

**NTSE-2013(Stage-I)**  
**(For Class X Students)**  
**MAT (Paper-1)**  
 (Question Nos. 1 – 50)

Time: 50 Min.

Max. Marks: 50

1. The product of two fractions is  $\frac{14}{15}$  and their quotient is  $\frac{35}{24}$ . The greater fraction is:

- |                   |                   |
|-------------------|-------------------|
| (1) $\frac{4}{5}$ | (2) $\frac{7}{6}$ |
| (3) $\frac{7}{4}$ | (4) $\frac{7}{3}$ |

1. 2

Sol. Let fractions =  $\frac{a}{b}, \frac{c}{d}$

$$\therefore \frac{ac}{bd} = \frac{14}{15}, \frac{ad}{bc} = \frac{35}{24}$$

$$\text{Now, } \left(\frac{ac}{bd}\right)\left(\frac{ad}{bc}\right) = \left(\frac{14}{15}\right)\left(\frac{35}{24}\right) = \frac{49}{36}$$

$$\Rightarrow \frac{a}{b} = \frac{7}{6} \therefore \frac{c}{d} = \frac{4}{5}$$

$$\therefore \text{Greater fraction} = \frac{7}{6}$$

2. The cost of an article are Rs. 75. The cost was first increased by 20% and later on it was reduced by 20%. The present cost of the article is:

- |            |            |
|------------|------------|
| (1) Rs. 60 | (2) Rs. 72 |
| (3) Rs. 90 | (4) Rs. 75 |

2. 2

Sol. Initial cost = 75

After 20% increment = 90

After 20% decrement = 72

3. Which one is in the ascending order in the following:

- |  |  |
|--|--|
| (1) $\frac{7}{6}, \frac{5}{4}, \frac{4}{3}, \frac{9}{7}$ | (2) $\frac{7}{6}, \frac{5}{4}, \frac{9}{7}, \frac{4}{3}$ |
| (3) $\frac{4}{3}, \frac{9}{7}, \frac{5}{4}, \frac{7}{6}$ | (4) $\frac{9}{7}, \frac{4}{3}, \frac{7}{6}, \frac{5}{4}$ |

3. 2

Sol. Given fractions =  $\frac{7}{6}, \frac{5}{4}, \frac{4}{3}, \frac{9}{7}$

(0 0)

$$= \frac{7}{6}\left(\frac{84}{84}\right), \frac{5}{4}\left(\frac{84}{84}\right), \left(\frac{4}{3}\right)\left(\frac{84}{84}\right), \frac{9}{7}\left(\frac{84}{84}\right)$$

$$= \frac{7(14)}{84}, \frac{5(21)}{84}, \frac{4(28)}{84}, \frac{9(12)}{84}$$

$$= \frac{98}{84}, \frac{105}{84}, \frac{112}{84}, \frac{108}{84}$$

$$\therefore \frac{7}{6} < \frac{5}{4} < \frac{9}{7} < \frac{4}{3}$$

4. If 10 men or 20 boys can make 260 mats in 20 days, then how, many mats will be made by 8 men and 4 boys in 20 days?

(1) 260 (2) 240  
(3) 520 (4) 280

4. 1

Sol. Given 10 men makes 260 mats in 20 days  
 $\therefore$  8 men will make 208 mats in 20 days  
Similarly boys will make 52 mats in 20 days  
 $\therefore$  8 men and 4 boys will make 260 mats in 20 days

5. A man completes 30 km of a journey at the speed of 6 km/hr and remaining 40 km of the journey in 5 hrs. His average speed for the whole journey is :

(1) 14 km/hr (2) 7 km/hr  
(3) 7.5 km/hr (4) 8 km/hr

5. 2

Sol. Average speed =  $\frac{\text{Total distance}}{\text{Total time taken}}$

$$= \frac{30 + 40}{\frac{30}{6} + 5} = \frac{70}{10} = 7 \text{ km/hr}$$

6. Four bells ring at interval 6, 12, 18, 24 seconds. They starts ringing simultaneously at 8 o'clock. When will they ring again together:

(1) 1 minutes 12 seconds past 8 (2) 2 minutes 24 seconds past 8  
(3) 5 minutes 17 seconds past 8 (4) 2 minutes 27 seconds past 8

6. 1

Sol. They will ring together again after L.C.M of (6, 12, 18, 24) seconds that means after 72 seconds (or) one minute 12 seconds.

