15

Non-Verbal Intelligence

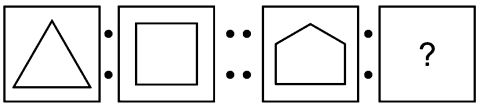
- Non-Verbal Intelligence is the ability to understand, analyse and solve problems using visual reasoning. It includes recognising visual sequences, identifying relationships, similarities and differences between shapes and patterns etc. In this chapter, we will discuss following topics

Analogy

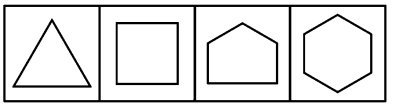
- Analogy refers to correspondence or similarity in relationship. When a figure exhibits some kind of relationship with another figure on some basis, then the two figures are said to be analogous to each other.
- In the questions based on analogy, two sets of figures namely problem figures and answer figures are given. The set of problem figures consists of two parts.
- The first part comprises of two figures, which have some relationship between them on the basis of a certain rule.
- The second part comprises of one figure and a sign of '?'. You are asked to select one figure from the set of answer figures to replace '?' but maintaining similar relationship as depicted between the first two figures.

Example 1 Find the figure from the answer figures that will replace the question mark (?) from the problem figures.

Problem Figures



Answer Figures

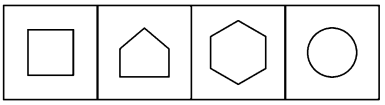


Sol. (*d*) By the analysis of first part of the problem figure, we find that the first figure has three lines which become four in the second figure i.e. from first to second figure one line is added. In the same manner, third figure has five lines which will transform into a six line figure in the fourth figure as shown in option (d).

Classification

- Classification is the process of putting things or objects into a group and then finding the different object or thing that does not belong to the group.
- In this topic, we deal with questions which have a set of four figures, out of which all except one are alike or have some common nature/characteristics. You will have to select the exclusively different figure from the given set.

Example 2 Choose the figure which is different from others.



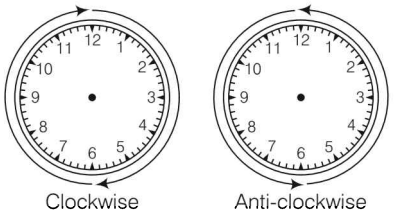
Sol. (*d*) All the figures, except figure (d) are made up of straight lines. But figure (d) is made from curved line, thus, it is different.

Series

- Series is a continuous sequence of figures following a certain defined pattern.
- This topic deals with questions which are based upon the continuation of series. In this type of questions, a series of figures is given as problem figure and the candidates are asked to select one of the figures from the set of answer figures which will continue the given sequence.
- To solve questions on series a candidate must have a clear vision of the concept like rotation, angles, steps of movement, etc. which are discussed below.

Rotational Direction

- The rotational direction basically states the clockwise and anti-clockwise directions.

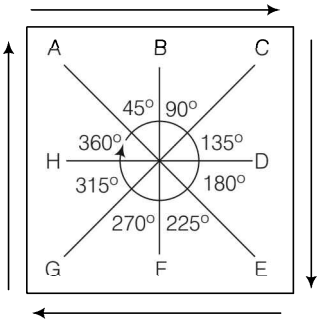


- **Clockwise Movement** When an object rotates in the direction of the hands of a clock, then this movement is called clockwise movement.
- **Anti-clockwise Movement** When an object rotates in the opposite direction of the hands of a clock, then this movement is known as anti-clockwise movement.

Angular Movement of Designs

This provides the knowledge of angular movement of designs in clockwise and anti-clockwise directions.

Clockwise Movement



$A \rightarrow B = 45°$ $A \rightarrow C = 90°$

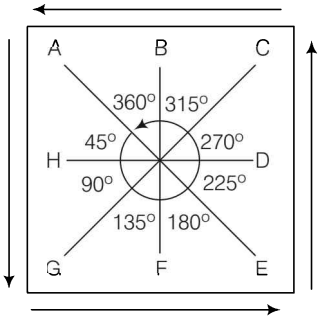
$A \rightarrow D = 135°$ $A \rightarrow E = 180°$

$A \rightarrow F = 225°$ $A \rightarrow G = 270°$

$A \rightarrow H = 315°$ $A \rightarrow A = 360°$

- When an object moves from A to B then, we can say that, it moves 45° in clockwise direction. Similarly, the object moves 90° in clockwise direction from A to C and so on.

Anti-Clockwise Movement



$A \rightarrow H = 45°$ $A \rightarrow G = 90°$

$A \rightarrow F = 135°$ $A \rightarrow E = 180°$

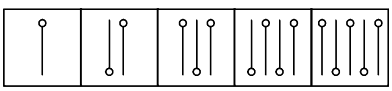
$A \rightarrow D = 225°$ $A \rightarrow C = 270°$

$A \rightarrow B = 315°$ $A \rightarrow A = 360°$

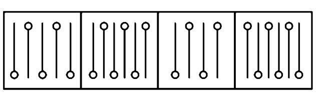
- When an object moves from A to H then, we can say that, it moves 45° in anti-clockwise direction. Similarly, the object moves 90° in anti-clockwise direction from A to G and so on.

