NATIONAL TALENT SEARCH EXAMINATION (NTSE-2017) STAGE -1

STATE : KARNATAKA PAPER : MAT

Date: 05/11/2017

Max. Marks: 50 **SOLUTIONS** **Time allowed: 45 mins**

1. In the given equation which set of signs among the alternative replace the symbols α and β respectively to make it meaningful ?

$$93\alpha 63 \div 21 - 23\beta 43 = 110$$

(1) + and – (2) × and – (3) × and + (4) – and +

Ans. (4)

Sol. $96\alpha 63 \div 21 - 23\beta 43 = 110$

$93 - 63 \div 21 - 23 + 43 = 110$

$93 - 6 - 23 + 43 = 110$

$136 - 26 = 110$

2. Which one of the following equations is NOT meaningful by substituting the set of mathematical signs (+, x, =, ÷) sequentially in them?

(1) 10 * 14 * 5 * 160 * 2 (2) 14*16*3* 180*3 (3) 12 * 15 * 4 * 144 * 2 (4) 16 * 18 * 2 * 156 * 3

Ans. (2)

Sol. $(14 + 16 \times 3 = 180 \div 3)$

$62 \neq 60$

Directions (Q.3-4) : Compare column - I and column - II to answer the given questions.

Column-I	Column-II
(i) 120	(a) $10n^2 + 10n$
(ii) 150	(b) $3n^3 + 3$
(iii) 180	(c) $2n^2 + 2n$
(iv) 200	(d) $n^3 + 3n$
	(e) $n^2 + n^2/2$
	(f) $4n^3 + 4n$

3. Which one of the given rules in column - II the number 200 follows ?

(1) $2n^2 + 2n$ (2) $3n^3 + 3$ (3) $10n^2 + 10n$ (4) $n^3 + 3n$

Ans. (3)

Sol. Check options

option (3)

$10n(n+1) = 200$

$n^2 + n = 20$

$n^2 + n - 20 = 0$

$n^2 + 5n - 4n = 0$

$(n+5)(n-4) = 0$

$n = -5, (4)$

4. Which number in column -I follows the rule ($4n^3 + 4n$) ?

(1) 120 (2) 150 (3) 180 (4) 200

Ans. (1)

Sol. $4x^3 + 4x \quad (x = n)$

$4n\left(n^2 + 1\right) = 120$

$n\left(n^2 + 1\right) = 30$

$\left(n = 3\right)$

Direction (Q.5-6) : Find the correct water images for the following problem figures from the given alternatives.

5.

(1)  (2)  (3)  (4) 

Ans. (2)

Sol. Option (2) by Observation

6.

(1)  (2)  (3)  (4) 

Ans. (3)

Sol. Option (3) by Observation

7. A cube of side 4 cm is painted with blue colour. It is cut into smaller cubes of 1 cm. Then, how many smaller cubes have paint on atleast one face?

(1) 56 (2) 48 (3) 36 (4) 24

Ans. (1)

Sol. 1 side painted $= 6 \times (4-2)^2 = 24$

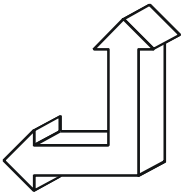
2 side painted $= 12 \times (4-2) = 24$

3 side painted $= 8$

option (1) Total $= 24 + 24 + 8 = 56$

Directions (Q.8-10) : Identify the number of specified geometric shapes in the given diagrams and mark the correct answers.

8. A figure of an object is given. Identify the number of surfaces of the object.

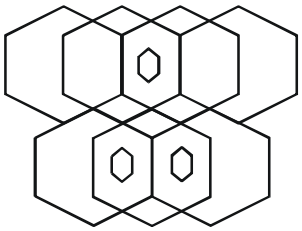


(1) 10 (2) 12 (3) 13 (4) 14

Ans. (4)

Sol. Option (3) by Observation, 14 surfaces

9. How many hexagons are in the given figure ?

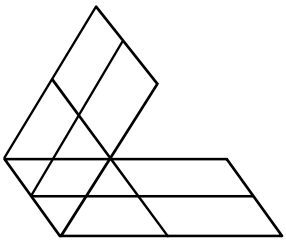


(1) 11 (2) 13 (3) 15 (4) 17

Ans. (3)

Sol. Option (2) by Observation - 12 Hexagon

10. How many parallelogram are there in the given figure?



(1) 17 (2) 19 (3) 20 (4) 21

Ans. (2)

Sol. Option (2) by Observation, 19 parallelogram

Directions (Q.11-13) : In the given questions there are four groups of numbers / pairs of numbers / group of letters of which three are alike and one is different. Find the one which is different ?

