

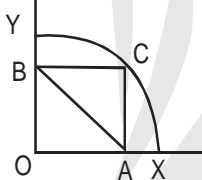
Number of Questions : 30

WSP-0018/18

Directions for questions 1 to 4: Each question is followed by two statements, I and II. Answer the questions based on the statements and mark the answer as

- (1) If the question can be answered with the help of any one statement alone but not by the other statement.
- (2) If the question can be answered with the help of either of the statements taken individually.
- (3) If the question can be answered with the help of both statements together.
- (4) If the question cannot be answered even with the help of both statements together.

1. Find the length of AB if $\angle YBC = \angle CAX = \angle YOX = 90^\circ$. **CAT 1998**



- I. Radius of the arc is given.
 - II. $OA = 5$
2. Is n odd? **CAT 1998**
 - I. n is divisible by 3, 5, 7 and 9.
 - II. $0 < n < 400$
3. Three friends P, Q and R are wearing hats, either black or white. Each person can see the hats of the other two persons. What is the colour of P's hat? **CAT 1997**
 - I. P says that he can see one black hat and one white hat.
 - II. Q says that he can see one white hat and one black hat.

4. What is the area bounded by the two lines and the coordinate axes in the first quadrant?
 - I. The lines intersect at a point which also lies on the lines $3x - 4y = 1$ and $7x - 8y = 5$.
 - II. The lines are perpendicular, and one of them intersects the Y-axis at an intercept of 4. **CAT 1997**

Directions for questions 5 to 9: Answer the questions on the basis of the information given below.

Rishi took four cubes and wrote one letter on each of the faces of the cubes such that all the letters written by him are distinct. He neither wrote the letter 'Q' nor 'X'. He played a game by throwing the cubes on the floor and forming a word using the letters appearing on the top face of each cube. Following is the list of ten such words that he made during the game.

CRAG	FLEW	WHIP	FOUR	GAZE
LAZY	POLE	ROAD	TUCK	MIKE

5. Out of the five other letters that are written on the same cube as the letter K, how many letters can be uniquely determined?

(1) 1	(2) 2
(3) 3	(4) 4
6. Which of the following words can be definitely formed using the given cubes?

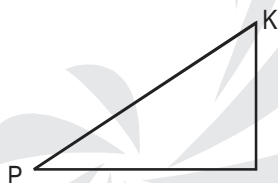
(1) HOPE	(2) FIRM
(3) DRUM	(4) CUBE
7. Which of the following words cannot be formed using the given cubes?

(1) DROP	(2) DAME
(3) WORD	(4) MEAL

8. If JUNK and SWAN can also be formed using the above mentioned cubes then which of the following combination belongs to one of the cubes?
 (1) S, I, U and Z (2) B, V, K and O
 (3) G, L, U and M (4) N, R, T and H
9. If JOIN and SAVE can also be formed using the above mentioned cubes then which of the following words cannot be made using the given cubes?
 (1) VASE (2) NOSE
 (3) JUNE (4) SAGE

Directions for questions 10 to 13: Answer the questions on the basis of the information given below.

- (1) if the question can be answered by one of the statements alone, but cannot be answered by using the other statement alone.
 (2) if the question can be answered by using either statement alone.
 (3) if the question can be answered by using both the statements together, but cannot be answered by using either statement alone.
 (4) if the question cannot be answered even by using both the statements together.
10. At what height is the kite "K" above the ground, when Ram is flying it, standing at point P?



- I. He is flying the kite at the best angle, which is 45° .
 II. He has let out 225 ft of string.
11. Is $z > 0$?
 I. $\frac{x}{y} < 0$ and $\frac{z}{y} > 0$
 II. $x < 0$
12. In quadrilateral ABCD, AB = 5 cm and CD = 3 cm. Find the area.
 I. ABCD is a cyclic quadrilateral.
 II. AB = BC and CD = AD

13. What is the price of mangoes per kilogram?
 I. 10 kg mangoes and two dozen oranges cost Rs. 252.
 II. 2 kg mangoes could be bought in exchange for one dozen oranges.

Directions for questions 14 to 17: Answer the questions on the basis of the information given below.