Example 3 Select the correct answer figure which will continue the series as established by the problem figures.

Problem Figures



Answer Figures

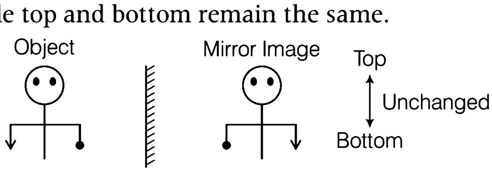


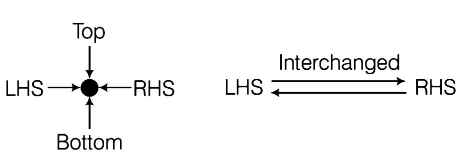
(a) (b) (c) (d)

Sol. (*b*) In each step a pin is added on the left hand side of existing pin/pins. The head of the pin is in a direction opposite to adjacent pin.

Mirror Image

- Mirror Image is the image or the reflection of an object into a mirror when that object is placed near it.
- In case of standard form of mirror image i.e. when the mirror is placed vertically, the object gets laterally inverted. In other words, the **Left Hand Side** (LHS) and **Right Hand Side** (RHS) of an object interchange their places while top and bottom remain the same.
- e.g.





- Mirror Image based on Lateral Inversion are given below

Mirror Images of Capital Letters

Real Image	A	B	C	D	E	F	G	H	I	J	K	L	M
Mirror Image	A	ᗺ	Ɔ	ᗡ	Ǝ	ꟻ	Ꭾ	H	I	Ⴑ	ꓘ	⅃	M
Real Image	N	O	P	Q	R	S	T	U	V	W	X	Y	Z
Mirror Image	И	O	ꟼ	Ϙ	Я	Ƨ	T	U	V	W	X	Y	Ƹ

- The letters which have the same mirror images are — A, H, I, M, O, T, U, V, W, X and Y.

Mirror Images of Small Letters

Real Image	a	b	c	d	e	f	g	h	i	j	k	l	m
Mirror Image	ɒ	d	ɔ	b	ɘ	ʇ	ǫ	ʜ	i	ɟ	ʞ	l	m
Real Image	n	o	p	q	t	s	t	u	v	w	x	y	z
Mirror Image	n	o	q	p	ɟ	ƨ	ɟ	u	v	w	x	ʏ	ƹ

- The letters which have the same mirror images are — i, I, o, v, w and x.

Mirror Images of Numbers

Real Image	1	2	3	4	5	6	7	8	9	0
Mirror Image	Ɩ	S	Ƹ	ᔨ	ꙅ	∂	٢	8	ɘ	0

- Numbers 0 and 8 have the same mirror image.

Directions (Ex. Nos. 4-6) *Select the alternative which exactly matches with the mirror image of the world/number/figure in the questions.*

Example 4 FUN

(a) ИUF (b) ƎՈN
(c) ИUꟻ (d) NUꟻ

Sol. (*c*) If we put a mirror in front of the word, we will get the following image like

FUN ⦚ ИUꟻ

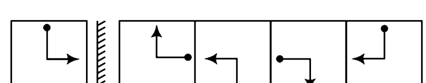
Example 5 2 3 4 5

(a) ꙅᔨƸS (b) ꙅᔨƸS (c) ꙅᔨƸS (d) ꙅƸᔨS

Sol. (c) If we put a mirror in front of the number, we will get the image like

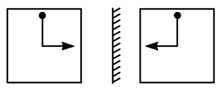
2 3 4 5 ⦚ ꙅ ᔨ Ƹ S

Example 6



(A) (a) (b) (c) (d)

Sol. (*d*) Here, mirror is taken vertically to right side. Hence, mirror image of figure (A) will be like

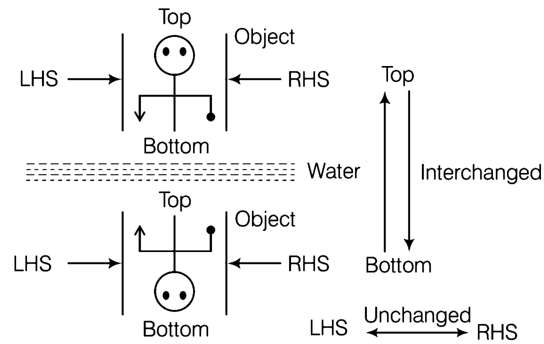


Object   Mirror image

Water Image

- Water Image is the reflection of an object into water. It is the vertically inverted image obtained by turning the object upside down.
- In questions based on water image, the candidate is required to determine how the image of object would look like in water when it is placed near a water source.
- Mostly the water image of a figure is different from the original figure which is because of the dissimilarity in the upper and lower half of the figure. This can be better understood with the help of example illustrated below

e.g.