11. (1) 5 3 9 (2) 6 7 9 (3) 7 4 9 (4) 8 2 9

Ans. (4)

Sol. Every option divisible by 7 except option 4.

12. (1) 96, 56, 12 (2) 154, 63, 14 (3) 208, 91, 16 (4) 252, 98, 18

Ans. (2)

Sol. (a) 96 56 $12 \rightarrow 12 \times 8$ 7×8 12

(b) 154 63 $14 \rightarrow 14 \times 11$ 7×9 14

(c) 208 91 $16 \rightarrow 6 \times 13$ 7×13 16

(d) 252 98 $18 \rightarrow 18 \times 14$ 7×14 18

option (2)

13. (1) A S D W F Z (2) E O I R L V (3) M Y J Q B N (4) K T C X G P

Ans. (1)

Sol. First and sixth term sum is 27.
Second and fifth term sum is 27.
Third and fourth term sum is 27.
option (1).

Directions (Q.14-17) : Complete the following number/ figural series by choosing the correct answer from the given alternatives.

14. 98, 75, 54, ?, 18, 3

(1) 45 (2) 38 (3) 35 (4) 23

Ans. (3)

Sol. $98, 75, 54, 35, 18, 3$

difference $= 98 - 75 = 23$

$75 - 54 = 21$

$54 - 35 = 19$

$35 - 18 = 17$

$18 - 3 = 15$

option (3)

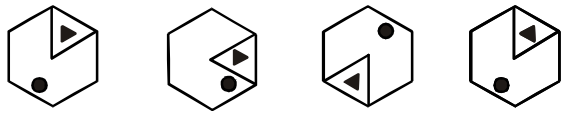
15. 0, 1, 4, 15, 64, ?

(1) 275 (2) 325 (3) 365 (4) 435

Ans. (2)

Sol. $0, 1, 4, 15, 65, ?$

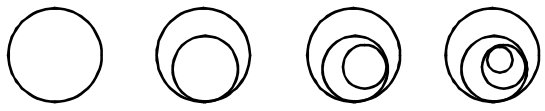
$0 \times 1 + 1 = 1 \times 2 + 2 = 4 \times 3 + 3 = 15 \times 4 + 4 = 64 \times 5 + 5 = 325$

16.  ?

(1)  (2)  (3)  (4) 

Ans. (4)

Sol. By observation.

17.  ?

(1)  (2)  (3)  (4) 

Ans. (3)

Sol. By observation.

18. Pramod and Praveen are the sons of Prakash.

The present age of Prakash is 4 times the age of Pramod and 6 times the age of Praveen. If the sum of their ages is equal to 51 years, the present ages of Pramod and Praveen respectively are :

(1) 9 years, 6 years (2) 6 years, 9 years (3) 9 years, 4 years (4) 12 years, 6 years

Ans. (1)

Sol. Pramod $= P_1$ $P_3 = 4P_1$

Praveen $= P_2$ $P_3 = 6P_2$

Prakash $= P_3$ $P_1 + P_2 + P_3 = 51$

option (1) $P_3 = 36$ yrs

$P_1 = 9$ yrs

$P_2 = 6$ yrs

Directions (Q.19-23) : Complete the given number/ letter/figure analogy by choosing the correct answer from the given alternatives.

19. 18 : 289 : 272 :: ? : 169 : ?

(1) 19,342 (2) 17,306 (3) 14,210 (4) 14,156

Ans. (4)

Sol. $18 : 17^2 : \left(17^2 - 18 + 1\right) :: 14 : 13^2 : \left(13^2 - 14 + 1\right)$

option (4) (14) (156)

20. 66 : 400 : : 166 : ?