7. A cricketer has a certain average of runs for his 64 innings. In his 65<sup>th</sup> inning, he is bowled out for no score on his part. This brings down his average by 3 runs. His new average of runs is:

(1) 195 (2) 130  
(3) 192 (4) 128

7. 3

Sol. Assume, the average upto 64 innings = x

So the score for 64 innings = 64x

Now the average after 65 innings = x - 3

$\therefore$  Total score in 65 innings = 65 (x - 3)

From given data we have :

$$64x = 65(x - 3)$$

$$64x = 65x - 195$$

$$x = 195$$

8. If  $x = \sqrt{136 + \sqrt{52 + \sqrt{144}}}$  then value of x equals:

(1) 12 (2) 11  
(3) 10 (4) 13

8. 1

Sol.  $x = \sqrt{136 + \sqrt{52 + \sqrt{144}}}$

$$= \sqrt{136 + \sqrt{64}} = \sqrt{144} = 12$$

9. A fruit seller buys bananas at 2 for a rupee and sells them at 5 for three rupees. His profit per cent is:  
 (1) 25 (2) 10  
 (3) 15 (4) 20

9. 4

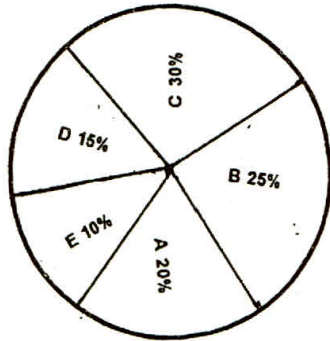
Sol. C.P of 10 bananas = Rs. 5  
 S.P of 10 bananas = Rs. 6

$$\therefore \text{Profit \%} = \frac{6-5}{5} \times 100 = 20\%$$

**For Questions 10 to 12. refer to following pie chart.**

The following pie diagram shows the expenditure incurred on the preparation of a book by publisher under various head:

- A. Paper 20%  
 B. Printing 25%  
 C. binding Designing 30%  
 D. Royalty 15% or  
 E. Miscellaneous 10%



10. What is the angle of Pie diagram showing the expenditure incurred on paying royalty?  
 (1)  $54^\circ$  (2)  $45^\circ$   
 (3)  $48^\circ$  (4)  $60^\circ$

10. 1

Sol. Given expenditure on royalty = 15%

$$\therefore \text{The angle incurred} = \frac{15}{100} \times (360^\circ) = 54^\circ$$

11. Which two expenditure together will form an angle of  $108^\circ$  at the centre of pie – diagram?  
 (1) B and E (2) A and E  
 (3) A and D (4) D and E

11. 2

Sol. Angle formed by A =  $72^\circ$   
 Angle formed by B =  $90^\circ$   
 Angle formed by C =  $108^\circ$   
 Angle formed by D =  $54^\circ$   
 Angle formed by E =  $36^\circ$   
 Here clearly A and E together will form  $108^\circ$