- From the above example, it is clear that in the water image, (LHS) and (RHS) remain unchanged while upper and lower parts get interchanged, means top becomes bottom and bottom becomes top.

Water Images of Capital Letters

Real Image	A	B	C	D	E	F	G	H	I	J	K	L	M
Water Image	∀	B	C	D	E	Ꞁ	ᘓ	H	I	ᒣ	K	Γ	W
Real Image	N	O	P	Q	R	S	T	U	V	W	X	Y	Z
Water Image	И	O	Ь	Ό	ʁ	Ƨ	⊥	∩	Λ	M	X	⅄	Ƶ

The letters which have the same water images are — C, D, E, H, I, O and X.

Water Images of Small Letters

Real Image	a	b	c	d	e	f	g	h	i	j	k	l	m
Water Image	ɐ	d	ɔ	ꟼ	ɞ	ƚ	ɑ	ɥ	!	ꞁ	ʞ	l	ɯ
Real Image	n	o	p	q	r	s	t	u	v	w	x	y	z
Water Image	u	o	b	d	ɩ	ƨ	ʈ	∩	ʌ	ʍ	x	λ	ƶ

The letters which have the same water images are — c, l, o and x.

Water Images of Numbers

Real Image	0	1	2	3	4	5	6	7	8	9
Water Image	0	⅂	Ƨ	3	߅	ƻ	ϱ	⅃	8	ə

Numbers 0, 3 and 8 have the same water image.

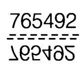
Directions (Ex. Nos. 7 and 8) *Choose the alternative which shows the correct water image of the word/number given in the questions.*

Example 7 FROG

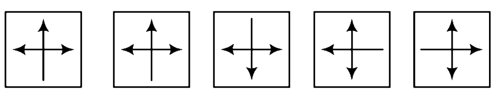
Sol. (*a*) The water image of given sequence will be

Example 8 765492

Sol. (*a*) The water image of given sequence will be



Example 9 In the following question, choose the correct water image of the figure (A) from the given four alternatives (a), (b), (c) and (d).



(A) (a) (b) (c) (d)

Sol. (*b*) The water image of the figure (A) will be

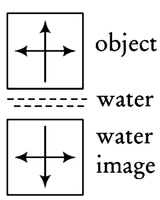
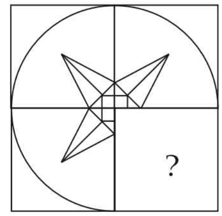


Figure Completion

- Figure completion is a process to find out the missing part of an incomplete figure to complete it.
- In this topic, we deal with the questions in which a part of figure is missing, generally $\frac{1}{4}$ th part of figure and a candidate is asked to find the missing part from the given option figures.

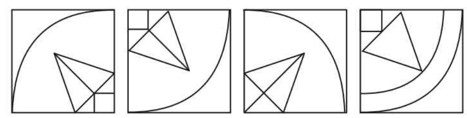
Example 10 Select a figure from the four alternatives, which when placed in the missing portion of the original figure, as shown by figure (X), would complete the pattern.

Problem Figure



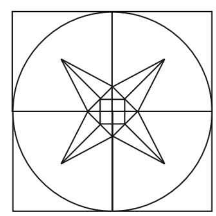
(X)

Answer Figures



(a) (b) (c) (d)

Sol. (*b*) Clearly, option (b) completes the original figure which looks like the figure given below.

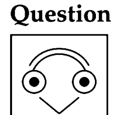


Formation of Figures

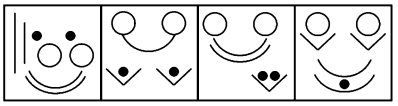
- Formation of figure is use the fragmented part to construct a desired figure. It requires a high spatial visualisation skill, as different fragmented parts of a figure are combined to form the desired figure.
- In this type of questions, question figures are to be formed with the pieces of one of the figures given in the answer choices and the candidate is required to find out the correct answer figure.

Example 11 Find the figure from the given answer choices, that can form the question figure.

Question Figure

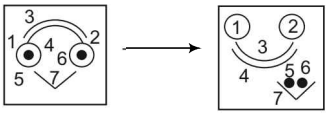


Answer Figures



(a) (b) (c) (d)

Sol. (*c*) Here, the question figure can be formed by joining the pieces given in option (c) as shown below.

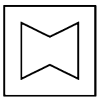


Embedded Figures

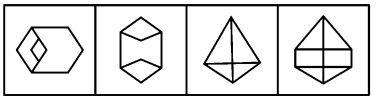
- A figure is said to be embedded in another figure when the second figure completely contains the first figure.
- Questions based on Embedded figures comprise of a question figure and four answer figures and it is asked to find the correct answer figure in which the given question figure is embedded.

Example 12 In the following question, a question figure and a set of four answer figures (a), (b), (c) and (d) is given. Find out that answer figure in which the question figure is embedded.

Question Figure



Answer Figures



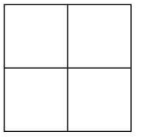
(a) (b) (c) (d)

Sol. (*b*) Clearly, the question figure is embedded in answer figure (b). The portion which the question figure occupies in the alternative figure (b) has been shown in the below figure.

