

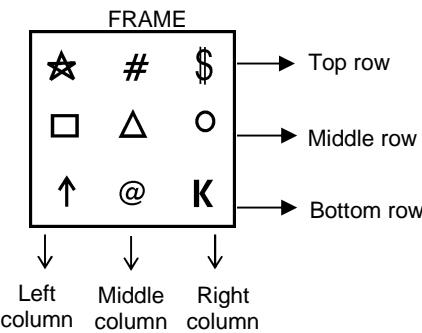
CHAPTER – 13

NON - VERBAL REASONING

Exercise - 13 (a)

Introduction

The non-verbal questions test the ability of the candidate to develop logic from certain abstract figures given in the question. To understand the pattern in the given figures, one should develop a systematic method of studying the figures given. These questions consist of figures given in square boxes. These boxes are referred to as frames. The figures in each frame are called elements, which are generally identified by their position in the frame.



In the above frame each element is referred to by its row and column. The element '★' is referred to as op-left element. i.e., top row-left column. The element 'Δ' is referred to as the central element. The behaviour of these elements, with reference to their position is studied. In certain questions each frame contains only one big element, with certain smaller elements attached to it.

The question may be based on any one of the above patterns or a combination of two or more patterns.

Types of questions:

The questions can be classified into the following basic groups.

- (A) Series
- (B) Analogies
- (C) Odd man out

(A) Series:

These questions are further classified as follows.

- (1) Five figure series (to find the next figure).

- (2) Five figure series (to find the missing figure).

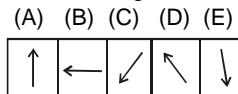
- (1) **Five figure series (to find the next figure):** In these questions five problem figures followed by answer figures are given. By observing the pattern followed by the problem figures, one of the answer figures which continues the same pattern is to be chosen as the answer.

Pattern of the question

Problem figures



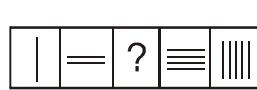
Answer figures



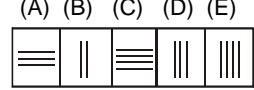
- (2) **Five figure series (to find the missing figure):** These questions are similar to the previous type, but in these questions one of the five problem figures is not given. One of the answer figures, which along with the other problem figures can form a logical series, is to be chosen as the answer.

Pattern of the question

Problem figures



Answer figures



(B) Analogies:

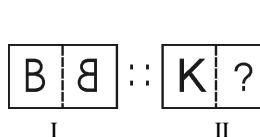
Questions based on analogies are classified as,

- (1) Four figure analogy
- (2) Similar pair

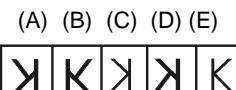
- (1) **Four figure analogy:** These questions contain two pairs of problem figures followed by five answer figures. Among the two figures in the second pair of problem figures one is not given. An answer figure should be chosen in such a way that a relation between the two figures of the second pair of problem is established, which is similar to the relationship existing between the two figures of the first pair of the problem figures.

Pattern of the question

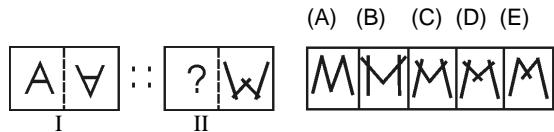
Problem figures



Answer figures



or



(A) (B) (C) (D) (E)

- (2) **Similar pair:** These questions contain a pair of problem figures, followed by five pairs of answer figures. The answer pair which has a relationship between its two figures, which is similar to the relationship existing between the two figures of the problem pair, should be chosen as the answer.

Pattern of the question

Problem figures	Answer figures				
	(A)	(B)	(C)	(D)	(E)
A O I II	U L I II	V J I II	T S I II	M H I II	D X I II

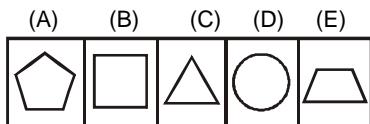
(C) Odd man out:

These type of questions are given in the following ways.

- (1) Odd man out (individual figures)
- (2) Odd pair

(1) Odd man out: These questions contain five independent figures. The pattern of arrangement of the elements within a frame will be similar in four out of the five figures and it would be different in one of them. The number of that figure should be marked as the answer.

Pattern of the question



(2) Odd pair: These questions contain five pairs of answer figures. The relationship between the two figures of four out of the five pairs will be similar, but it would be different for one of the pairs. The number of that pair should be given as the answer.

Pattern of the question

(A)	(B)	(C)	(D)	(E)

Pattern of behaviour of the elements

The behaviour of elements means the changes that take place in them. These changes are classified as follows.

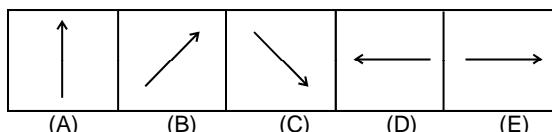
- (i) Shift
- (ii) Rotation
- (iii) Image formation
- (iv) Change in the number of elements
- (v) Substitution

Shift: Shift means change in position. That is movement from one position to another. The shift is measured by the distance moved by the element with respect to its position in the immediate previous figure. The unit of measurement of distance is one side, which is equal to the distance between one corner of the figure and its adjacent corner. The following example gives a clear idea of studying the shift.

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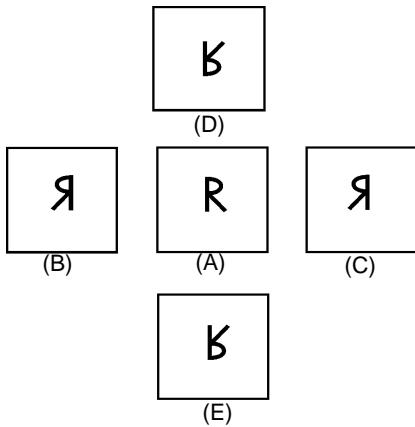
When the positions of the elements in figure (A) are compared to those of the elements in figure (B), it is clear that each element is shifted by half-a-side in the clockwise direction. From figure (B) to (C) the shift is one side, from figure (C) to (D) the shift is one and half side, from figure (D) to (E) the shift is two sides. Thus the shift is measured in multiples of half-a-side. The shift may take place in clockwise or counter clockwise direction.

Rotation: When an element changes the direction towards which it is pointing, the element is said to be rotated. Let us study the pattern of rotation in the following illustration.



In figure (A), the element is pointing towards north and in figure (B) it is pointing towards north-east. i.e., the element is rotated by 45° in clockwise direction. From figure (B) to (C), the rotation is by 90°; from figure (C) to (D) the rotation is by 135° and

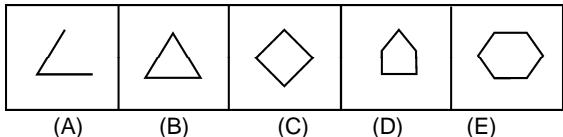
from figure (D) to (E) the rotation is by 180° . Thus the rotation is given in multiples of 45° . The rotation may be in clockwise or counter clockwise direction.
 Image formation: In this case an element in a frame is represented in the form of its image in the next frame. This image could be mirror image or water image as illustrated below.



In the above diagram, frame (B) and (C) are the mirror image of frame (A) (i.e; lateral inversion) and frame (D) and (E) are the water image of frame (A) (i.e; vertical inversion).

Change in the number of elements: In certain questions the number of elements either increase or

decrease from one figure to the next one.



From figure (A) to (B) the number of sides decreased by 1. In the above series from one figure to another the number of sides increased by one.

Substitution: In some cases one of the elements in the previous figure is substituted by a new element in the next figure.

$\star \circ @$	$\square \circ @$	$\square \circ \pi$	$\square \circ \pi$	$\square \circ \pi$
$\uparrow \square \Delta$	$\uparrow \square \Delta$	$\uparrow \square \Delta$	$\uparrow \Delta$	$\uparrow \Delta$
$\# = \theta$	$\# = \theta$	$\# = \theta$	$\# = \theta$	$\wedge = \theta$

(A) (B) (C) (D) (E)

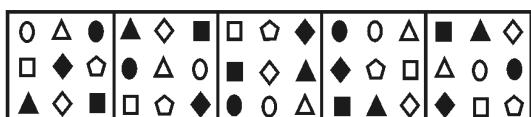
In figure (B), the top-left element of figure (A) is substituted by a new element. In figure (C), the top-right element of figure (B), is substituted by a new element. In figure (D), the central element of figure (C) is substituted by a new element. In figure (E), the bottom-left element of figure (D) is substituted by a new element. i.e., every alternate element starting from the top-left element is substituted in the subsequent figure.

Exercise – 13(a)

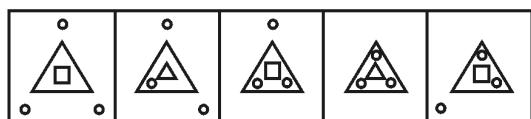
Directions for questions 1 to 15: Given below are the two sets of figures, the problem figures and the answer figures marked (A), (B), (C), (D) and (E). Which figure from (A), (B), (C), (D) and (E) would be the next in the series of the problem figures?

PROBLEM FIGURES

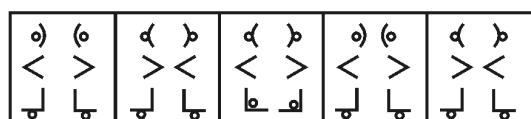
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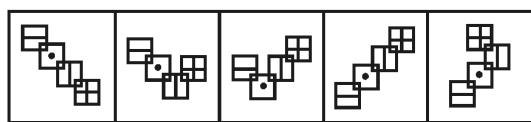
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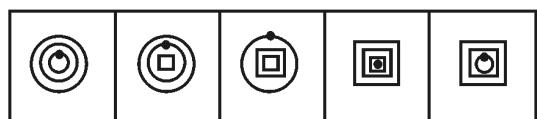
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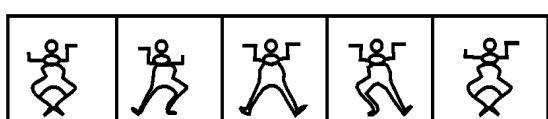
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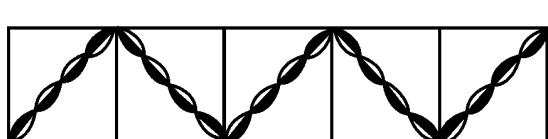
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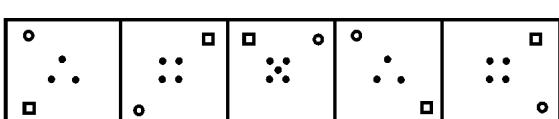
6.