12. If the difference between the expenditure be represented by  $18^\circ$  in the pie diagram. These expenditures are:

- (1) B and E (2) A and C  
 (3) B and D (4) B and C

12. 4

Sol. Clearly from the options B and C will have the difference of  $18^\circ$

13. A number whose double is 48 greater than its half: is-  
 (1) 30 (2) 32  
 (3) 31 (4) 29

13. 2  
 Sol. Let number = x

$$\text{Given } 2x = 48 + \frac{x}{2}$$

$$4x = 96 + x$$

$$3x + 96 \Rightarrow x = 32$$

14. Value of  $1 + \frac{1}{1 + \frac{1}{1 - \frac{1}{6}}}$  is

(1)  $\frac{16}{11}$  (2) 1

(3)  $\frac{11}{16}$  (4) 10

14. 1  
 Sol.  $1 + \frac{1}{1 + \frac{1}{1 - \frac{1}{6}}} = 1 + \frac{1}{1 + \frac{1}{\frac{5}{6}}} = 1 + \frac{1}{1 + \frac{6}{5}}$

$$= 1 + \frac{1}{\frac{11}{5}}$$

$$= 1 + \frac{5}{11} = \frac{16}{11}$$

15. How many numbers between 11 and 90 are divisible by 7?  
 (1) 10 (2) 11  
 (3) 12 (4) 7

15. 2  
 Sol. Divisible by '7' means the number = 7k (for k = 1, 2, 3 ...)  
 Now between 11 and 90 means  
 K = 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12  
 Total values = 11

16. Given that  $2x - y + z = 240$ . If  $z = 2y$ ,  $y = 2x$ , then  $x = ?$   
 (1) 0 (2) 50  
 (3) 70 (4) 60

16. 4  
 Sol.  $z = 27$   
 $y = 2x$   
 $\Rightarrow z = 2(2x) = 4x$   
 $2x - y + z = 240$   
 $2x - 2x + 4x = 240$   
 $4x = 240$   
 $X = 60.$

17. Ratio of milk is to water in certain solution of 75 litres is 2 :1. How much water is to be mixed in solution so that ratio becomes 1:2 :

- (1) 75 litres (2) 60 litres  
(3) 65 litres (4) 80 litres

17. 1

Sol. Amount of water in first solution =  $\frac{1}{3} \times 75 = 25\ell$

Amount milk in first solution =  $\frac{2}{3} \times 75 = 50\ell$

Let the amount of water to be mixed be  $x \ell$

$$25 + x = \frac{2}{3}(75 + x)$$

$$\frac{1}{3}x = 50 - 25$$

$$X = 75 \ell$$

18. Simple interest on a sum of money is  $\frac{1}{25}$  of the principal and the number of years is equal to

the rate percent per annum is:

- (1)  $2\frac{1}{2}\%$  (2) 2%  
(3)  $3\frac{1}{2}\%$  (4)  $1\frac{1}{2}\%$

18. 2

Sol.  $SI = \frac{PTR}{100}$

$$\frac{PTR}{100} = \frac{P}{25}$$

$$\frac{P.R.R}{100} = \frac{P}{25}$$

$$R^2 = 4$$

$$R = 2\% \text{ p.a.}$$

19. The average of the first 100 natural number is

- (1) 51 (2) 100  
(3) 50.5 (4) 101

19. 3

Sol. Average of first 100 natural numbers =  $\frac{100 \times 101}{2 \times 100} = 50.5$

20. The unit's digit in the expansion  $(2317)^{759}$  is:

- (1) 7 (2) 9  
(3) 3 (4) 1

20. 3

Sol.  $759 = 4(189) + 3$

$$\therefore \text{Units digit of } (2317)^{759}$$

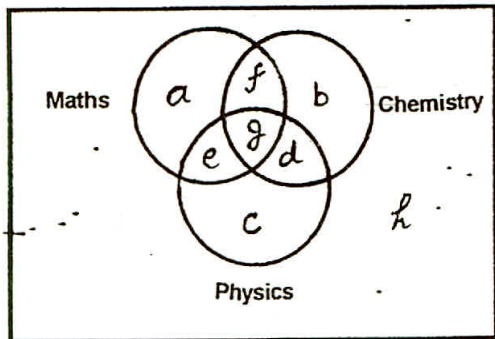
$$= \text{Unit's digit of } (7)^{759}$$

$$= \text{Unit's digit of } (7)^3$$

$$= 3$$

For Question 21 to 25 refer following diagram.

