

SERIES

Contents

2.4 SERIES

An Analysis

The one way of solving problem based on series is being able to identify the rule of sequence, i.e., the rule on the basis of which the series progresses. In this type of questions, there are two sets of figures. One set is called 'Problem Figures' while the other as 'Answer Figures'. Problem figures are first and five in number while answer figures are after and are also five in number. The five problem figures make a series. That means they change from left to right in specific order

In the most elementary cases, series can be classified in the following categories:

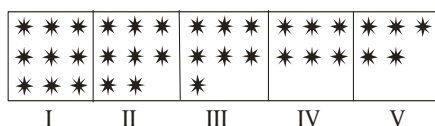
- A. Based on number of elements.
- B. Based on rotation of elements.
- C. Based on shift of elements.
- D. Based on shape and size of elements.
- E. Based on appearance and disappearance of elements.
- F. Mixed series.
 - a) Number of elements + Shift of elements.
 - b) Shift of elements + rotation of elements.
 - c) Rotation + Number of elements.

A. Based on Number of Elements

A series may be based on change on the number of its components/elements. The numbers may be increasing or decreasing in order or both. The following examples illustrate how the number of components becomes an important consideration in series problems.

In each of the subsequent figure the number of designs may either be increasing or decreasing.

(i)



Here from I to II the number of designs is changing from 9 to 8.

From II to III the number of designs is changing from 8 to 7.

From III to IV the number of designs is changing from 7 to 6.

From IV to V the number of designs is changing from 6 to 5.

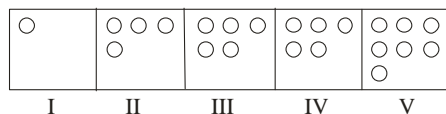
Thus in each subsequent figure the number of designs is decreasing by one.

Hence in VI the number of designs will be 4.

Therefore answer is



(ii)



In this series

From I to II the number of designs is increasing by 1.

From II to III the number of designs is increasing by 2.

From III to IV the number of designs is increasing by 1.

From IV to V the number of designs is increasing by 2.

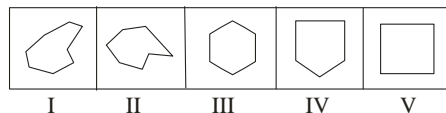
∴ From V to next figure the number of designs will increase by 1.

Hence answer is



Increase or decrease in the number of lines of the designs —

(iii)



In this series

From I to II the number of lines of the design is changing from 8 to 7.

From II to III the number of lines of the design is changing from 7 to 6.

From III to IV the number of lines of the design is changing from 6 to 5.

From IV to V the number of lines of the design is changing from 5 to 4.

Thus in each subsequent figure the number of line of the design is decreasing by 1.

Hence the number of lines of the design in VI will be 3.

Therefore answer is

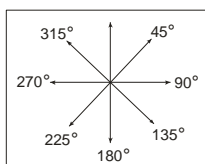


B. Based on Rotation of Elements

The rotation of figures or the components (elements) of figures is an important consideration while making a series. The components may be rotating according to definite pattern and thereby creating a new sequence. The candidates should have the ability to keenly observe and detect the pattern of rotation.

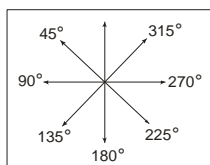
Clockwise Direction

Angle in the rotation on the basis of clockwise direction is as shown below:

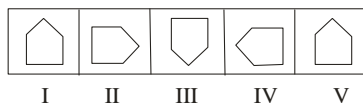


Anticlockwise Direction

Angle in the rotation on the basis of anticlockwise direction is as shown below:



Rotation of figures clockwise –



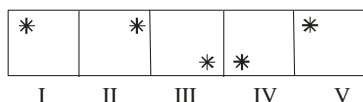
In this series each figure is rotating through 90° clockwise from one to next in each subsequent figure.

Hence the next (VI) figure is



C. Based on shift of elements

In many questions on series, the positions of various elements vary according to a definite pattern. When an element changes its position, it is said to have 'shifted'. This 'shift' of the elements is also the criterion for determining the next figure of the series.



Here in each subsequent figure the design is shifting one side clockwise.

Hence the next (VI) figure is

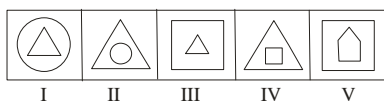


D. Shape and Size of elements

The series may be based on increasing or decreasing size of the elements. The following example illustrates how the changing size helps to decide the answer of problems based on series.