(1) 800 (2) 1000 (3) 1200 (4) 1400

Ans. (2)

Sol. $66 : 400 :: 166 : ?$

$66 \times 6 + 4 = 400$

$166 \times 6 + 4 = 1000$

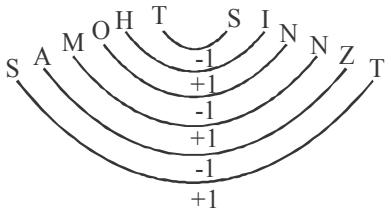
option (2)

21. SAMOHT : SINNZT :: RELHEM : ?

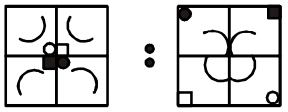
(1) L F G M D S (2) L F I M D S (3) S F M I F N (4) R D K G D L

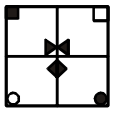
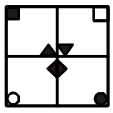
Ans. (1)

Sol.



option (1)

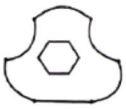
22.  ?

(1)  (2)  (3)  (4) 

Ans. (4)

Sol. (4) By observation.

23.  ?

(1)  (2)  (3)  (4) 

Ans. (3)

Sol. (3) By observation.

24. Direction : Find the wrong number in the given series.

24. 200, 300, 500, 900, 1800, 3300

(1) 3300 (2) 1800 (3) 900 (4) 500

Ans. (2)

Sol. $200 \times 2 - 100 = 300 \times 2 - 100 = 500 \times 2 - 100 = 900$

$900 \times 2 - 100 = 1700 \times 2 - 100 = 3300$

option (2)

25. Take the given statements as true and decide which of the conclusions logically follow from the statements.

Statements :

a. Some cows are horses.

b. Some camels are goats.

c. All goats are horses.

Conclusions :

I. Some cows are not horses.

II. Some horses are not goats.

III. Some camels are horses.

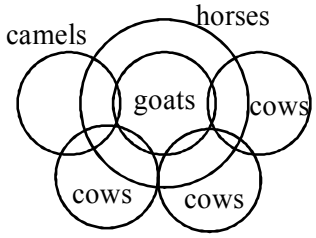
IV. All horses are camels.

(1) Conclusions I, II and III only follow (2) Conclusions II, III and IV only follow

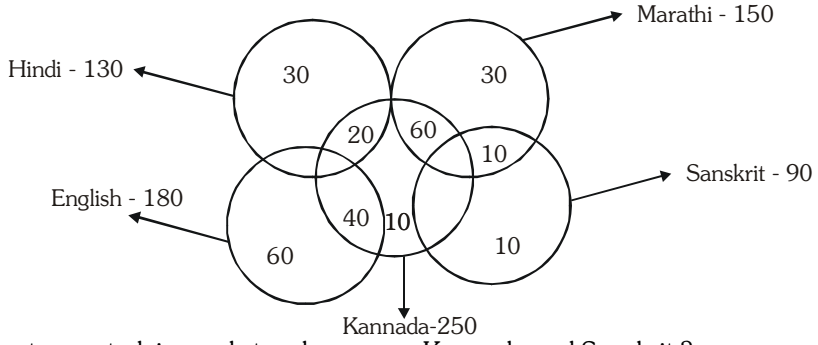
(3) Conclusions I and II only follow (4) Conclusions III and IV only follow

Ans. (Bonus)

Sol. Conclusion 3 is correct only.



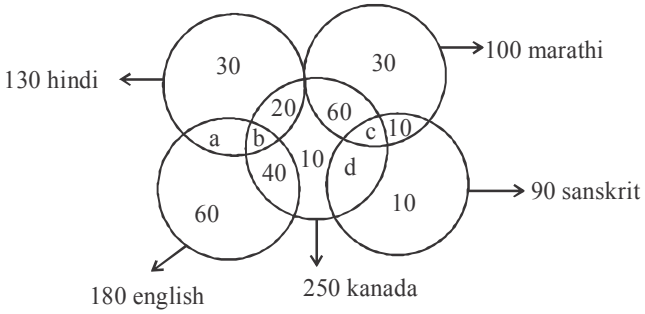
Direction (Q.26-27) : A high school in Belagavi has 800 students. The numbers of students who are studying different languages in the school are represented by intersecting circles. Find the answers to the given questions by studying the figure.



26. How many students are studying only two languages Kannada and Sanskrit ?
(1) 10 (2) 20 (3) 30 (4) 40

Ans. (2)

Sol.