Read the statements and choose the letters of the region which correctly represent the statement in venn diagram.



21. Students who took chemistry but opted neither maths nor Physics:

- |       |       |
|-------|-------|
| (1) b | (2) e |
| (3) g | (4) d |

21.

1

Sol. 'b' takes only Chemistry.

22. Students who took Maths and Physics both:

- |       |       |
|-------|-------|
| (1) a | (2) c |
| (3) g | (4) e |

22.

4

Sol. 'e' takes Maths and Physics both.

23. Students who took all three subjects i.e. Physics, Chemistry and Maths

- |       |       |
|-------|-------|
| (1) e | (2) d |
| (3) g | (4) f |

23.

3

Sol. 'g' takes all three subjects.

24. Students who took Physics and Chemistry both:

- |       |       |
|-------|-------|
| (1) f | (2) g |
| (3) e | (4) d |

24.

4

Sol. 'd' takes Physics and Chemistry both.

25. Students who did not take any of the three subjects

- |       |       |
|-------|-------|
| (1) d | (2) g |
| (3) f | (4) h |

25.

4

Sol. 'h' did not take any of the three subjects.

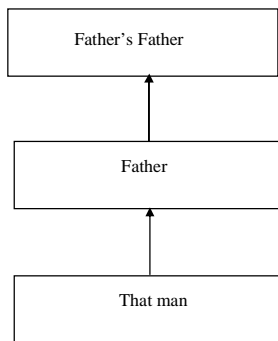
26. Pointing to a photograph, a man said, "I have no brother or sister but that man's father is my father's son". Whose photograph was it:

- |                 |                  |
|-----------------|------------------|
| (1) His nephews | (2) His father's |
| (3) His son's   | (4) His own      |

26.

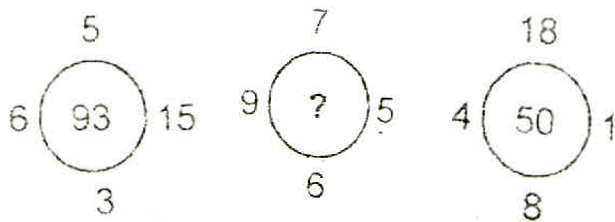
3

Sol.



There are no brothers and sisters. So it's his son's photo.

27. Insert the missing number



- (1) 5 (2) 19  
 (3) 27 (4) 89

27. 4

Sol.  $(5 \times 15) + (6 \times 3) = 75 + 18 = 93$   
 $(7 \times 5) + (9 \times 6) = 35 + 54 = 89$   
 $(18 \times 1) + (4 \times 8) = 18 + 32 = 52$

28. Choose the correct alternative which shows the same relationship with the word as the words of the given pair bear:

Sword : Slaughter : : Auger : \_\_\_\_

- (1) Dig (2) Carve  
 (3) Bore (4) Grind

28. 3

Sol. Auger is a tool used to bore holes in wood.

29. Select the wrong number in the series

6, 26, 62, 123, 214, 341

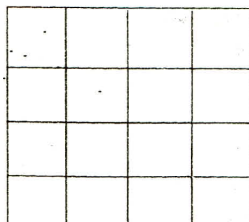
- (1) 26 (2) 62  
 (3) 123 (4) 214

29. 1

Sol.  $2^3 - 2, 3^3 - 2, 4^3 - 2, \dots$  and so on.

So, the number should be 25

30. In given figure, how many squares are there?



- (1) 28 (2) 32  
 (3) 16 (4) 30

30. 4

Sol. It's a (4 x 4) square

So, number of squares =  $1^2 + 2^2 + 3^2 + 4^2 = 30$

31. Insert the missing number:

5	26	1
9	84	3
11	?	5

(1) 104

(2) 146

(3) 126

(4) 60

31. 3

Sol.  $5^2 + 1 = 26$

$9^2 + 3 = 84$

$11^2 + 5 = 126$

Direction (Question 32 - 34) – Select the pair that has the same relationship as the original pair of words / numbers:

32. 11 : 1210

(1) 6 : 216

(2) 7 : 1029

(3) 8 : 448

(4) 9 : 729

32. 3

Sol.  $11^3 - 11^2 = 1331 - 121 = 1210$

Similarly,  $8^3 - 8^2 = 512 - 64 = 448$

33. ADG : KNQ : BEH : \_\_\_\_

(1) CFI

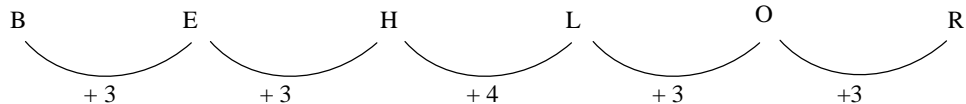
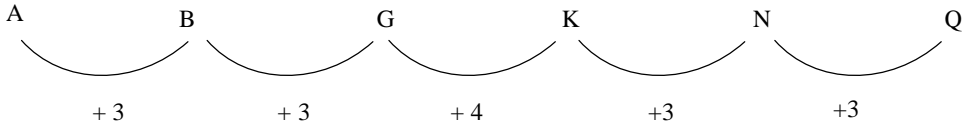
(2) ILO

(3) LOR

(4) MPS

33. 3

Sol.



34. Part : Whole :: Arc : \_\_\_\_

(1) Area

(2) Chord

(3) Circumference

(4) Segment

34. 3

Sol. Arc is a part of circumference.

35. In a code language, 'LONDON' is written as MPOEPO, what is CPNCBZ?

(1) DQODCA

(2) MADRAS

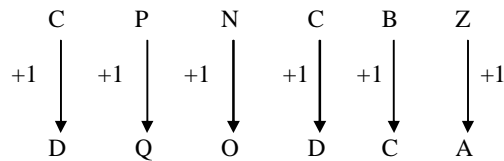
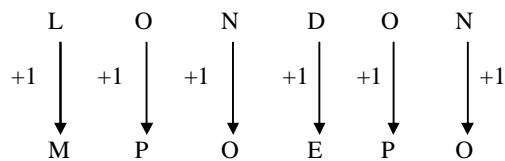
(3) BOMBAY

(4) RAJKOT

35. 1



Sol.

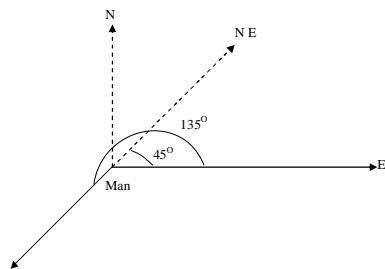


36. A man is facing East. He turns  $135^\circ$  in the anti-clockwise direction and then  $90^\circ$  in the clockwise direction. Which direction is he facing now?

- |                  |                  |
|------------------|------------------|
| (1) North – East | (2) North - West |
| (3) South – West | (4) South – East |

36. 1

Sol.



37. Which two months in a year have the same calendar?

- |                   |                       |
|-------------------|-----------------------|
| (1) June, October | (2) April, November   |
| (3) April, July   | (4) October, December |

37. 3

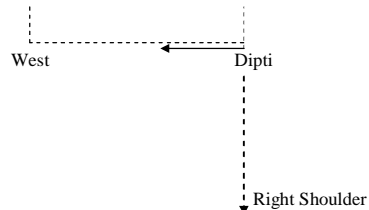
Sol. Between April and July, 7 odd days are there.

38. Dipti is performing Shirshashan facing towards West. In which direction will her right shoulder be?

- |           |           |
|-----------|-----------|
| (1) North | (2) East  |
| (3) West  | (4) South |

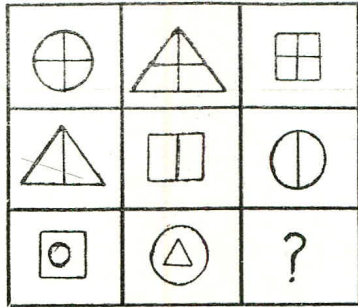
38. 4

Sol.