The shape of components or figure may change on a definite pattern to form a series.

(i)

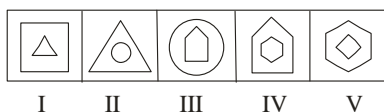


In this series from I to II the inner small design is coming out after enlarging while the outer large design is going inside after reducing. Similarly from III to IV the small design is coming out after enlarging while the outer large design is going inside after reducing. The same order of change will be from V to VI.

Therefore answer is



(ii)



In this series from I to II the inner design is enlarging and inside it another small new design takes place. The same order of change goes on.

Therefore answer is



(iii)



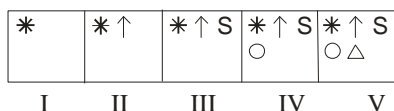
In this series from I to II the design is enlarged. From III to IV the design is also enlarged. Hence from V to VI the design will also be enlarged.

Therefore answer is



E. Based on Appearance and Disappearance of Elements

In a series new elements may be being added on a definite pattern or at definite places. Or, the existing elements may be disappearing on a definite pattern or at definite places. These should be taken into account while solving the problems.



Here the designs are increasing according the a, b, c, d, e, f, g, h, i, in the figure



so the new design will take place at 'f'.

Hence answer figure is



F. Mixed Series

We have seen that the three most common bases of forming a series of figures are: number of components, shift of components and rotation of components. We have also seen that other considerations are also made, although they are not as common, while forming a series. But usually, a series of figures does not have only one of these features. It may be made of several components where one may be increasing in number, the other may be shifting to new positions, and another may be rotating in some direction while yet another may be changing in size. Thus a series may have mixed features. This gives rise to the concept of mixed series which is the most common way of forming a series.

a. Number of elements + Shift of elements

The number of elements may be increasing or decreasing and their positions may be shifting simultaneously to form a series.

b. Shift of elements + rotation of elements

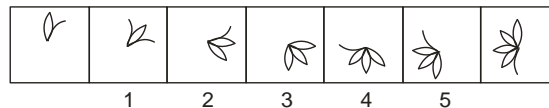
In some of the series problems we see that the elements simultaneously shift their position and get rotated in a definite pattern. We can solve the problem by carefully observing their shift and rotation.

c. Rotation + Number of elements

In some of the series problems we observe the elements got rotated and the number of elements changes (increases or decreases) simultaneously. So while solving such problems both the rotation and number considerations are taken into account.

Example:

Following series consists of seven figures, two of which at the ends are unnumbered. One of the five numbered figures doesn't fit into the series. Find out the figure.

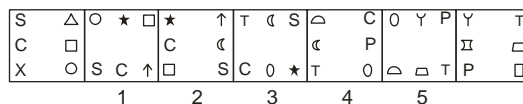


Answer:

5
In each step the whole figure rotates by 45° clockwise while one arc is added alternately on anti-clockwise and clockwise ends.

Example:

Following series consists of seven figures, two of which at the ends are unnumbered. One of the five numbered figures doesn't fit into the series. Find out the figure.



Answer:

3
The elements of a particular row (or column) shifts one side anti-clockwise while one of them is replaced in turn in subsequent steps. The two anti-clockwise elements of the other row/column shift half a side anti-clockwise while the last one shifts two sides and the anti-clockwise-end element is replaced in each step.

Some Important Rules to Solve the Problems in Series

Rule (1): If in the series first problem figure is same to fifth problem figure then answer figure will be same to second problem figure.

Rule (2): In the series if $IV = V$ then $III =$ answer figure.

Rule (3): In the series if $I = IV = VI$ (answer figure)

Rule (4): In the series if $I = II$ and $III = IV$ then $V =$ answer figure or $I: II:: III: IV$ then $V: VI$.

Rule (5): In the series if $I = IV$ and $II = V$ then answer figure = III .

Rule (6): In the series if $IV =$ inverse of I and $III =$ inverse of II the answer figure = inverse of III .

Rule (7): In the series if $III = V$ then answer figure = II .

Rule (8): In the series if I, II, III, IV and V all are different from one another and appear indefinite, then answer figure will also be different from these.

Rule (9): In the series if letter of English alphabet are used as figures then the lines used in the letter are considered.