Counting of Figures

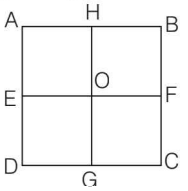
- Counting of figures is simply the realisation of different geometrical figures from a complex one.
- The questions asked on the counting of figures are designed to test the analytical deposition of candidates and check his ability to count different similar figures in a complex figure. The figures, which are asked to count are straight lines, triangles, squares, rectangles etc.

Example 13 How many squares are there in the figure given below?



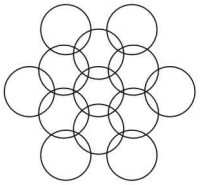
(a) 4 (b) 5 (c) 6 (d) 7

Sol. (*b*) Naming the figure,



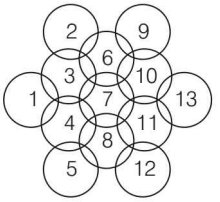
Clearly, there are five squares in the given figure *viz.* AHOE, HOFB, FOGC, OGDE and ABCD.

Example 14 Find the total number of circles in the figure given below.



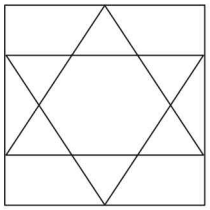
(a) 10 (b) 11 (c) 12 (d) 13

Sol. (*d*)



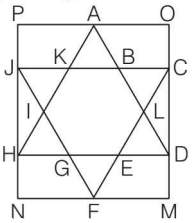
Clearly, total number of circles = 13

Example 15 How many triangles are there in the following square?



(a) 6 (b) 14
(c) 9 (d) 7

Sol. (*b*) Naming the figure,



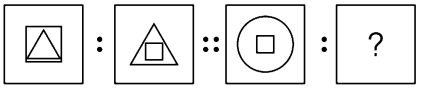
∴Number of triangles = ABK, BCL, CLD, LDE, EFG, GHI, HIJ, IJK, ADH, JCF, CFM, JNF, PAH and AOD = 14

Hence, there are 14 triangles in the given figure.

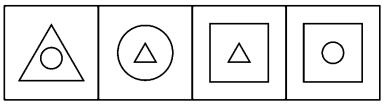
Practice Exercise

Directions (Q. Nos. 1-5) *Select a figure from the set of answer figures which would replace the question mark (?).*

1. Problem Figures

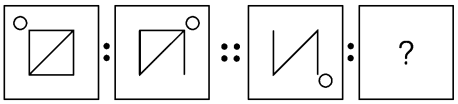


Answer Figures

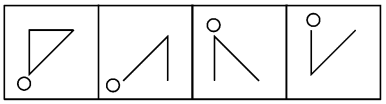


(a) (b) (c) (d)

2. Problem Figures

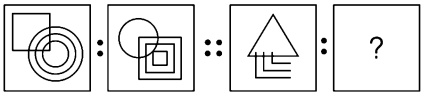


Answer Figures

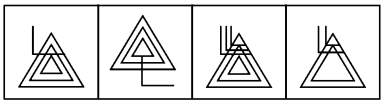


(a) (b) (c) (d)

3. Problem Figures

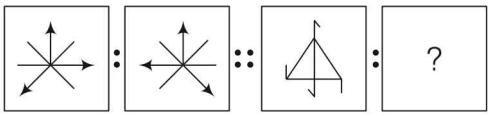


Answer Figures

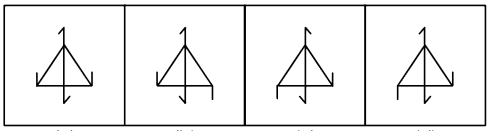


(a) (b) (c) (d)

4. Problem Figures

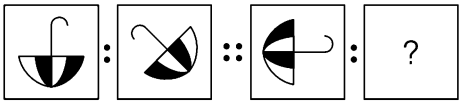


Answer Figures

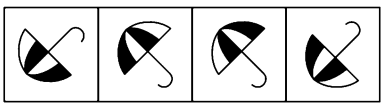


(a) (b) (c) (d)

5. Problem Figures



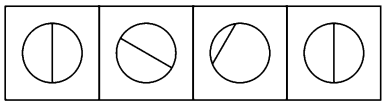
Answer Figures



(a) (b) (c) (d)

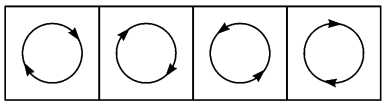
Directions (Q. Nos. 6-10) *Choose the figure which is different from others.*

6.



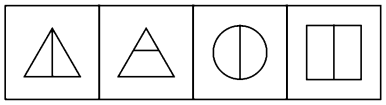
(a) (b) (c) (d)

7.



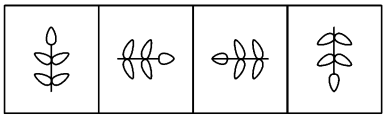
(a) (b) (c) (d)

8.