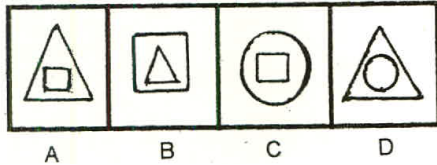


**Direction : In question Nos. (39 – 41):** Which answer figure will correctly the given figure?

39.



Answer figure

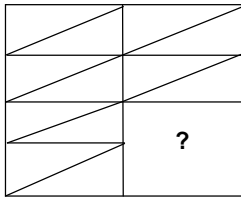


- (1) A (2) B  
(3) C (4) D

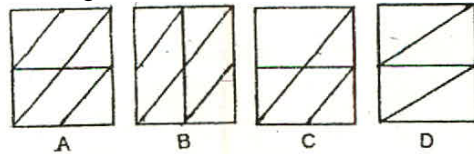
39.

Sol. 1  
In the last row, circle is coming inside square, then triangle is coming inside square, then triangle is coming inside circle, so the remaining will be square coming in side triangle.

40



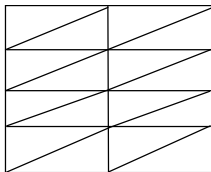
Answer figure



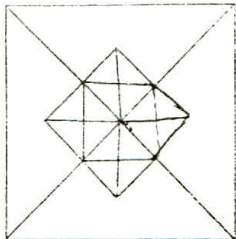
- (1) A (2) B  
(3) C (4) D

40.

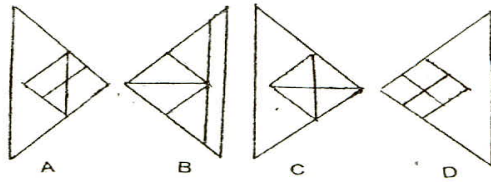
Sol. 4



41.



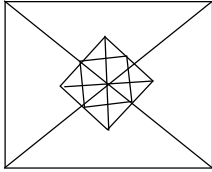
Answer Figure



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

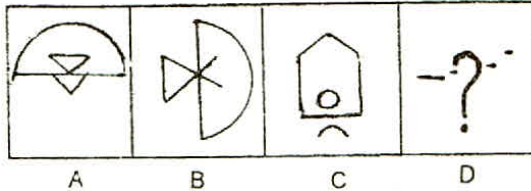
41.  
 Sol.

3

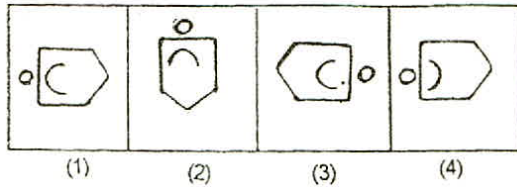


42. There is a definite relationship between figures A and B. Establish a similar relationship between figures C and D by selecting a suitable figure form the answer set

Problem figure



Answer figure

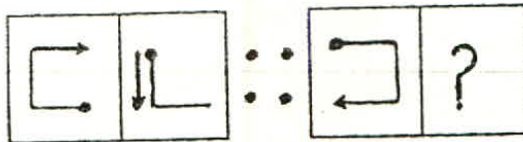


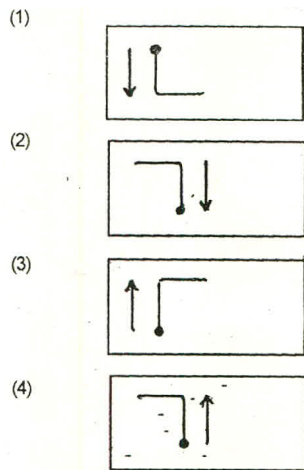
42.  
 Sol.

4 In B, the semicircle was rotated 90° clockwise then, figure inside is coming outside and the figure outside is going inside rotating 90° anti – clockwise.