$130 = 50 + a + b$

$150 = 30 + 10 + 60 + d \Rightarrow \boxed{d = 50}$

$50 + 10 + 10 + c = 90 \Rightarrow \boxed{c = 20}$

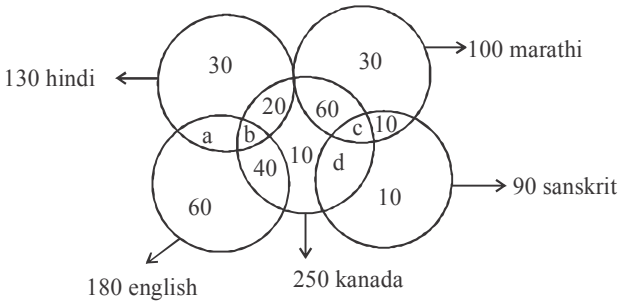
$20 + 60 + 10 + 40 + 50 + 20 + b = 250 \Rightarrow \boxed{b = 50}$

option (2)

27. How many students are studying only three languages Kannada, English and Hindi?
(1) 30 (2) 40 (3) 50 (4) 60

Ans. (3)

Sol.



$130 = 50 + a + b$

$150 = 30 + 10 + 60 + d \Rightarrow \boxed{d = 50}$

$50 + 10 + 10 + c = 90 \Rightarrow \boxed{c = 20}$

$20 + 60 + 10 + 40 + 50 + 20 + b = 250 \Rightarrow \boxed{b = 50}$

option (3)

28. When (PQRS) is multiplied by S, the product is (3 S Q 9 Q). If the value of Q is 6, the values of P and R respectively are :

(1) 7 and 3 (2) 2 and 5 (3) 9 and 8 (4) 8 and 7

Ans. (4)

Sol. option (4)

$$\begin{array}{l} PQRS \\ \times\ S \\ \hline 3SQ9Q \end{array} \qquad Q = 6 \text{ (given)} \qquad \begin{array}{l} P6RS \\ \times\ \ S \\ \hline 35696 \end{array}$$

possible values 4, 6.

1) $S = 4$

$$\begin{array}{l} P6R4 \\ \times\ \ 4 \\ \hline 34696 \end{array}$$

On solving we get $P = 8$

$R = 7$

29. If $\begin{array}{r} APPLE \\ +\ BALL \\ +\ \ APE \\ \hline 47958 \end{array}$

The code for PEBBLE is

(1) 2 3 4 4 1 3 (2) 1 3 6 6 2 3 (3) 3 1 2 2 6 1 (4) 1 2 3 3 6 2

Ans. (2)

Sol. $2E + L = 8$

take $E = 3, L = 2$

$2L + P = 5, P = 1$

$2A + P = 9, A = 4$

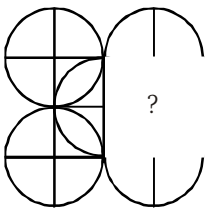
$P + B = 7, B = 6$

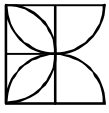
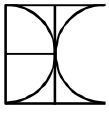
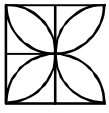
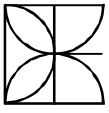
$PEBBLE = 136623$

option (2)

Directions (Q.30-31) : Find the missing part of the given figure from the alternatives.

30.

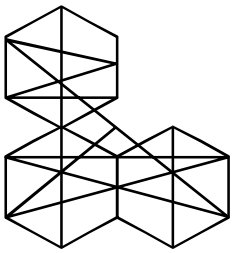


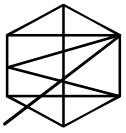
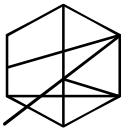
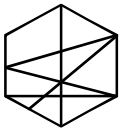
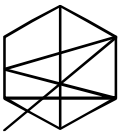
(1)  (2)  (3)  (4) 

Ans. (1)

Sol. option (1). By observation.

31.



(1) 
(2) 
(3) 
(4) 

Ans. (4)

Sol. option (4). By observation.

32. What are the least number of ducks that could swim in the following formation?

a. Two ducks infront of a duck

b. Two ducks behind a duck

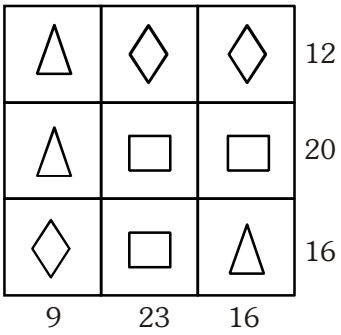
c. A duck between two ducks.