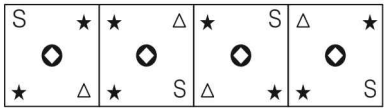
(a) (b) (c) (d)

9.



(a) (b) (c) (d)

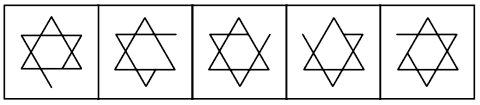
10.



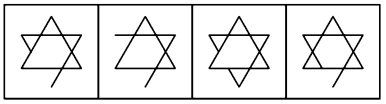
(a) (b) (c) (d)

Directions (Q. Nos. 11-15) *In each of the questions given below which one from the four answer figures should come at the right of the problem figures to complete the series logically.*

11. Problem Figures

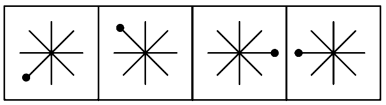


Answers Figures

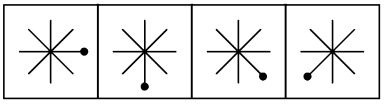


(a) (b) (c) (d)

12. Problem Figures

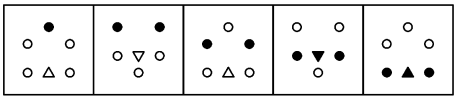


Answers Figures

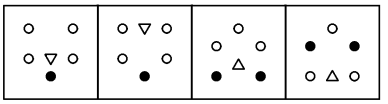


(a) (b) (c) (d)

13. Problem Figures

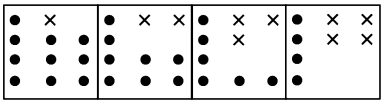


Answers Figures

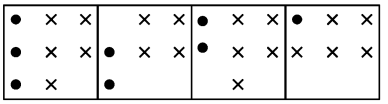


(a) (b) (c) (d)

14. Problem Figures

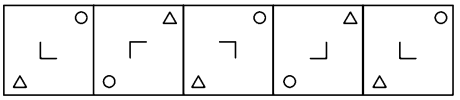


Answers Figures

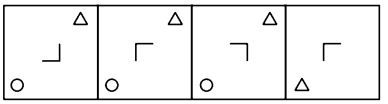


(a) (b) (c) (d)

15. Problem Figures



Answers Figures



(a) (b) (c) (d)

Directions (Q. Nos. 16-20) *In each of the following questions, you are given a combination of alphabets and/or numbers followed by four alternatives (a), (b), (c) and (d). Choose the alternative which most closely resembles the mirror image of the given combination.*

16. BUZZER

(a) ЯƎZZUB (b) RUZZEB

(c) ꓤƎZZUꓭ (d) REZZBU

17. 1 3 9 4

(a) 4 ɘ 3 1 (b) ߈ e 3 1

(c) ᔭ 6 Ɛ ⇂ (d) 4 e 3 1

18. disturb

(a) qıstnɹp (b) dɿutsib

(c) disturd (d) dɿutsib

19. RUN69test

(a) tsɘt96ИUЯ (b) tsɘt96ИUЯ

(c) ꓤUИ96tsƧt (d) ꓤUИ96tɘst

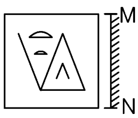
20. ANS43Q12

(a) ANSᔭƐQ12 (b) S1Q34SNA

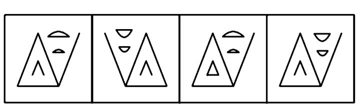
(c) SNAƐᔭQƧ⇂ (d) 12O43ANS

Directions (Q. Nos. 21-25) *In each of the following questions, if mirror is placed on the line MN, then which of the answer figures is the correct mirror image of the given figure.*

21. Problem Figure

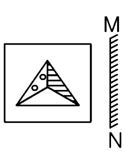


Answer Figures

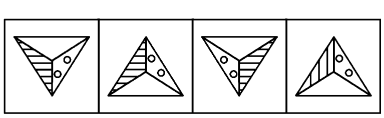


(a) (b) (c) (d)

22. Problem Figure

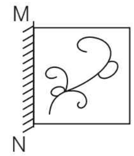


Answer Figures

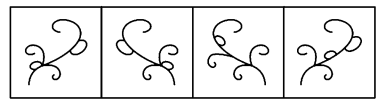


(a) (b) (c) (d)

23. Problem Figure

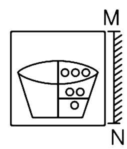


Answer Figures

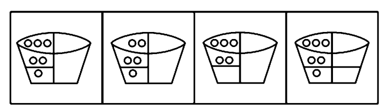


(a) (b) (c) (d)

24. Problem Figure

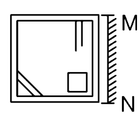


Answer Figures

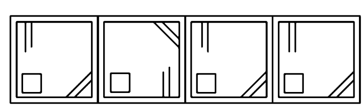


(a) (b) (c) (d)

25. Problem Figure



Answer Figures



(a) (b) (c) (d)