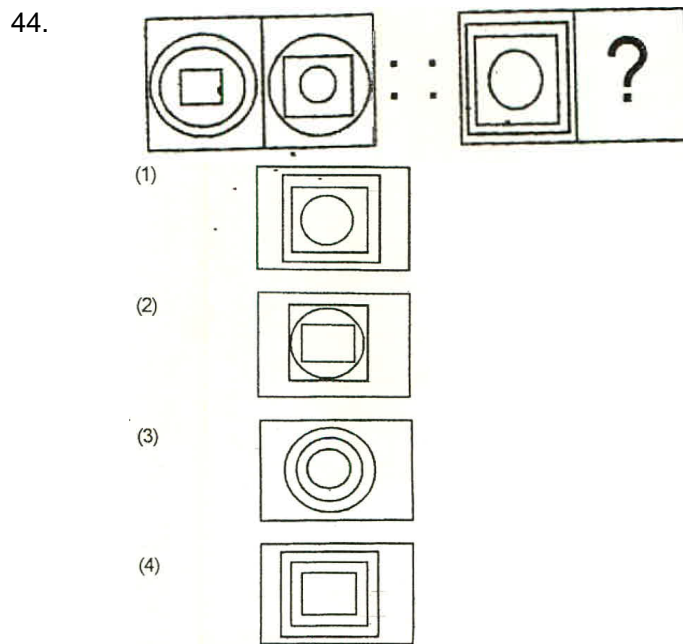
**Direction : Questions (43 – 45)** Select the answer (1, 2, 3, 4) which has the same relationship to the third figure which is between the first two figures on the left of sign ::

43.

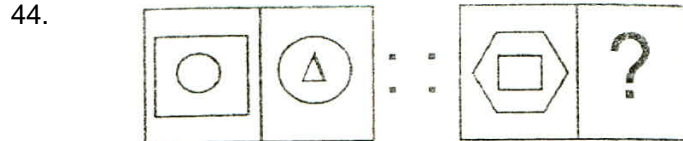


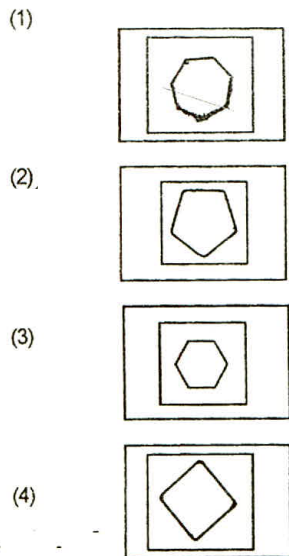


43. 4  
Sol. Each element is rotating 180°.



44. 2  
Sol. The innermost and middle elements interchange places.



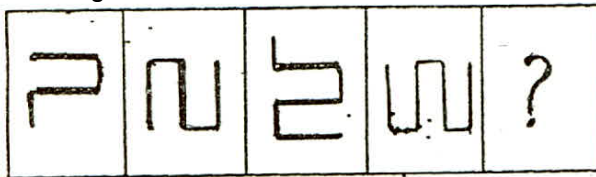


45. 2

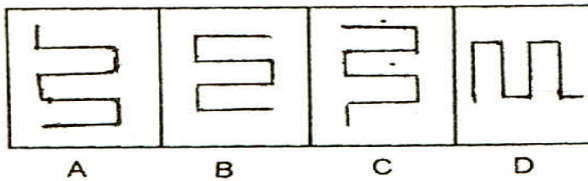
Sol. The inner figure becomes the outer figure and the inner figure comes with one side less than the original outer figure