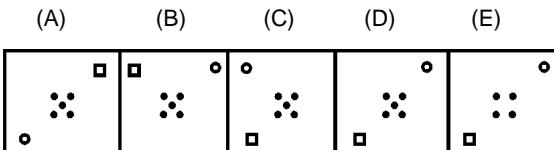
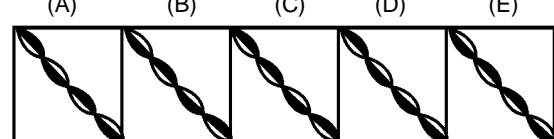
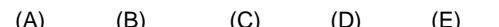
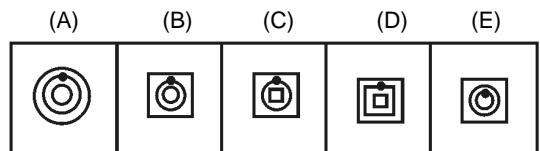
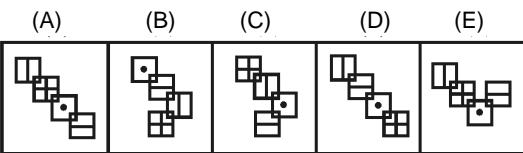
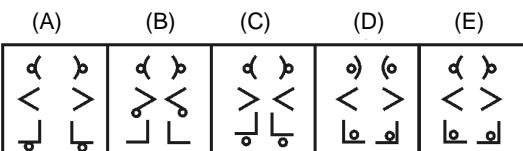
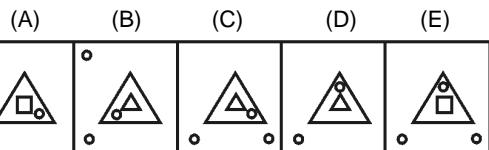
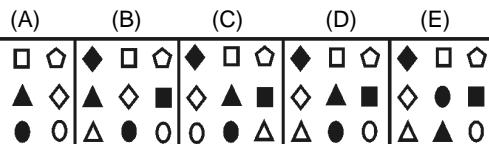
7.



8.



ANSWER FIGURES



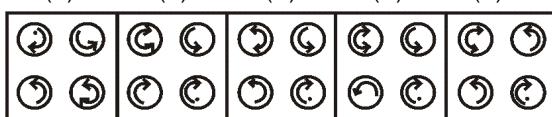
PROBLEM FIGURES

9.



ANSWER FIGURES

(A) (B) (C) (D) (E)



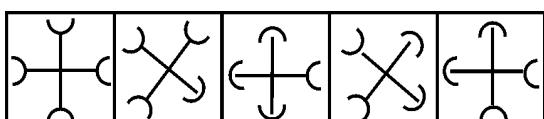
10.



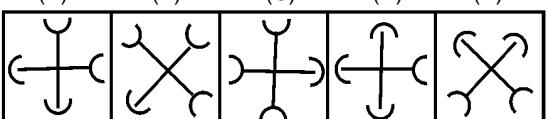
(A) (B) (C) (D) (E)



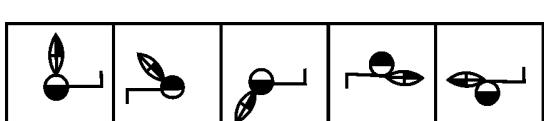
11.



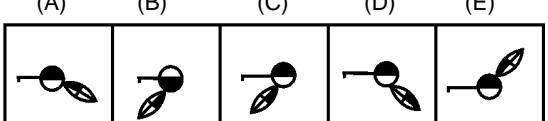
(A) (B) (C) (D) (E)



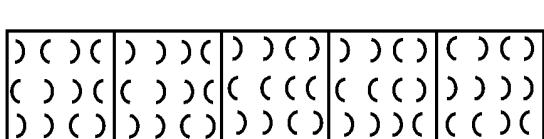
12.



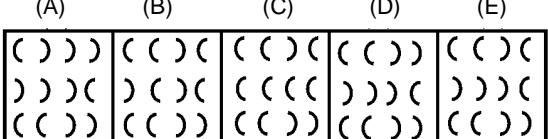
(A) (B) (C) (D) (E)



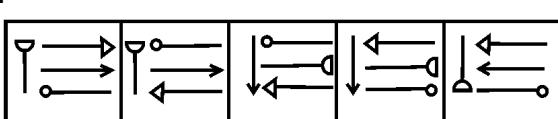
13.



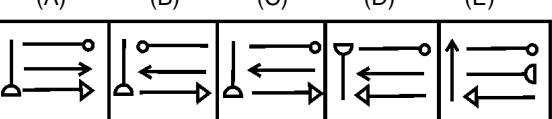
(A) (B) (C) (D) (E)



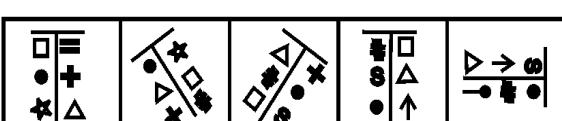
14.



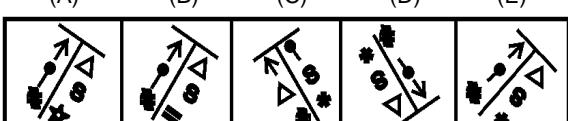
(A) (B) (C) (D) (E)



15.



(A) (B) (C) (D) (E)



Directions for questions 16 to 20: In each of these questions there are two sets of figures. The figures on the left are Problem Figures. (Four figures and one question marked space) and those on the right are Answer Figures indicated by numbers (A), (B), (C), (D) and (E). A series is established if one of the five Answer Figures is placed at the "question marked space". Figures form a series if they change from left to right according to the same rule. The number of the Answer Figure which should be placed in the question-marked space is the answer. All the five figures i.e. four Problem Figures and one Answer Figure placed in the question-marked space should be considered as forming the series.

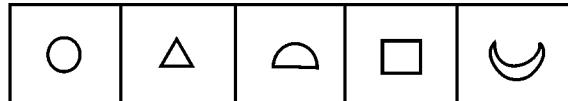
PROBLEM FIGURES

16.



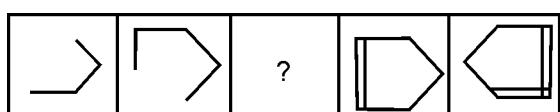
ANSWER FIGURES

(A) (B) (C) (D) (E)



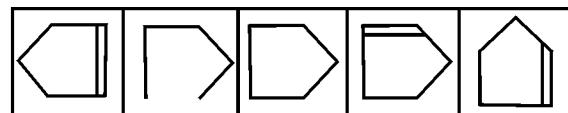
PROBLEM FIGURES

17.

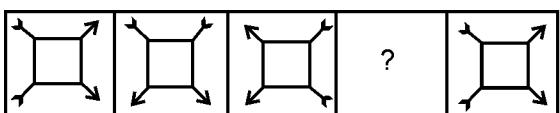


ANSWER FIGURES

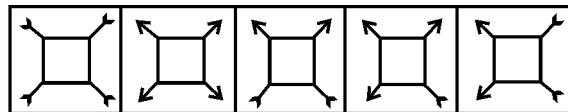
(A) (B) (C) (D) (E)



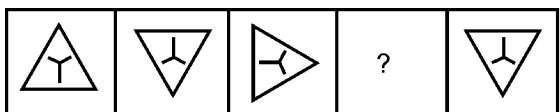
18.



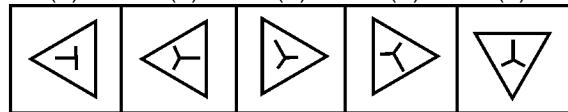
(A) (B) (C) (D) (E)



19.



(A) (B) (C) (D) (E)



20.

b # c	# b	?	c % b	c % a
a % a	% c		# a	# b

(A) (B) (C) (D) (E)

% # c a	b % c a	b a # c	b a c n	a % # c b

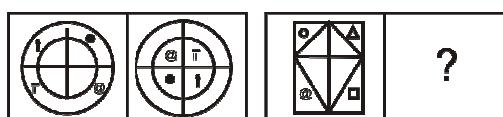
Directions for questions 21 to 25: In each of the following questions the first two problem figures are related to each other in a certain way. Find out which figure from the answer figures (A), (B), (C), (D) and (E), should be placed at the "?" so that the second pair of problem figures so formed will have a similar relationship as the first pair.

PROBLEM FIGURES

21.

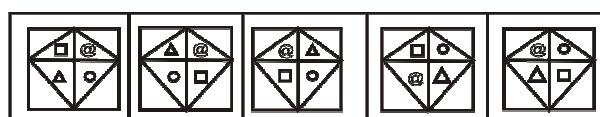
(i)

(ii)



ANSWER FIGURES

(A) (B) (C) (D) (E)



22.

(i)

(ii)

K M O	P	N K P	M O
		4 5 3 2	

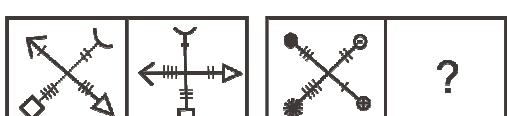
(A) (B) (C) (D) (E)

1 5 3	2 4 2	4 3 1	3 1 3	2 5 2

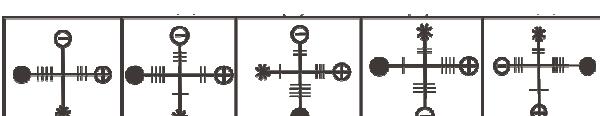
23.

(i)

(ii)



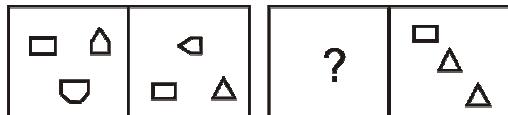
(A) (B) (C) (D) (E)



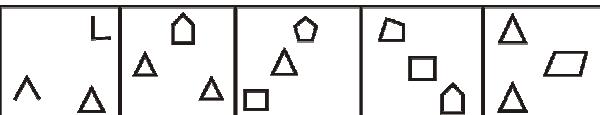
24.

(i)

(ii)



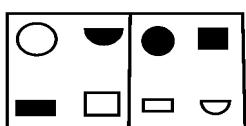
(A) (B) (C) (D) (E)



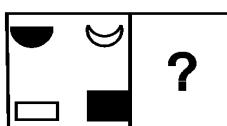
PROBLEM FIGURES

25.

(i)



(ii)



ANSWER FIGURES

(A)



(B)



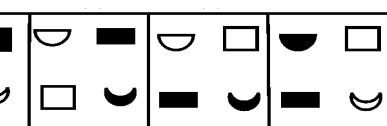
(C)



(D)



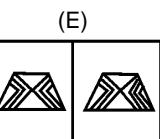
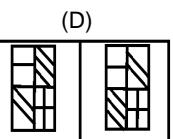
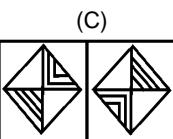
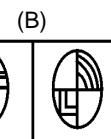
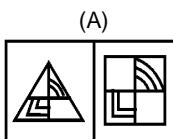
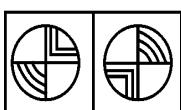
(E)



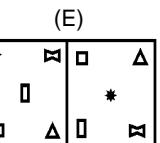
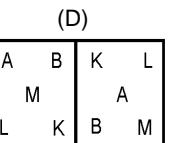
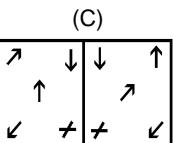
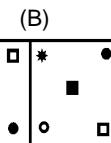
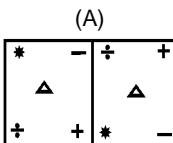
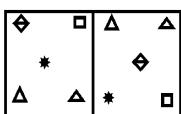
Directions for questions 26 to 30: In each of the following question a pair of problem figures given at extreme left is followed by five pairs of answer figures. The first figure in the problem figure bears a certain relationship with the second figure. Only one out of the five answer pairs is similar to the pair given in the problem figure. Find that pair.