Directions (Q. Nos. 26-30) *In the following questions choose the alternative which is the correct water image of the given word/group of letters or numbers or both.*

26. WOMAN

(a) WOMAN (b) MOMⱯИ

(c) MOWAN (d) MOMⱯN

27. rise

(a) ɿıse (b) esir

(c) ɿise (d) esiɿ

28. 3 7 1 3

(a) 3ƧɹƷ (b) 3ƧɹƷ

(c) 3ɹ7Ɛ (d) 3ɹƧƷ

29. D6Z7F4

(a) DϱZƧFϟ (b) DϱCƩƧƎϟ

(c) DϱƩƧƎϟ (d) D6ƩƎϟ7

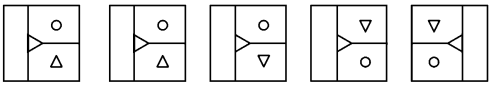
30. ab45CD67

(a) apϟϱCD6Ɛ (b) ϬpϟϱCDϱƐ

(c) ϬpϟϱCDϑƐ (d) ϬpϟϱCD9Ɛ

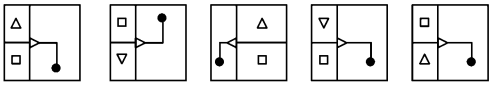
Directions (Q. Nos. 31-35) *Choose the correct water image of the figure (A) from the given four alternatives.*

31.



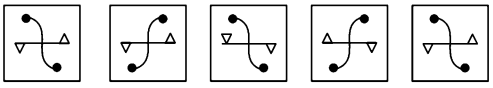
(A) (a) (b) (c) (d)

32.



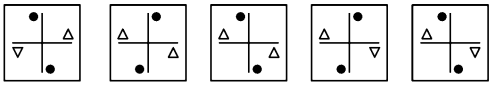
(A) (a) (b) (c) (d)

33.



(A) (a) (b) (c) (d)

34.



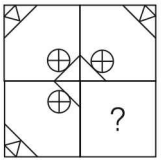
(A) (a) (b) (c) (d)

35.

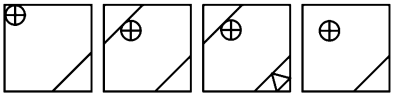
(A) (a) (b) (c) (d)

Directions (Q. Nos. 36-40) *In each of the following problems, select a figure from the given four alternatives, which when placed in the blank space of problem figure would complete the pattern.*

36. Problem Figure

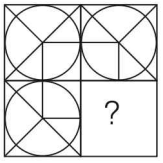


Answer Figures

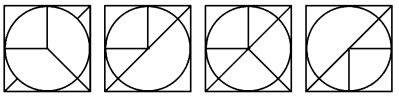


(a) (b) (c) (d)

37. Problem Figure

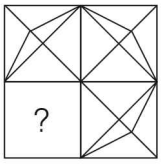


Answer Figures

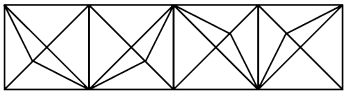


(a) (b) (c) (d)

38. Problem Figure

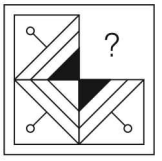


Answer Figures

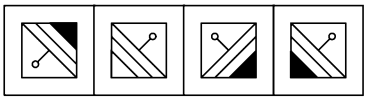


(a) (b) (c) (d)

39. Problem Figure

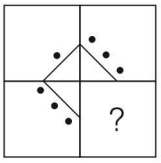


Answer Figures

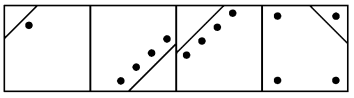


(a) (b) (c) (d)

40. **Problem Figure**

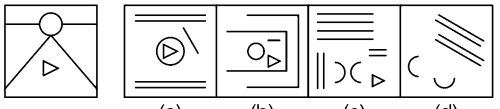


Answer Figures

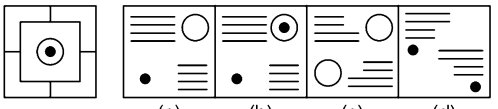


Directions (Q. Nos. 41-43) *From the answer figures, select the cut pieces from which the problem figure is formed/made.*

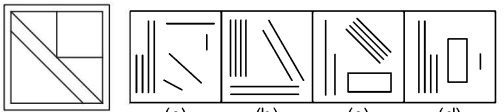
41. **Problem Figure** **Answer Figures**



42. **Problem Figure** **Answer Figures**

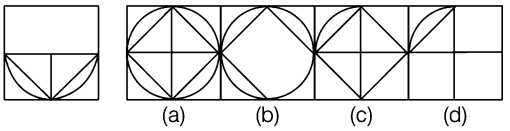


43. **Problem Figure** **Answer Figures**

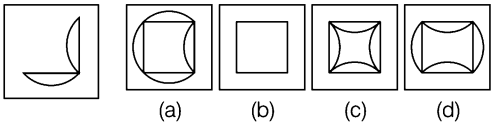


Directions (Q. Nos. 44-48) *In each of the following problems, choose the alternative figure in which the problem figure is embedded.*

