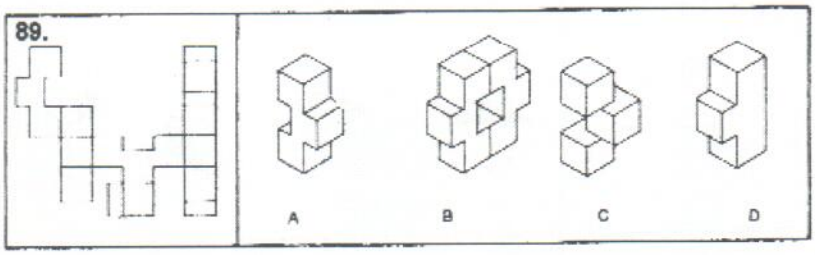

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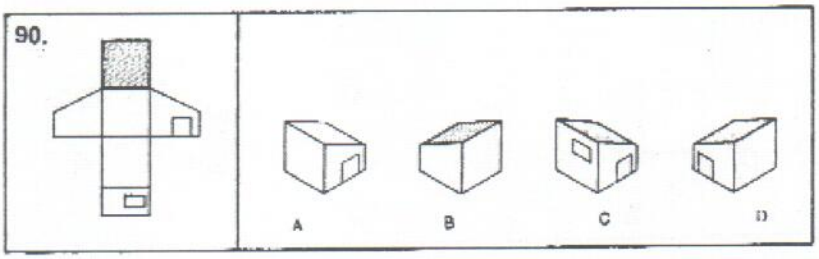

THE END