PROBLEM FIGURES

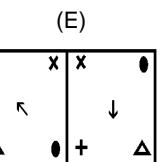
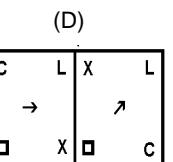
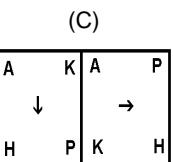
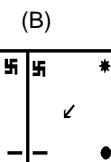
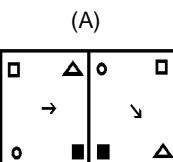
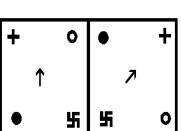
26.



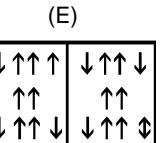
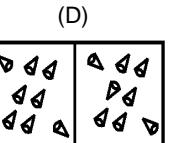
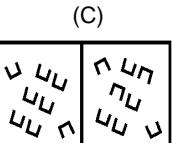
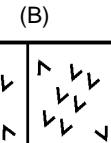
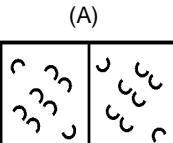
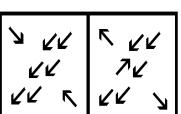
27.



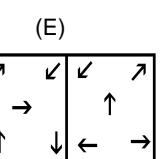
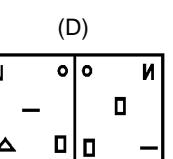
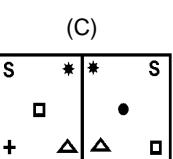
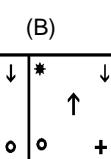
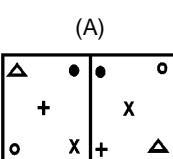
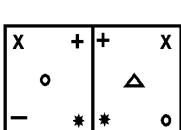
28.



29.



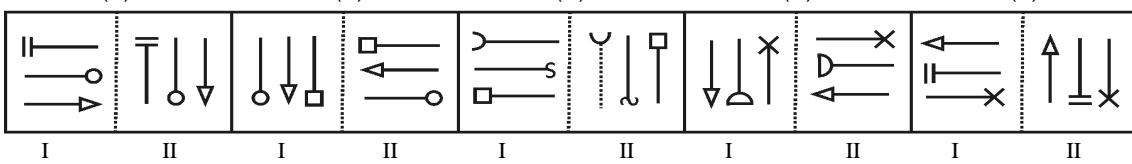
30.



Directions for questions 31 to 35: In each of the following questions, in four out of the five figures element II is related to element I in the same pattern. Find out the figure in which the element II is not so related to element I in that pattern.

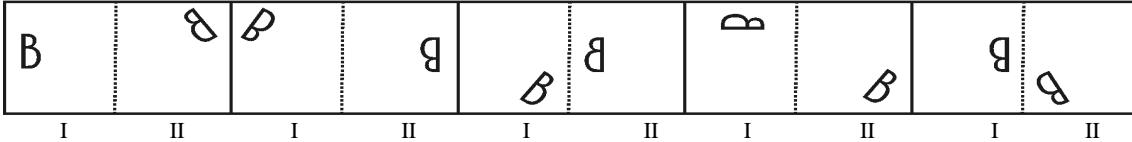
31.

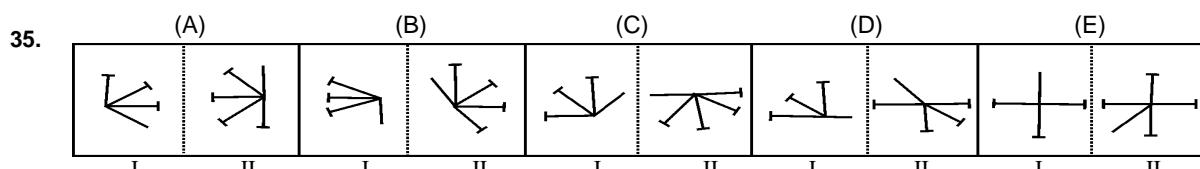
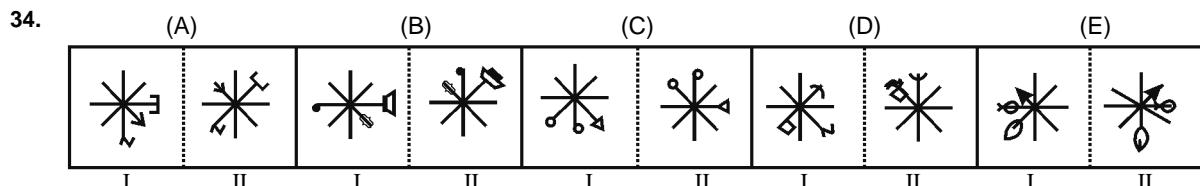
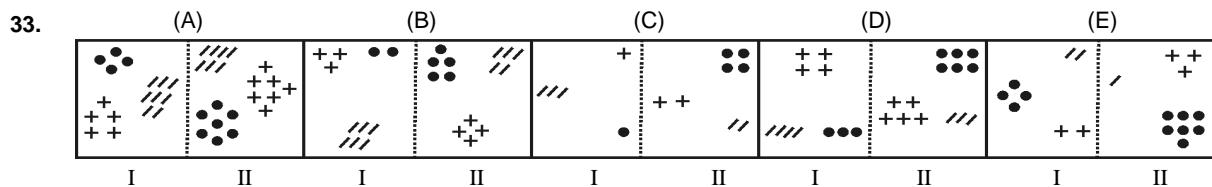
(A)



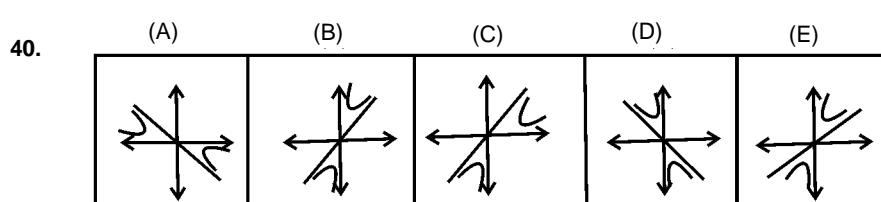
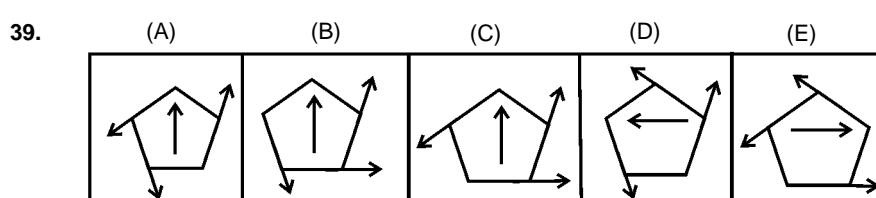
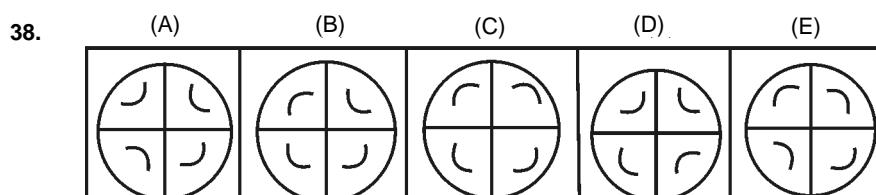
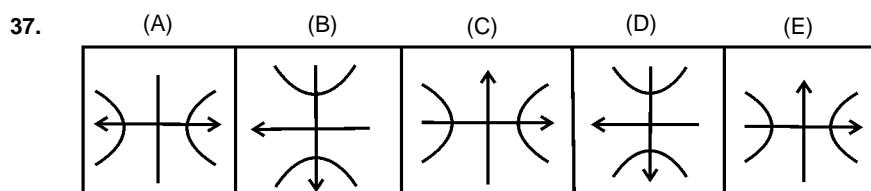
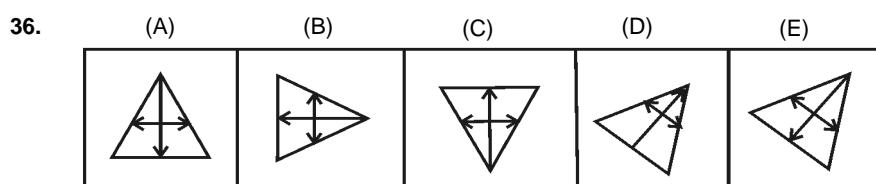
32.

(A)





Directions for questions 36 to 40: Among the given figures, four figures follow the same pattern and one figure is different from these four. Mark this figure (which is different from the other four) as your answer.



Exercise -- 13 (b)

Introduction

The questions based on paper cutting and paper folding test the student's ability to imagine.

Paper folding:

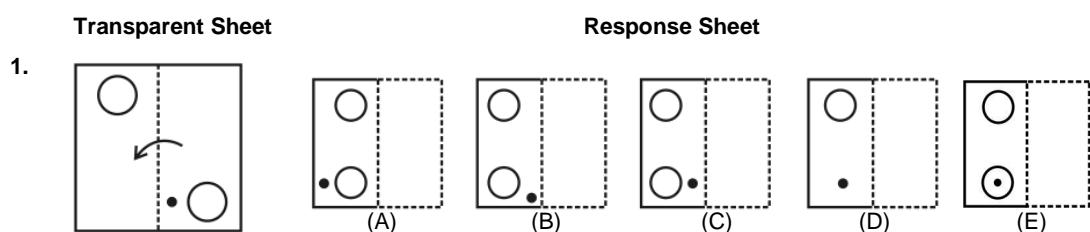
In paper folding questions a diagram of a transparent paper is given with certain figures drawn on it. The student has to identify the figure after the paper is folded in such a way that one part of the figure is super imposed on the remaining part of the figure.