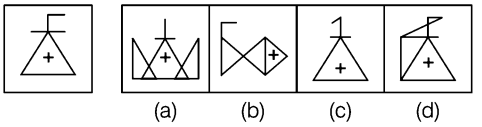
44. **Problem Figure** **Answer Figures**



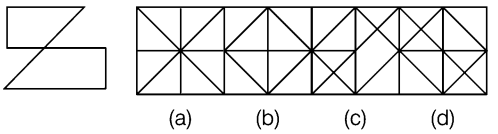
45. **Problem Figure** **Answer Figures**



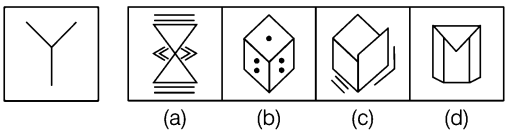
46. **Problem Figure** **Answer Figures**



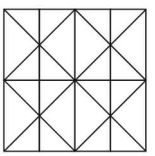
47. **Problem Figure** **Answer Figures**



48. **Problem Figure** **Answer Figures**

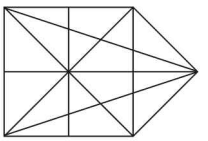


49. What is the number of straight lines in the following figure?



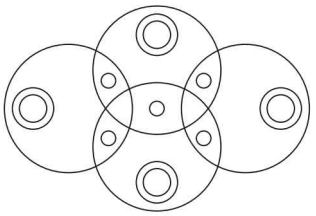
(a) 11 (b) 14
(c) 16 (d) 17

50. How many straight lines are there in the following figure?



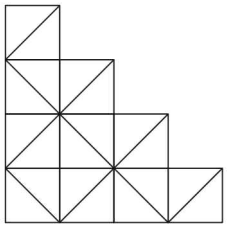
(a) 10 (b) 12
(c) 13 (d) 17

51. How many circles are there in this figure?



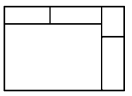
(a) 13 (b) 16
(c) 17 (d) 22

52. How many squares are there in the given figure?



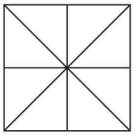
(a) 10 (b) 13
(c) 12 (d) 14

53. How many rectangles are there in the question figure?



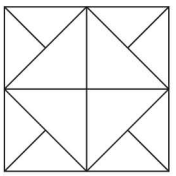
(a) 6 (b) 7 (c) 8 (d) 9

54. How many triangles are there in the following figures?



(a) 16 (b) 12 (c) 10 (d) 8

55. How many triangles are there in the given figure?



(a) 18 (b) 20 (c) 12 (d) 16

Answers

1	*(d)*	2	*(b)*	3	*(a)*	4	*(d)*	5	*(a)*	6	*(c)*	7	*(c)*	8	*(b)*	9	*(c)*	10	*(b)*
11	*(a)*	12	*(c)*	13	*(a)*	14	*(c)*	15	*(b)*	16	*(a)*	17	*(c)*	18	*(b)*	19	*(b)*	20	*(b)*
21	*(a)*	22	*(b)*	23	*(b)*	24	*(a)*	25	*(c)*	26	*(b)*	27	*(a)*	28	*(b)*	29	*(c)*	30	*(b)*
31	*(c)*	32	*(a)*	33	*(c)*	34	*(c)*	35	*(d)*	36	*(c)*	37	*(c)*	38	*(a)*	39	*(b)*	40	*(a)*
41	*(c)*	42	*(a)*	43	*(b)*	44	*(a)*	45	*(a)*	46	*(d)*	47	*(a)*	48	*(b)*	49	*(b)*	50	*(b)*
51	*(c)*	52	*(d)*	53	*(d)*	54	*(a)*	55	*(b)*										

Hints & Solutions

1. (d) The outer figure comes inside, the inner figure comes outside.

2. (b) The symbol 'O' is moving from one corner to another in clockwise direction and one line is removed to get the second figure of the pair.

3. (a) Both the figures interchange positions. Single figure is converted into three figures and *vice-versa*.

4. (d) Problem figure second is mirror image of problem figure first. So, the option (d) is the mirror image of problem figure third.

5. (a) Figure rotates 45° anti-clockwise, shaded portion becomes white and *vice-versa,* also the handle of the figure is reversed.

6. (c) In all the figures except figure (c), the circles are divided into two equal parts.

7. (c) Direction of arrows in all figures except figure (c), is in clockwise direction.

8. (b) All the figures except figure (b), are divided into two equal parts.

9. (c) Except figures (c), all have undivided leave.

10. (b) In all the figures except figure (b) stars are on the diagonally opposite corners.

11. (a) One and two parts of the line disappear alternately and the disappearance of line is anti-clockwise.

12. (c) The dot moves two steps, three steps, four steps and five steps respectively, in clockwise direction.