(1) 11 (2) 7 (3) 5 (4) 3

Ans. (1)

Sol. option (1). [Duck 1 Duck 2 Duck 3]

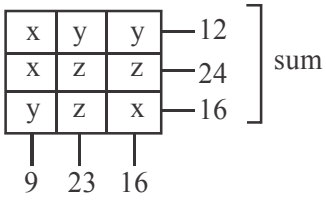
33. Using the given Matrix find the vlaue of ($\Diamond + \Diamond + \square$).



(1) 18 (2) 19 (3) 20 (4) 21

Ans. (2)

Sol. $\triangle = x$
$\Diamond = y$ So,
$\square = z$



$x + 2y = 12$ $2x + y = 9$

$x + 2z = 20$ $y + 2z = 23$

$x + y + z = 16$ $x + y + z = 16$

with help of these equation

we get $x = 2$

$y = 5$

$z = 9$

we want $2y + z = 19$. option (2).

34. In the given Matrix find the missing section.

18	21	19	22
20			24
19	22		23
21	24	22	25

(1)

21	23
	20

(2)

19	22
	24

(3)

22	20
	19

(4)

23	21
	20

Ans. (4)

Sol.

18	21	19	22
20	a	b	24
19	22	c	23
21	24	22	25

$22 + a = 21 + 24$, $a = 23$

$a + b = 20 + 24$

$b = 44 - 23 = 21$

$22 + c = 19 + 23$, $c = 20$

35. The three pairs of opposite faces of a cube are given as follows:

A, D

B, E

C, F

Identify the correct figure from the given alternatives, when the cube is unfolded.

(1)

A	D	
	B	E
	C	F

(2)

C	D	
	A	B
	E	F

(3)

C	E	
	A	F
	B	D

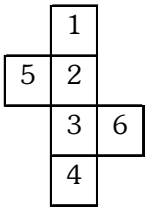
(4)

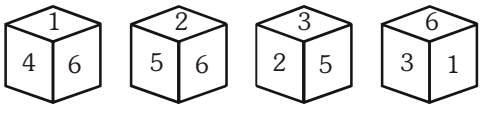
A	C	
	E	D
	B	F

Ans. (3)

Sol. By observation, option (3)

36. When the problem figure is folded into a cube, which ot the following cubes will be formed?





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

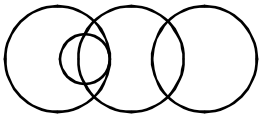
(1) A and C only (2) B and D only (3) A only (4) D only

Ans. (1)

Sol. $1 \leftrightarrow 3,\ 2 \leftrightarrow 4,\ 5 \leftrightarrow 6$

($\leftrightarrow$ mean opposite faces) (option 1)

37. Which one of the following relations are represented by the above Venn Diagram?



(1) Doctors, Engineers, Professors, Businessman (2) Professors, Engineers, Doctors, Industrialists

(3) Lawyers, Doctors, Engineers, Professors (4) Doctors, Surgeons, Professors, Engineers

Ans. (4)

Sol. By observation, option (4)

Direction (Q.38-39) : In a school 90 students play different kinds of games.

Among them,

a. 15 play Cricket, Hockey and Football

b. 15 play Cricket and Football only

c. 10 play Hockey and Football only

d. Totally 30 play only two kinds of games

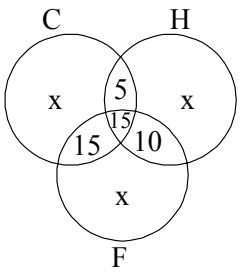
e. Equal number of students play only one of the games.

38. Find the number of students who play Hockey and Cricket only.

(1) 5 (2) 10 (3) 15 (4) 20

Ans. (1)

Sol.



$3x + 5 + 15 + 15 + 10 = 90$

$\Rightarrow x = 15$

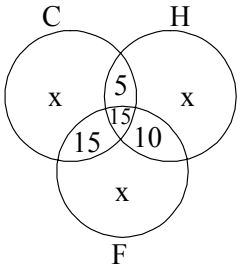
30 – (15 –10) = 15 (option 1)

39. Find the number of students who play Cricket.

(1) 40 (2) 45 (3) 50 (4) 55

Ans. (3)

Sol.