Paper cutting:

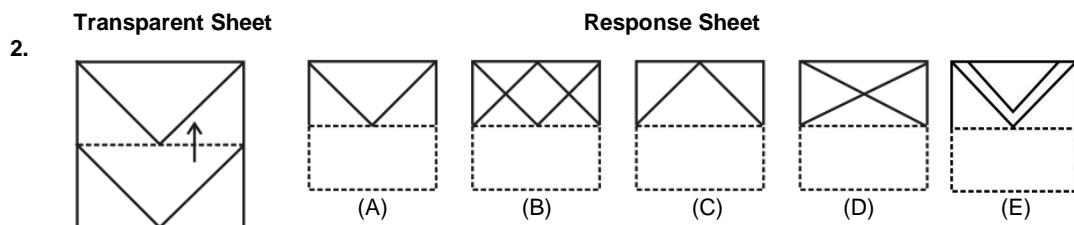
In paper cutting questions, a paper is folded several times in a particular manner, which is illustrated in the question. After folding, a hole is made on the folded paper such that all the layers get the hole. The student has to identify the pattern of holes that appear on the paper when it is unfolded. Let us study the following worked out examples.

Directions for questions 1 and 2: In each one of the following examples, find the one which resembles the pattern formed when the transparent sheet, carrying a design is folded along the dotted line along the direction shown by the arrow.

Examples:



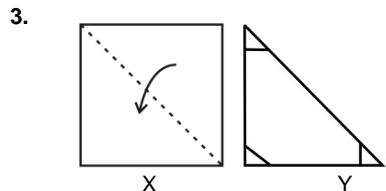
Sol: The dotted line in the transparent sheet indicates that the paper is divided into two parts. The arrow on the dotted line shows that the right half of the paper is to be folded onto the left half. Visualizing the combination of the designs on the two parts, we obtain fig (C).



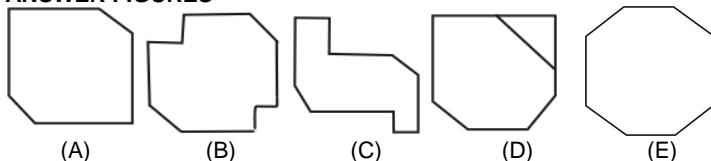
Sol: The dotted line in the transparent sheet indicates that the paper is divided into two parts. The arrow on the dotted line shows that the bottom half of the paper is to be folded onto the upper half. Visualising the combination of the design on the two parts, we obtain fig (B).

Directions for questions 3 to 5: Consider the figures X and Y showing a sheet of paper folded in figure X and punched in figure Y. From amongst the answer figures (A), (B), (C) and (D), select the figure, which will most closely resemble the unfolded position of figure Y.

PROBLEM FIGURES

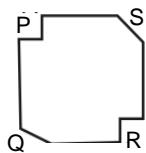


ANSWER FIGURES



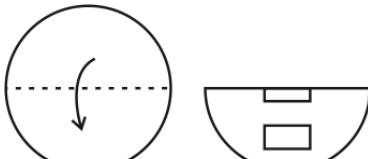
Sol: In figure X, the upper half of the square paper sheet is folded onto the lower half. The resultant figure is Y. In figure Y three pieces of triangle shape were punched on the folded paper at the corners. Now, if Y is unfolded the same cut will appear at S as it appears at Q and at P and R. The cuts will be placed symmetrically along the diagonals.

∴ The resultant figure is

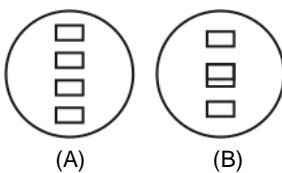


Choice (B)

4. PROBLEM FIGURES

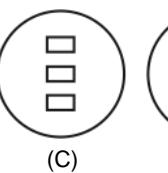


ANSWER FIGURES



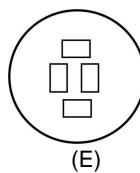
(A)

(B)



(C)

(D)



(E)

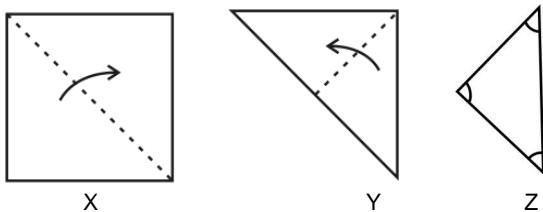
Sol: In the figure X, the upper half was folded onto the lower half to become Y. In Y the folded sheet was punched. Now, if Y is unfolded then the cuts will be symmetrical to the horizontal diameter.

∴ The resultant figure is

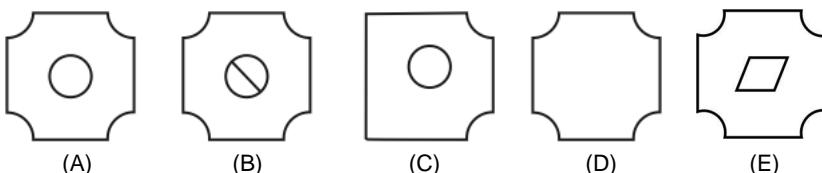


Choice (C)

5. PROBLEM FIGURES



ANSWER FIGURES



(A)

(B)

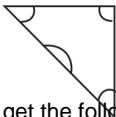
(C)

(D)

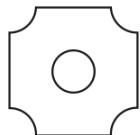
(E)

Sol: In figure X, the lower triangle was folded over the upper half. In figure Y, the paper is to be folded to form a triangle. In figure Z, a sector has been punched at all the vertices of the triangle. Now, if 'Z' is unfolded.

Then it becomes



Again, if it is unfolded, we get the following resultant figure.

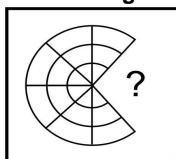


Choice (A)

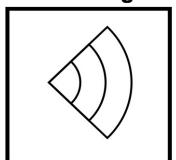
Figure Completion : In figure completion questions an incomplete pattern is given as question figure. The candidate is to identify the, from the given answer figures, the part which when placed in the empty space of the question figure completes it and forms a symmetric pattern. The following is an illustration of the figure completion question.

Directions for question 6: Which answer figure will complete the question figure?

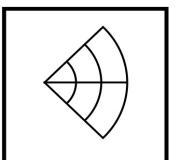
6. **Question figure:**



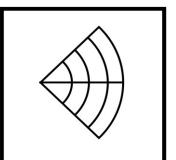
Answer figures:



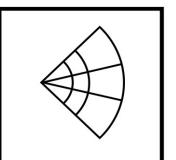
(A)



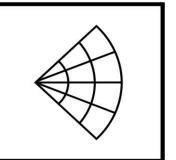
(B)



(C)



(D)



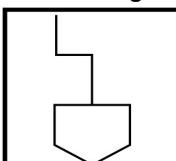
(E)

Sol. By observation we can say that two sectors are missing in the question figure. Hence none among (A), (D) and (E) can be the answer. Each sector should have three internal arcs and one external arc. Hence, (B) will complete the question figure.
Choice (B)

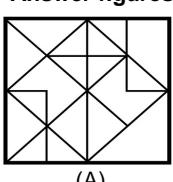
Embedded Figure: Embedded figure questions test the candidates ability to look for details. A keen observation is needed to answer these questions. We come across two types of questions in this category. A figure is given as question figure. The candidate is to identify, from the answer figures, in which the question figure is embedded. In the second type is, the candidate is to identify which of the answer figures is embedded in the question figure. Let us understand the two kinds of questions from the following examples.

Directions for question 7: From the given answer figures select the one in which the question figure is hidden/embedded.

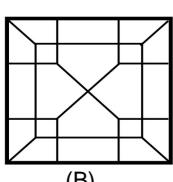
2. **Question figure:**



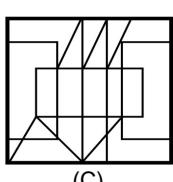
Answer figures:



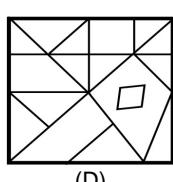
(A)



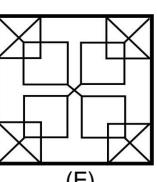
(B)



(C)

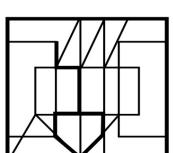


(D)



(E)

Sol.

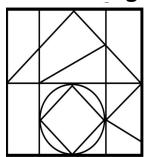


The question figure contains an inverted pentagon, with a line drawn perpendicular to its base. This cannot be found in any of the answer figure (A), (B), (D) and (E). Only (C) has the required figure.

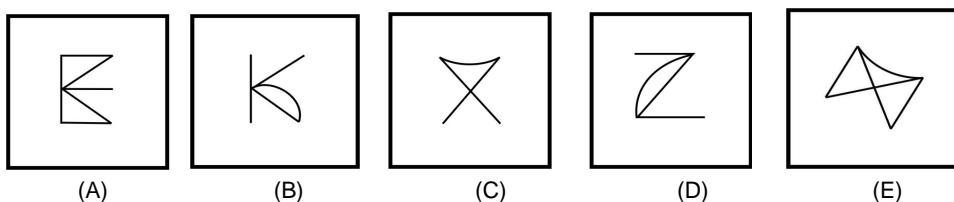
Choice (C)

Directions for question 8: From the given answer figures, select the one which is hidden embedded in question figure.

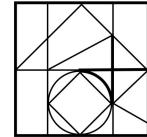
8. **Question figure:**



Answer figures:



Sol. Choice (A) has two slanted lines and one horizontal line converging at one point but the question figure does not have such lines. Hence, (A) cannot be the answer. (B) cannot be the answer because one of the two intersecting slant lines has a curve on it. Choice (D) cannot be the answer as the shape 'z' is not available in the question figure. Though two cross line with a curve can be found in the question figure, but it does not have two perpendicular lines as given in choice (E). Hence, the answer figure (C) is embedded in the question figure.

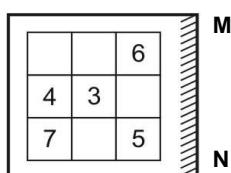


Choice (C)

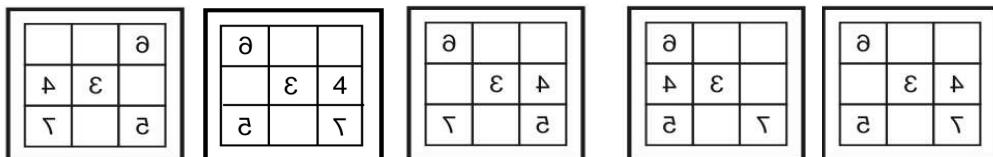
Images: In these questions, the question figure contains a picture and a line drawn to indicate the position of a mirror. The candidate is to identify, from the answer figures, how the reflection of the question figure appears. The position of the mirror could be placed vertically on the right side or the left side of the question figure or at the bottom or the top of the question figure. The candidate should choose the answer choice carefully depending on the position of the mirror. Let us look at the following examples.

Directions for questions 9 and 10: If a mirror is placed on the line MN, in the question figure, then which of the answer figures is the right image of the given figure.