13. (a) Designs in figure first, third and fifth are same. Similarly, designs in second, fourth and answer figure are same. Also, other shaded portion shifts downwards in each alternate figure.

14. (c) The two dots are lost and one cross appears in each subsequent figure. So, in continuation with the given series of figures, the next figure would be (c).

15. (b) Central element rotate 90° clockwise and corner elements are interchanging their positions.

16. (a) Option (a) is the correct mirror image of the given combination.

17. (c) Option (c) is the correct mirror image of the given combination.

18. (b) Option (b) is the correct mirror image of the given combination.

19. (b) Option (b) is the correct mirror image of the given combination.

20. (b) Option (b) is the correct mirror image of the given combination.

21. (a) Option (a) is the correct mirror image of the given figure.

22. (b) Option (b) is the correct mirror image of the given figure.

23. (b) Option (b) is the correct mirror image of the given figure.

24. (a) Option (a) is the correct mirror image of the given figure.

25. (c) Option (a) is the correct mirror image of the given figure.

26. (b) Option (b) is the correct water image of the given combination.

27. (a) Option (a) is the correct water image of the given combination.

28. (b) Option (b) is the correct water image of the given combination.

29. (c) Option (c) is the correct water image of the given combination.

30. (b) Option (b) is the correct water image of the given combination.

31. (c) Option (c) is the correct water image of the given figure.

32. (a) Option (a) is the correct water image of the given figure.

33. (c) Option (c) is the correct water image of the given figure.

34. (c) Option (c) is the correct water image of the given figure.

35. (d) Option (d) is the correct water image of the given figure.

36. (c) The missing figure which will complete the figure pattern is given by option (c).

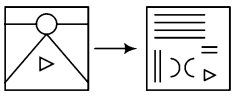
37. (c) The missing figure which will complete the figure pattern is given by option (c).

38. (a) The missing figure which will complete the figure pattern is given by option (a).

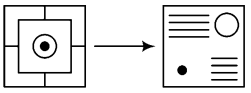
39. (b) The missing figure which will complete the figure pattern is given by option (b).

40. (a) The missing figure which will complete the figure pattern is given by option (a).

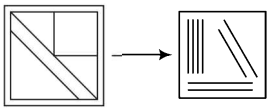
41. (c) Here, the problem figure can be formed by joining the pieces given in option (c) as shown.



42. (a) Here, the problem figure can be formed by joining the pieces given in option (a) as shown below.



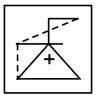
43. (b) Here, the problem figure can be formed by joining the pieces given in option (b) as shown below.



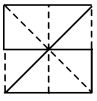
44. (a) On close observation, we find that the problem figure is embedded in figure (a) as shown below.

45. (a) On close observation, we find that the problem figure is embedded in figure (a) as shown below.

46. (d) On close observation, we find that the problem figure is embedded in figure (d) as shown below.

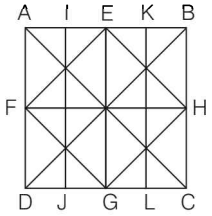


47. (a) On close observation, we find that the problem figure is embedded in figure (a) as shown below.



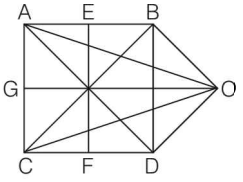
48. (b) On close observation, we find that the problem figure is embedded in figure (b) as shown below.

49. (b) Naming the figure,



Clearly, there are 14 straight lines in this figure namely AB, BC, CD, AD, AC, BD, EG, FH, EF, FG, GH, EH, IJ and KL.

50. (b)



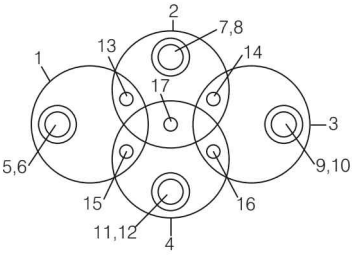
Horizontal lines = AB, GO, CD = 3

Vertical lines = AC, EF, BD = 3

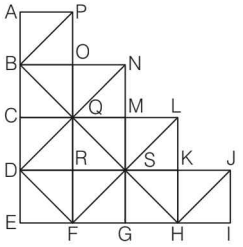
Slant lines = BO, DO, AO, CO, AD, BC = 6

$\therefore$ Total number of straight lines = 3 + 3 + 6 = 12

51. (c) There are 17 circles in the given figure as shown below



52. (d) Naming the figure,

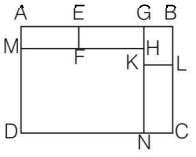


Name of the squares are

ABOP, BCQO, OQMN, CDRQ, QRSM, MSKL, DEFR, RFGS, SGHK, KHIJ, BDSN, CEGM, DFSQ and QFHL.

Hence, there are 14 squares in this figure.

53. (d) The figure in the question has been labelled as under



Clearly, there are 9 rectangles in the figure given above namely, AEFM, EGHF, AGHM, GBLK, KLCN, GBCN, MHND, ABCD and AGND.