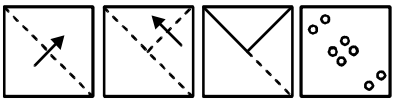


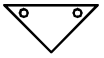
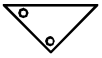
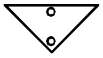
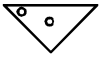
$3x + 5 + 15 + 15 + 10 = 90$

$\Rightarrow x = 15$

15 + 15 + 15 + 5 = 50 (option 3)

40. A square shaped paper is folded as shown and punched. The problem figure shows the paper when unfolded. Which among the alternatives indicates the position of the punch made when it was folded ?



(1)  (2)  (3)  (4) 

Ans. (3)

Sol. By observation, option (3)

41. Find the missing letters in the given matrix.

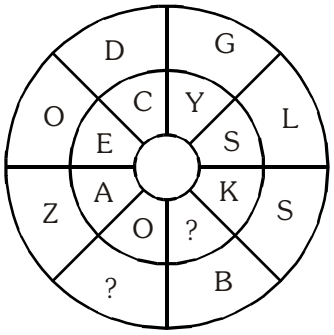
G	C	X	?
C	Y	T	N
X	T	?	I
R	?	I	C

(1) S, G, N (2) R, Q, X (3) R, O, N (4) Y, P, G

Ans. (3)

Sol. Sum of horizontal & vertical alphabet is same. (Option 3)

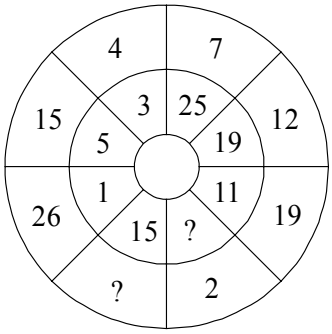
42. Find the missing letters in the given Pattern.



(1) A, M (2) V, E (3) F, Q (4) T, P

Ans. (1)

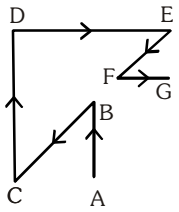
Sol. A = 1, B = 2 _ _ _ _ _ _ _ z = 26

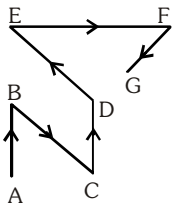


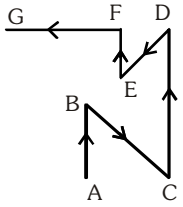
Outerring difference increasing by 2 from 4 in clockwise direction

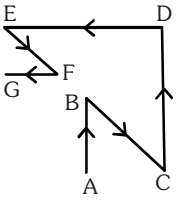
Innerring difference increasing by 2 from 3 in clockwise direction

43. A person starts from a place A and moves towards North. He then turns to South - east direction and moves. Again he turns towards North and moves for sometime. He then turns to his left and moves. After sometime he turns to South-east and moves. Finally he moves in the west direction and rests at G. Which of the option figures Indicates his complete movement ?

(1) 

(2) 

(3) 

(4) 

Ans. (4)

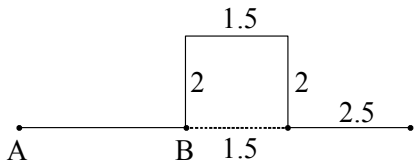
Sol. (Option 4)

44. A motor cyclist moves from a place A to B in East direction. From B he turns to left and moves for 2 km. He then takes a right down and rides for 1.5 km. Again he turns right and moves for 2 km. He then takes a left turn and rides for 2.5 km. and stops. If he is distance of 7 km. from starting place A, find the distance between A and B.

(1) 2.5 km (2) 3 km (3) 4 km (4) 1 km

Ans. (2)

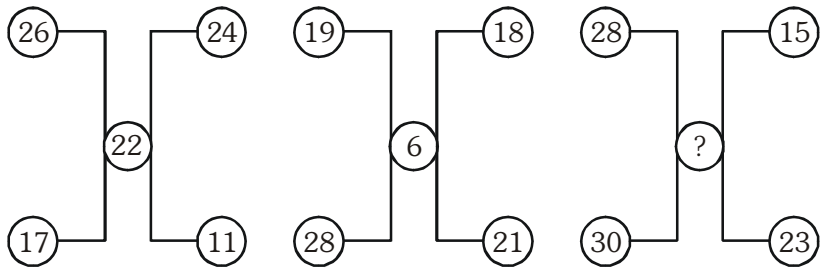
Sol.



3 km (Option 2)

Direction (Q.45-46) : In the questions below the numbers in the figures are related. Identify their relationship and find the missing numbers in the given figures.