9. Question figure:



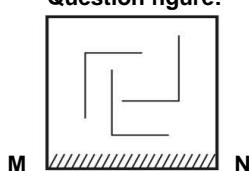
Answer figures:



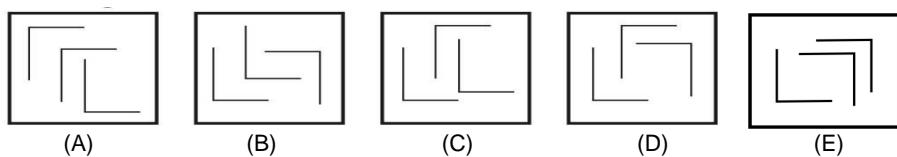
Sol. Each digit should be laterally inverted the digits nearer to the reflecting surface should appear nearer in the image and digits which are away, should appear away from the reflecting surface. In (A) each digit is laterally inverted but positions are not proper. In (B) digit 4 is not inverted. In (C) the positions are improper. In (D) also the positions are improper. Choice (E) is the correct image of the given figure.

Choice (E)

10. Question figure:



Answer figures:



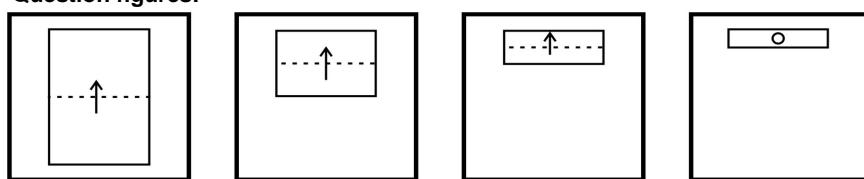
Sol. The answer figure should be vertically inverted. None of the answer choice (A), (B), (C) and (E) is a correct vertical inversion. Choice (D) is the correct image of the given figure.

Choice (D)

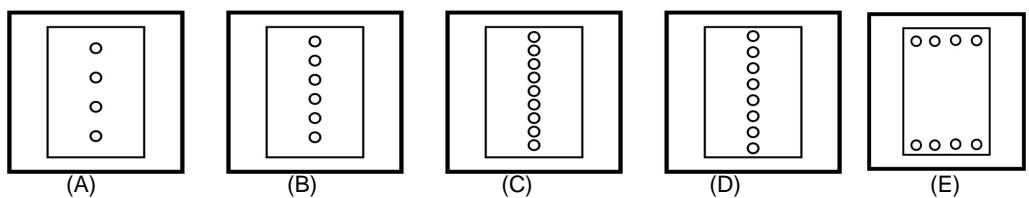
Exercise – 13 (b)

Directions for questions 1 to 13: A piece of paper is folded and cut/punched as shown below in the question figures. From the given answer figures indicate how it will appear when opened.

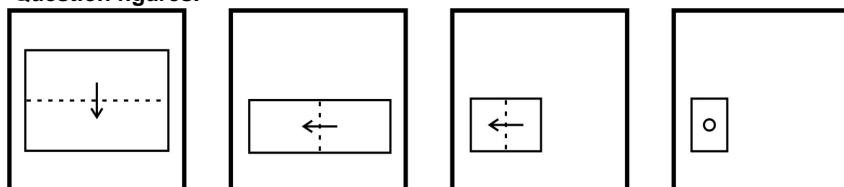
1. Question figures:



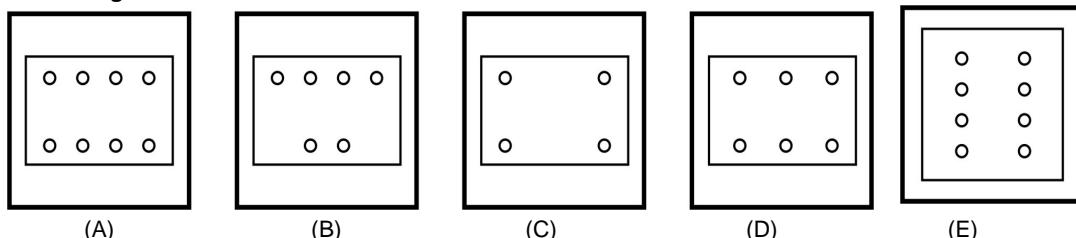
Answer figures:



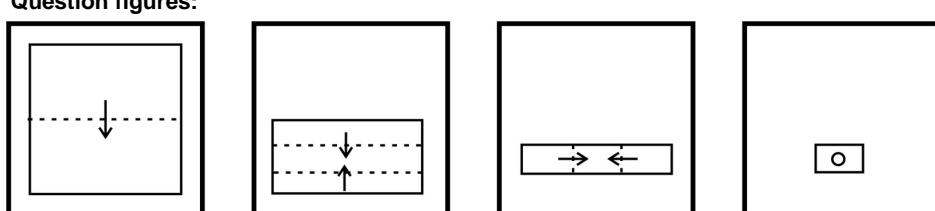
2. Question figures:



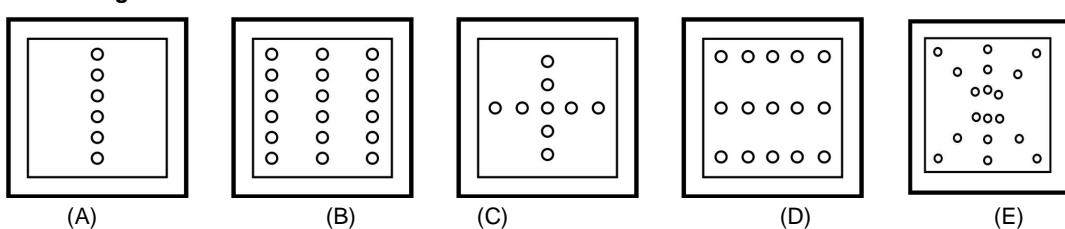
Answer figures:



3. Question figures:

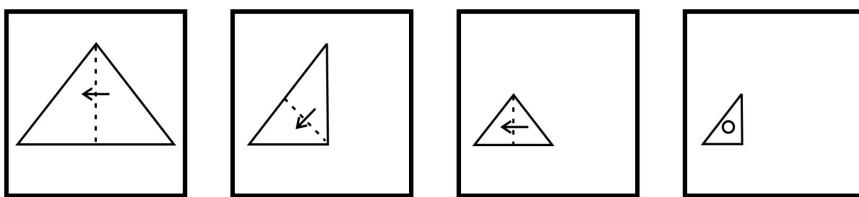


Answer figures:

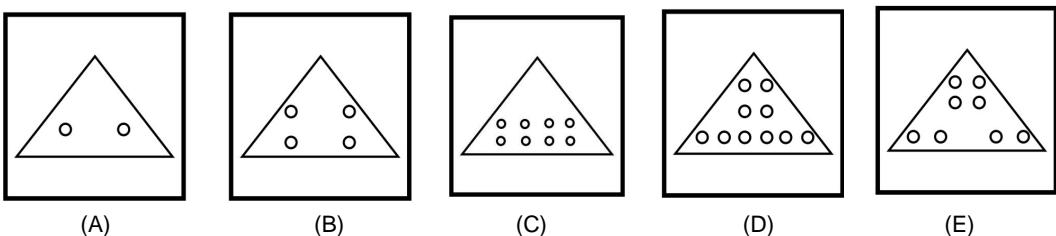


4.

Question figures:

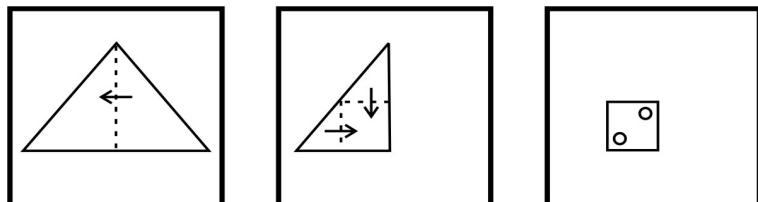


Answer figures:

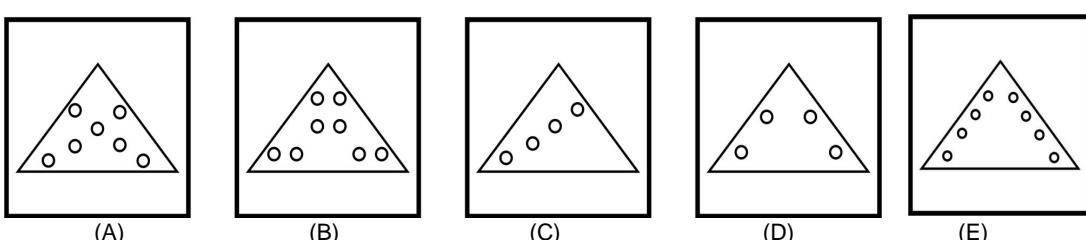


5.

Question figures:

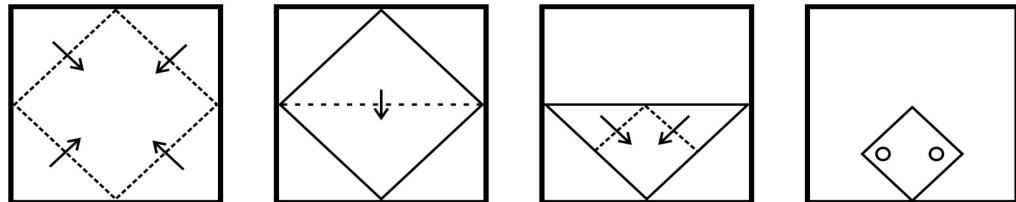


Answer figures:

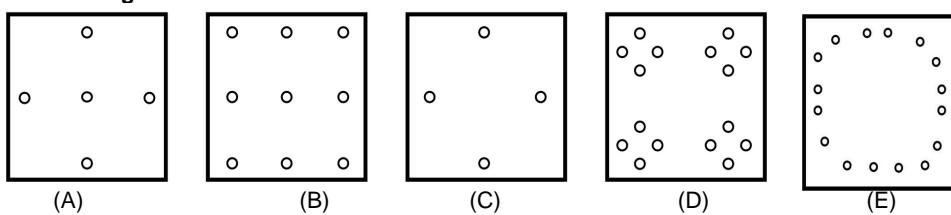


6.

Question figures:

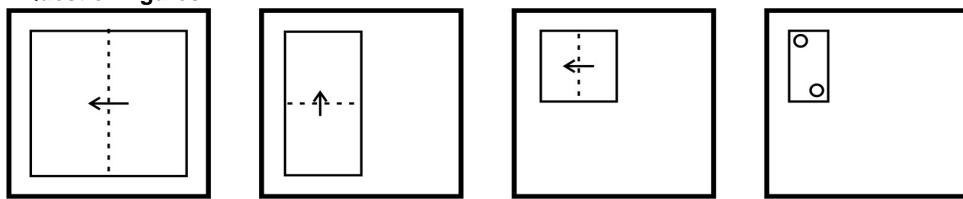


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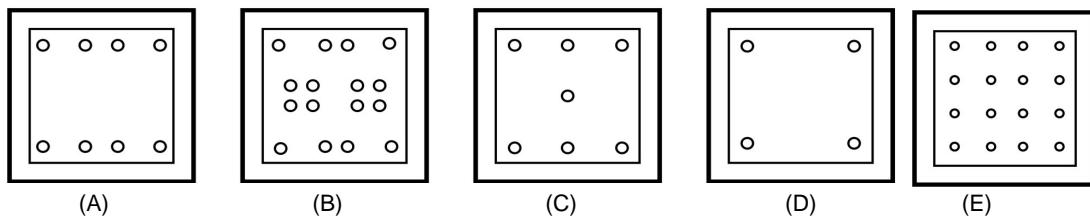


7.