**Direction: In Question (46 - 48), Complete the given series by choosing the appropriate answer:**

46. Problem figure



Answer figure



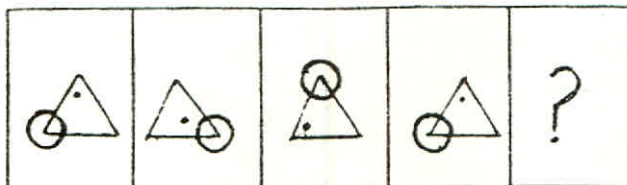
(1) A  
(3) C

(2) B  
(4) D

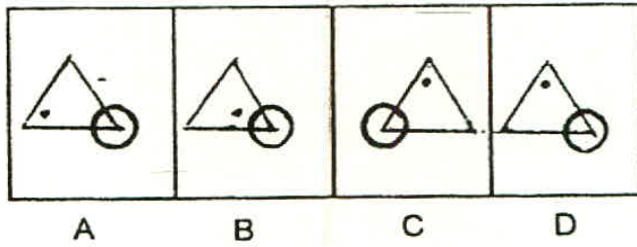
46. 3

Sol. The figure rotates 90° anti clock wise and a new line segment is added at the end.

47. Problem figure



Answer figure



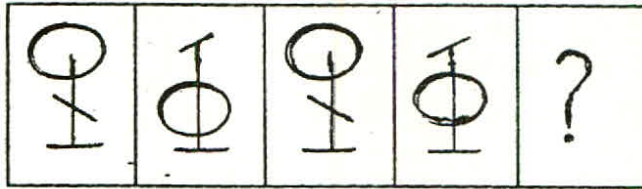
- (1) A (2) B  
 (3) C (4) D

47.

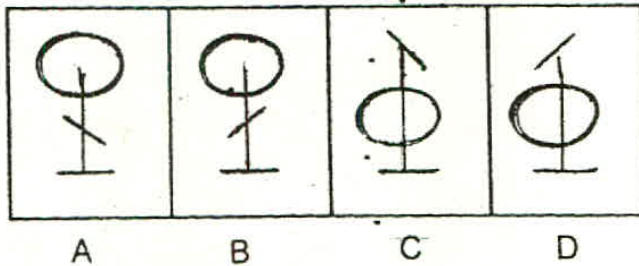
2

Sol. The position of circle shifts one vertex anti clock wise and the position of dot shifts one vertex clock wise.

48. Problem figure



Answer figure



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

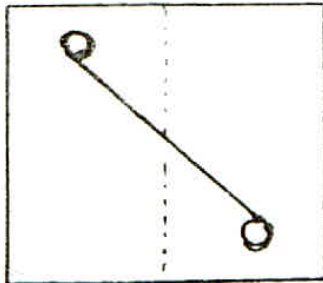
48.

1

Sol. The circle moves up and down in each step. The line flips horizontally in each step.

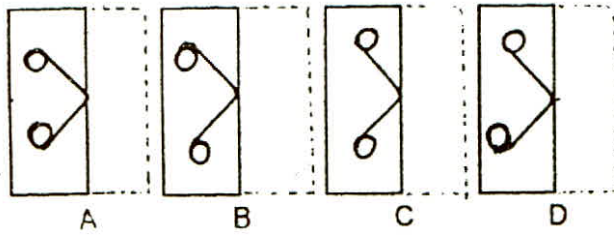
**Direction: In Questions (49 – 50).** Select the alternative which correctly depicts how the transparent sheet appears, when it is folded along dotted line?

49



Transparent Sheet

Answer Figure



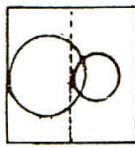
- (1) A (2) B  
 (3) C (4) D

49.

3

Sol. The fold on the transparent sheet acts like a mirror and the part on the right gets laterally inverted.

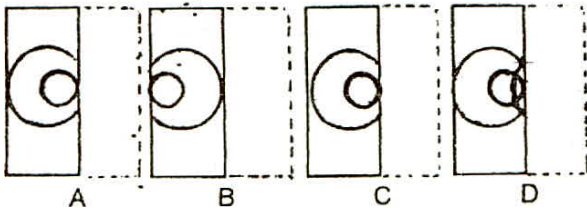
50.



Transparent  
Sheet

Answer figure

50.



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

50.

4

Sol. The fold on the transparent sheet acts like a mirror and the part on the right gets laterally inverted.