45.



(1) 20 (2) 18 (3) 16 (4) 14

Ans. (1)

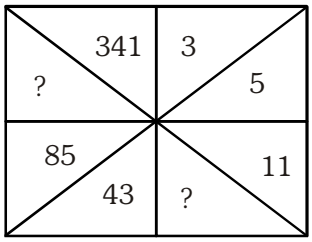
Sol. (Sum of even number) – (Sum of odd number) = middle number

(20 + 24) – (17 + 11) = 22

(28 + 18) – (19 + 21) = 6

(28 + 30) – (15 + 23) = 20 (Option 1)

46.



(1) 18, 151 (2) 18, 169 (3) 21, 171 (4) 21, 189

Ans. (3)

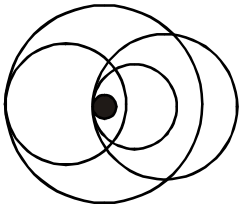
Sol. $3\times2-1=5,\ 5\times2+1=11, 11\times2-1=21,$

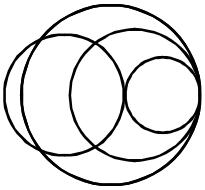
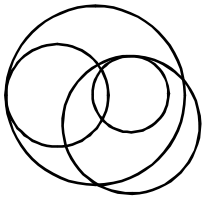
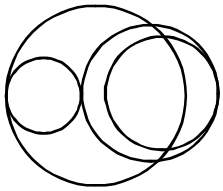
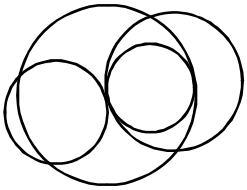
$21\times2+1=43, 43\times2-1=85,$

$85\times2+1=171$

Directions (Q.47 & Q.48) : The given problem figure has one or more dots. Observe the dot positions and identify the option figure which is exactly suitable to keep the dots with the same conditions.

47.

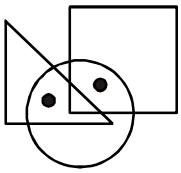


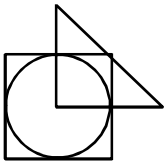
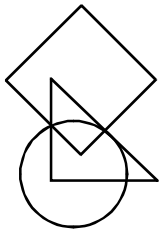
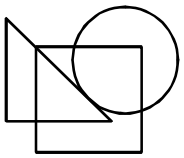
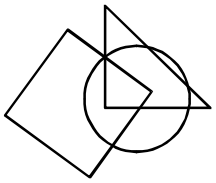
(1)  (2)  (3)  (4) 

Ans. (2)

Sol. By observation, option (2)

48.



(1)  (2)  (3)  (4) 

Ans. (4)

Sol. By observation, option (4)

49. The average body weights of 4 men A, B, C and D is 50 kg.

Decide whether the data given in the statements I, II and III are sufficient to find the individual body weights of B and D

I. The weight of A is 65 kg and of C is 45 kg

II. The sum of the weights of B and D is 90 kg

III. D has the least weight compared to A, B and C

(1) Data in I and II are sufficient

(2) Data in II and III are sufficient

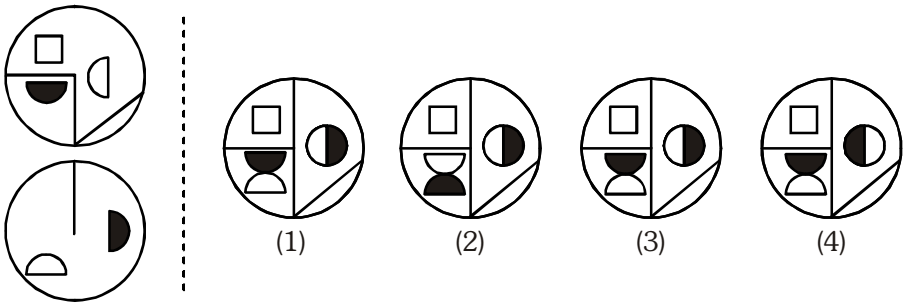
(3) Data in I, II and III are sufficient

(4) Data in I, II and III are not sufficient

Ans. (4)

Sol. By observation, option (4)

50. A set of two figures is given as problem figure. Find which one of the option figures is formed, when the upper figure is superimposed on the lower one.



Ans. (1)

Sol. By observation, option (1)