Question figures:

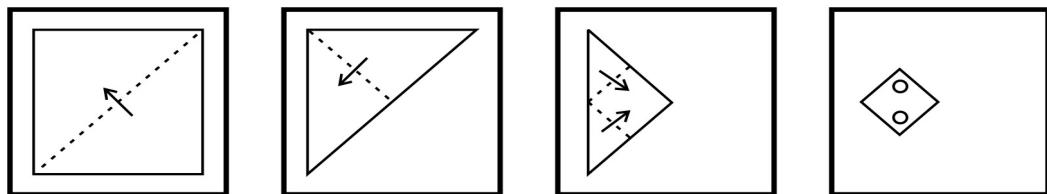


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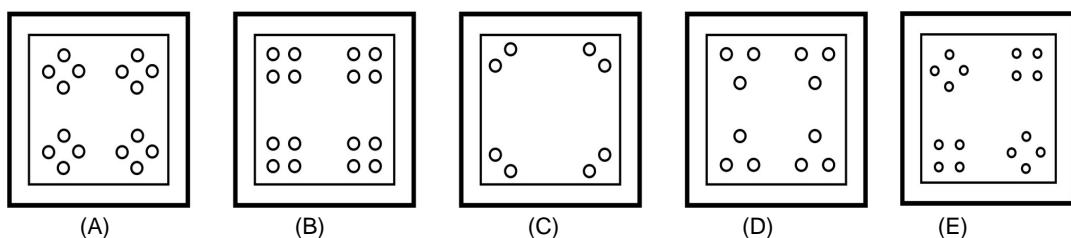


8.

Question figures:

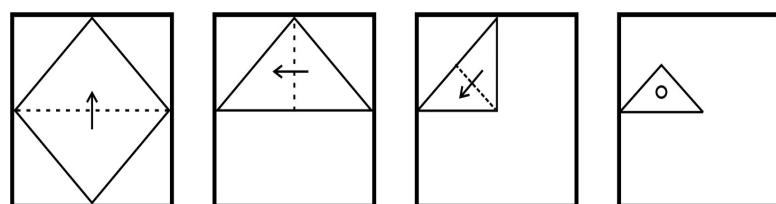


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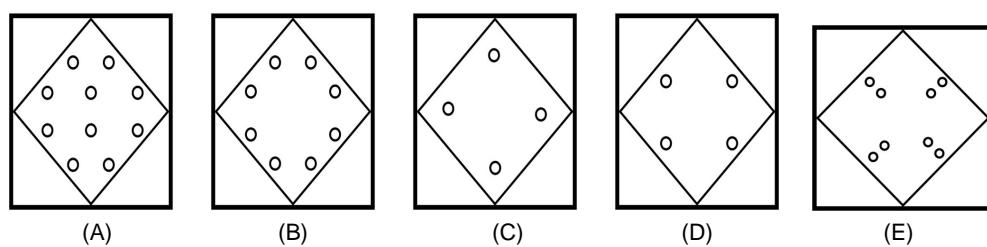


9.

Question figures:

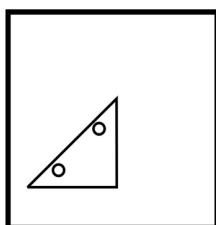
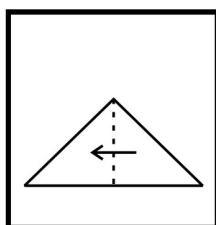
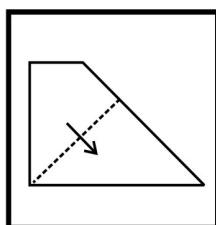
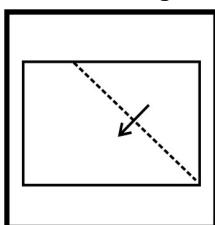


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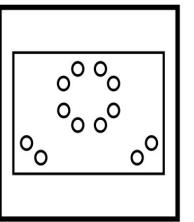
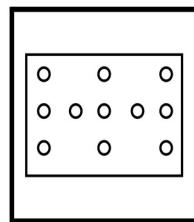
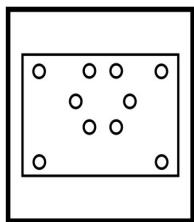
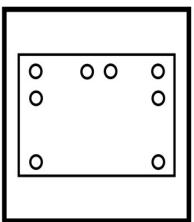
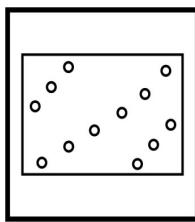


10.

Question figures:



Answer figures:



(A)

(B)

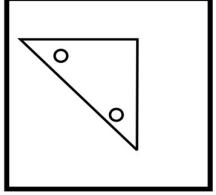
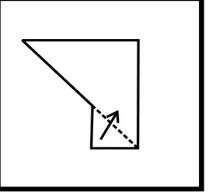
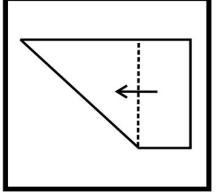
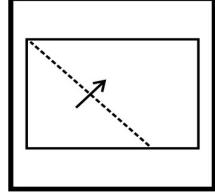
(C)

(D)

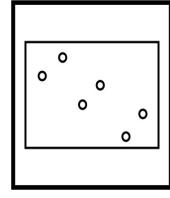
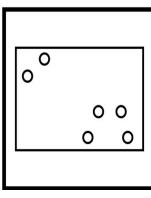
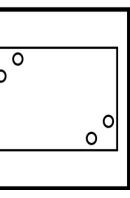
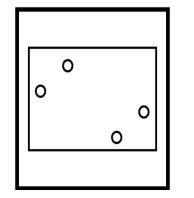
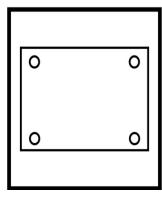
(E)

11.

Question figures:



Answer figures:



(A)

(B)

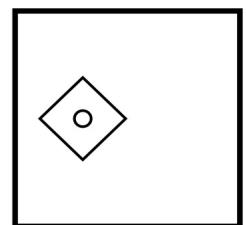
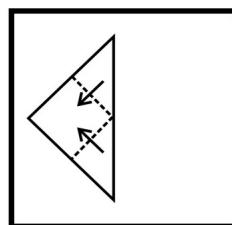
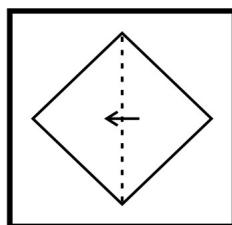
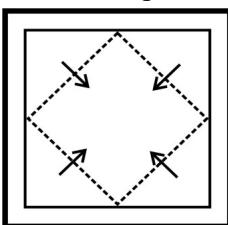
(C)

(D)

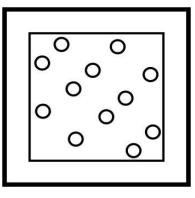
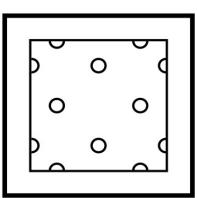
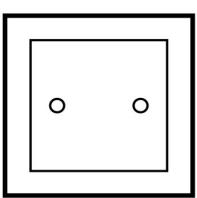
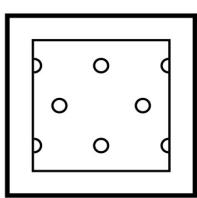
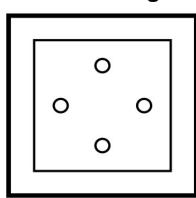
(E)

12.

Question figures:



Answer figures:



(A)

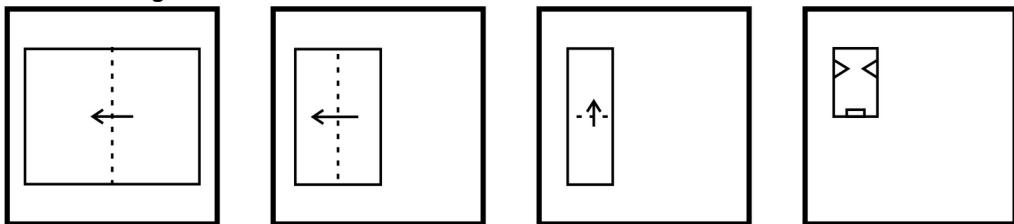
(B)

(C)

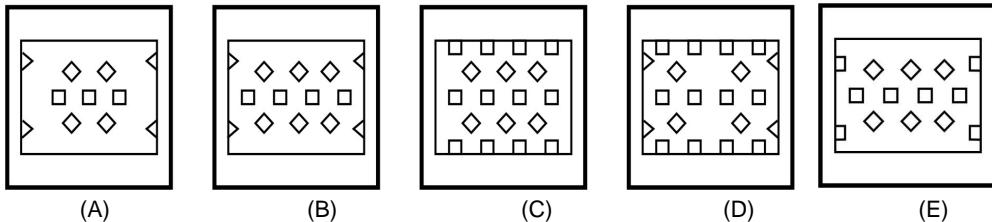
(D)

(E)

13. **Question figures:**

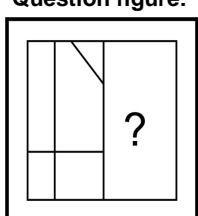


Answer figures:

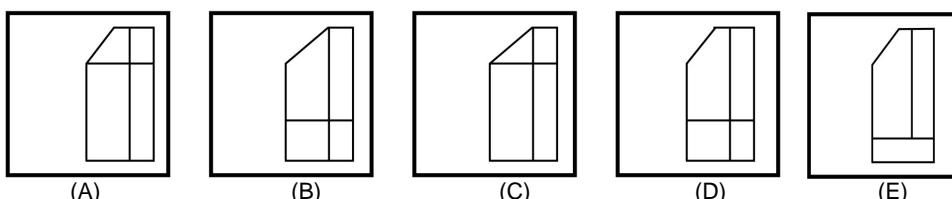


Directions for questions 14 to 25: Which answer figure will complete the question figure?

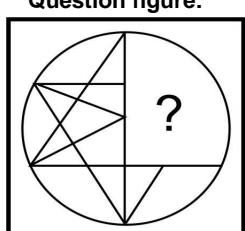
14. **Question figure:**



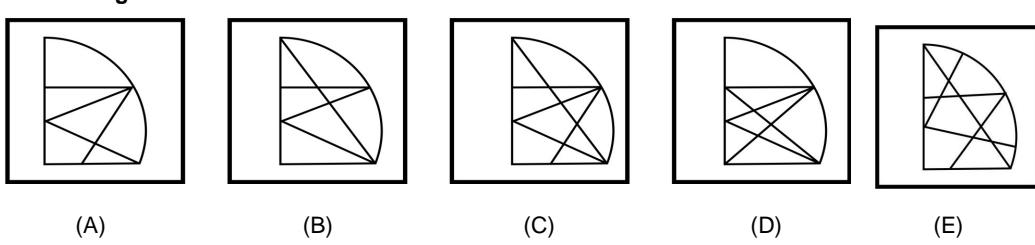
Answer figures:



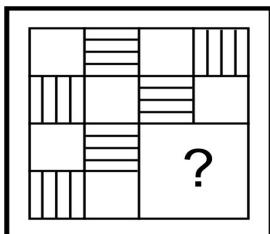
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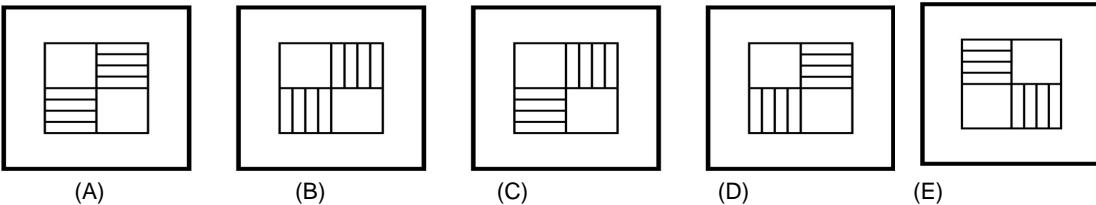
Answer figures:



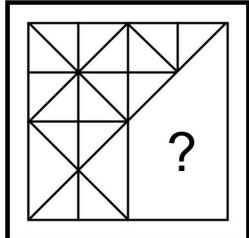
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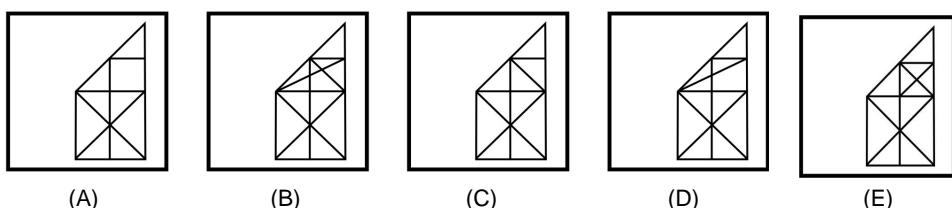
Answer figures:



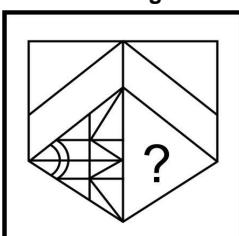
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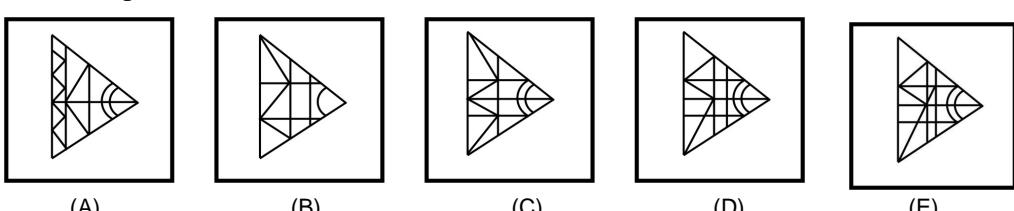
Answer figures:



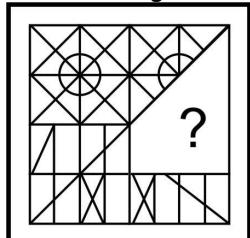
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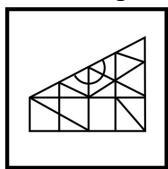
Answer figures:



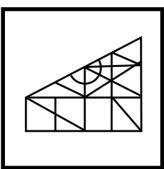
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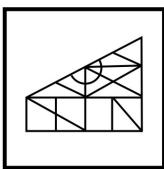
Answer figures:



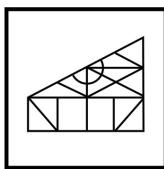
(A)



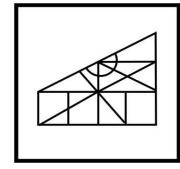
(B)



(C)

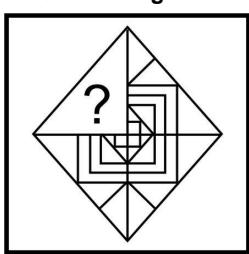


(D)

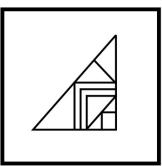


(E)

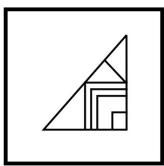
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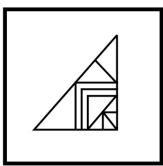
Answer figures:



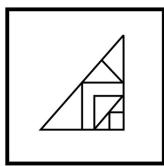
(A)



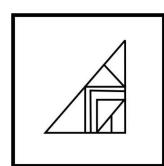
(B)



(C)

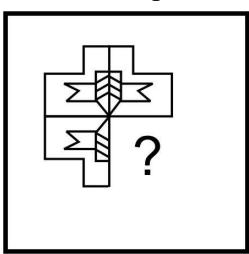


(D)

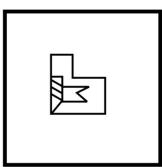


(E)

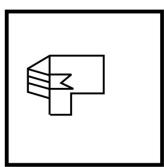
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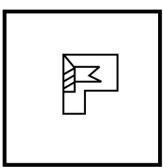
Answer figures:



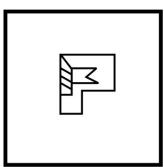
(A)



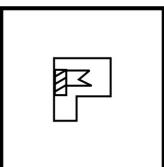
(B)



(C)

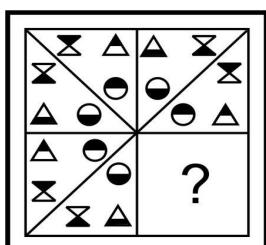


(D)

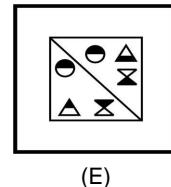
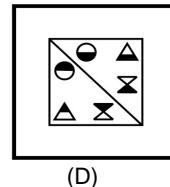
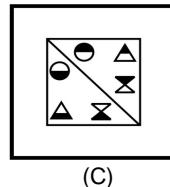
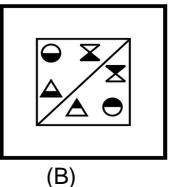
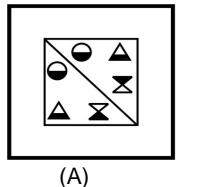


(E)

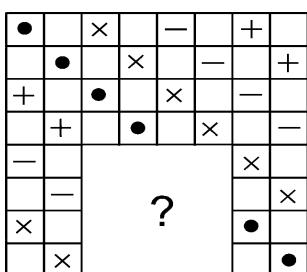
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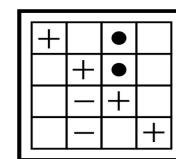
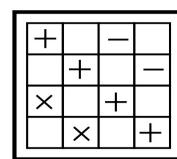
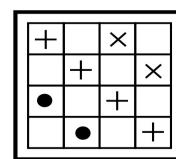
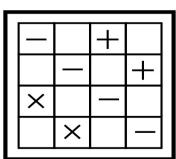
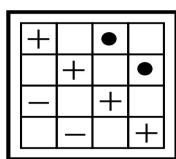
Answer figures:



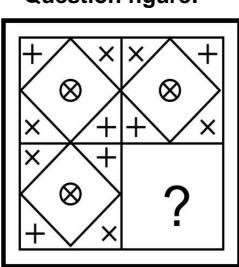
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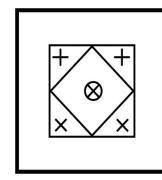
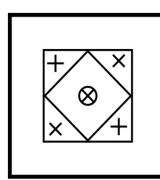
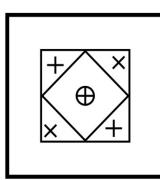
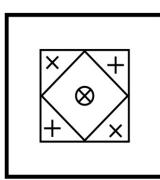
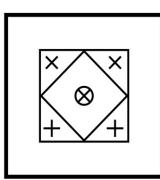
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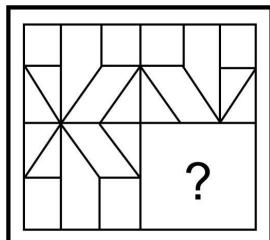
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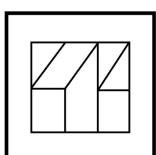
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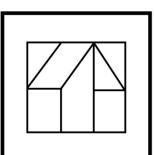
25. Question figure:



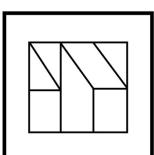
Answer figures:



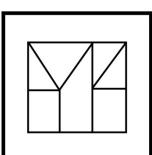
(A)



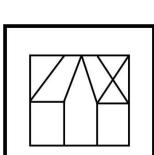
(B)



(C)



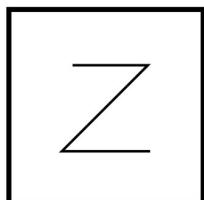
(D)



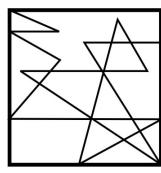
(E)

Directions for questions 26 to 30: From the given answer figures select the one in which the question figure is hidden/embedded.

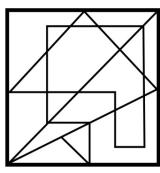
26. Question figure:



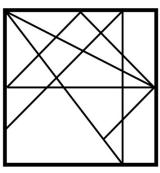
Answer figures:



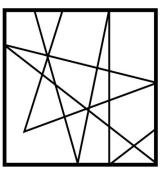
(A)



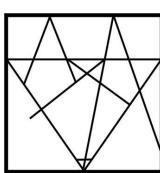
(B)



(C)

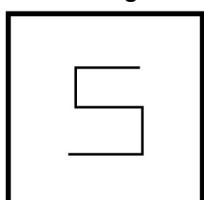


(D)

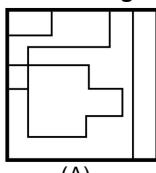


(E)

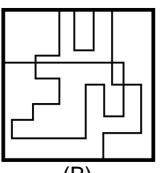
27. Question figure:



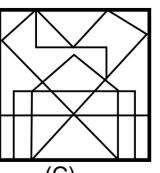
Answer figures:



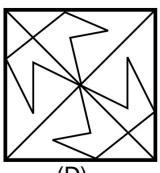
(A)



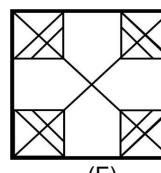
(B)



(C)



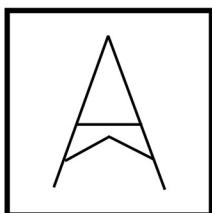
(D)



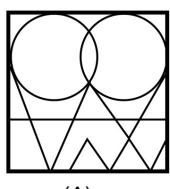
(E)

28.

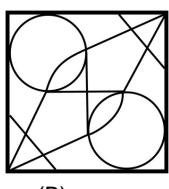
Question figure:



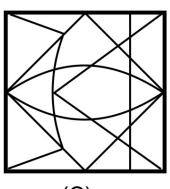
Answer figures:



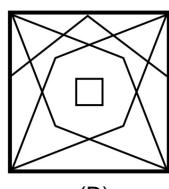
(A)



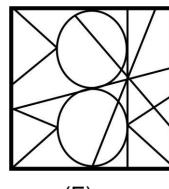
(B)



(C)



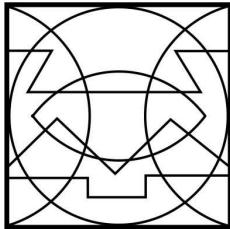
(D)



(E)

29.

Question figure:



Answer figures:



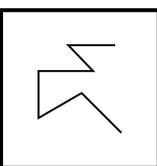
(A)



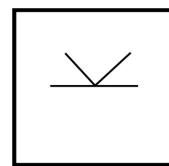
(B)



(C)



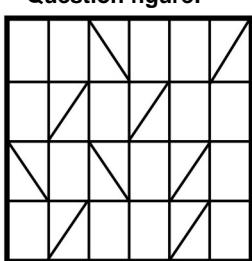
(D)



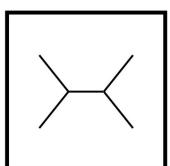
(E)

30.

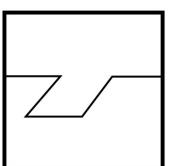
Question figure:



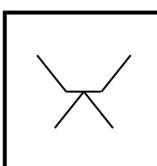
Answer figures:



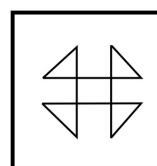
(A)



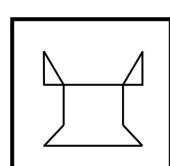
(B)



(C)



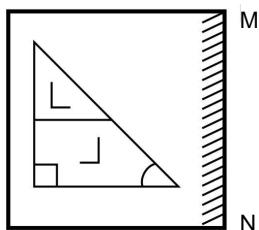
(D)



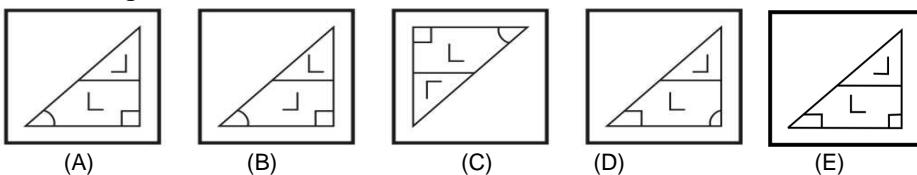
(E)

Directions for questions 31 to 35: If a mirror is placed on the line MN, in the question figure, then which of the answer figures is the right image of the given figure.

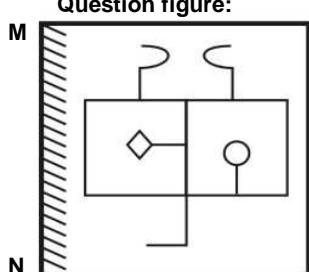
31. **Question figure:**



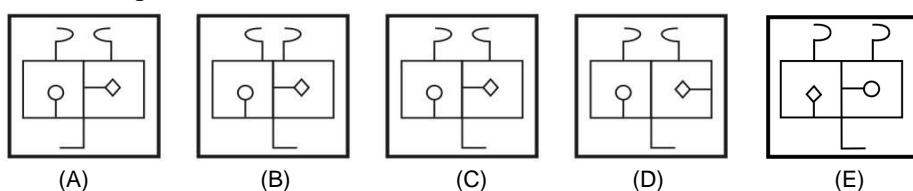
Answer figures:



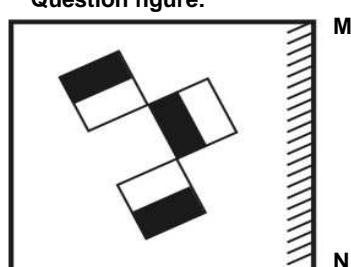
32. **Question figure:**



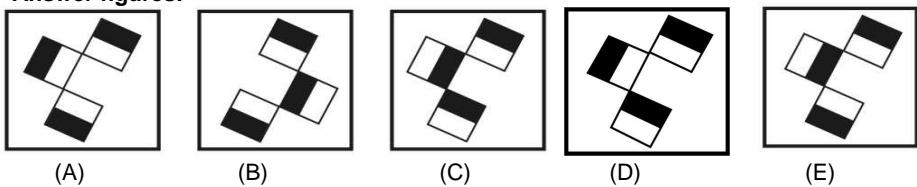
Answer figures:



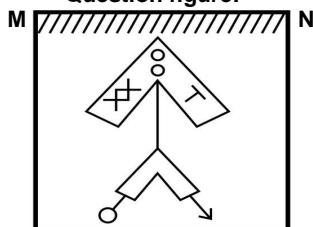
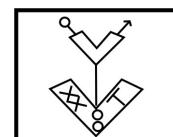
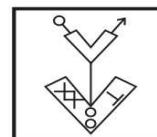
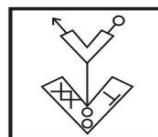
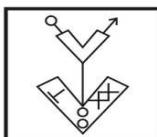
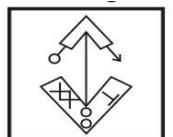
33. **Question figure:**



Answer figures:

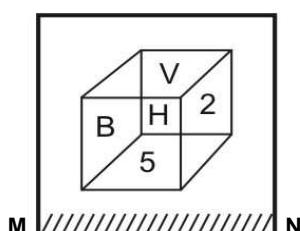
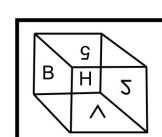
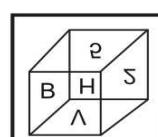
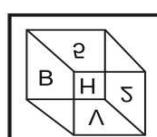
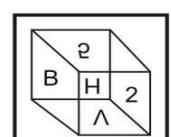


34.

Question figure:**Answer figures:**

(A) (B) (C) (D) (E)

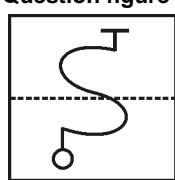
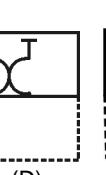
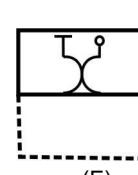
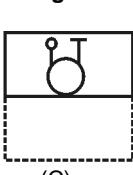
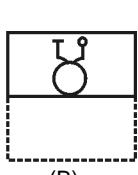
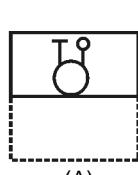
35.

Question figure:**Answer figures:**

(A) (B) (C) (D) (E)

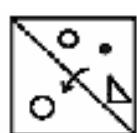
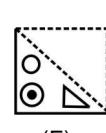
Directions for questions 36 to 40: In the following question a square transparent sheet with a pattern is given. Figure out from amongst the four alternatives as to how the pattern would appear when the transparent sheet is folded along the dotted line as shown by the arrow.

36.

Question figure**Answer figures**

(A) (B) (C) (D) (E)

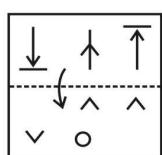
37.

Question Figure**Answer Figures**

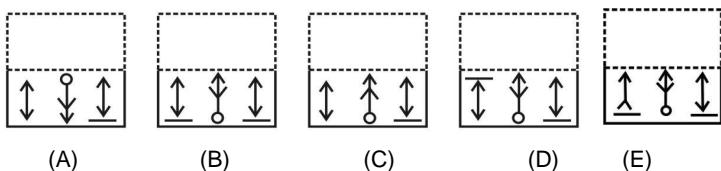
(A) (B) (C) (D) (E)

38.

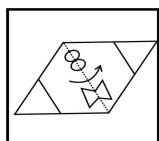
Question figure



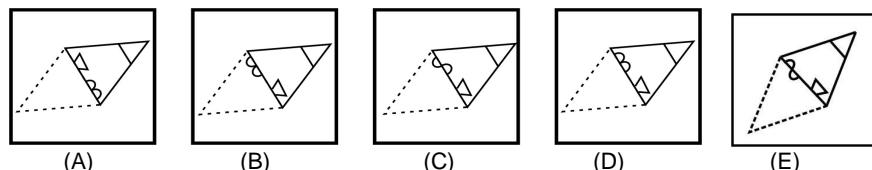
Answer figures



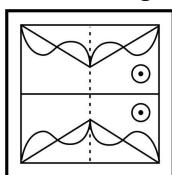
39. **Question Figure**



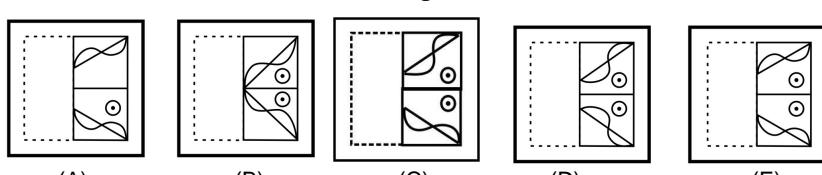
Answer Figures



40. **Question Figure**



Answer Figures



Key

Exercise – 13(a)

- | | | | | |
|------|-------|-------|-------|-------|
| 1. D | 9. D | 17. C | 25. D | 33. A |
| 2. E | 10. D | 18. C | 26. C | 34. A |
| 3. E | 11. B | 19. B | 27. E | 35. B |
| 4. C | 12. E | 20. A | 28. A | 36. D |
| 5. B | 13. E | 21. A | 29. D | 37. A |
| 6. E | 14. C | 22. C | 30. C | 38. C |
| 7. D | 15. E | 23. B | 31. B | 39. B |
| 8. D | 16. A | 24. D | 32. E | 40. C |

Exercise – 13(b)

- | | | | | |
|------|-------|-------|-------|-------|
| 1. D | 9. B | 17. C | 25. B | 33. E |
| 2. A | 10. E | 18. C | 26. B | 34. D |
| 3. B | 11. D | 19. C | 27. B | 35. B |
| 4. E | 12. D | 20. A | 28. D | 36. C |
| 5. B | 13. B | 21. C | 29. C | 37. C |
| 6. D | 14. D | 22. D | 30. B | 38. D |
| 7. B | 15. C | 23. A | 31. A | 39. D |
| 8. A | 16. E | 24. D | 32. C | 40. E |