Each digit, 1, 2, 3, 4, 5, 6, 7, 8 and 9 is represented by a different letter A, B, C, D, E, F, G, H and I but not necessarily in this particular order. Further, each of $A + B + C$, $C + D + E$, $E + F + G$ and $G + H + I$ is equal to 13.

14. Find the value of E.
 (1) 5 (2) 7
 (3) 4 (4) Can't be determined
15. What is the sum of C, E and G?
 (1) 7 (2) 9
 (3) 11 (4) Can't be determined
16. How many different values of $(A + D + F + I)$ are possible?
 (1) 1 (2) 2 (3) 4 (4) 3
17. Which one of the following is NEVER true?
 (1) A is greater than G
 (2) H is less than D
 (3) B is less than C
 (4) D is greater than F

Directions for questions 18 to 20: Answer the questions on the basis of the information given below:

We are three friends — Saptarsh, Rushat and Trivendra — each has certain number of red and white balls.

- I. Saptarsh has atleast one red ball and twice as many white balls as red balls.
 II. Rushat has atleast one red ball and three times as many white balls as red balls.
 III. Trivendra has atleast one red ball and three more white balls than red balls.
 IV. When I tell you the number of balls (the number is less than 25) we have altogether, you would know exactly how many balls I have, but would not know how many balls each of the others has".

18. How many balls do these three people have altogether?
 (1) 12 (2) 19
 (3) 24 (4) 18
19. Who is the speaker of the given text?
 (1) Saptarsh
 (2) Rushat
 (3) Trivendra
 (4) Either Rushat or Saptarsh
20. If the number of balls with Saptarsh is three less than that with Trivendra, then what is the number of balls with Rushat?
 (1) 4
 (2) 8
 (3) 9
 (4) Cannot be determined

Directions for questions 21 to 24: Answer the questions on the basis of the information given below.

Table A provides data about the ages of children in a school. For the age given in the first column, the second column gives the no of children not exceeding that age. For example, the first entry indicates that there are 9 children aged 4 years or less. Tables B and C provide data on the heights and weights respectively of the same group of children in a similar format. Assuming that an older child is always taller and weighs more than a younger child, answer the following questions.

Age (Years)	Number
4	9
5	12
6	22
7	35
8	42
9	48
10	60
11	69
12	77
13	86
14	100

Height (cm)	Number
115	6
120	11
125	24
130	36
135	45
140	53
145	62
150	75
155	81
160	93
165	100

Weight (kg)	Number
30	8
32	13
34	17
36	28
38	33
40	46
42	54
44	67
46	79
48	91
50	100

21. What is the no of children of age 9 years or less whose height doesn't exceed 135 cm?
 (1) 48 (2) 45
 (3) 3 (4) Can't be determined
22. How many children of age more than 10 years are taller than 150 cm and do not weigh more than 48 kg?
 (1) 16 (2) 40
 (3) 9 (4) Can't be determined
23. Among the children older than 6 years but not exceeding 12 years, how many weigh more than 38 kg?
 (1) 34 (2) 52
 (3) 44 (4) Can't be determined
24. How many children of age between 8 years and 13 years are not taller than 145 cm?
 (1) 11 (2) 30 (3) 33 (4) 20

Directions for questions 25 to 27: Answer the questions on the basis of the information given below.

There are 100 employees in an organization across five departments. The following table gives the department-wise distribution of average age, average basic pay and allowances. The gross pay of an employee is the sum of his/her basic pay and allowances.

Department	Number of Employees	Average Age (Years)	Average Basic Pay (Rs.)	Allowances (% of Basic Pay)
HR	5	45	5000	70
Marketing	30	35	6000	80
Finance	20	30	6500	60
Business Development	35	42	7500	75
Maintenance	10	35	5500	50

There are limited numbers of employees considered for transfer/promotion across departments. Whenever a person is transferred/promoted from a department of lower average age to a department of higher average age, he/she will get an additional allowance of 10% of basic pay over and above his/her current allowance.

There will not be any change in pay structure if a person is transferred/promoted from a department with higher average age to a department with lower average age.

Questions below are independent of each other.

25. What is the approximate percentage change in the average gross of the HR department due to transfer of a 40-year old person with basic pay of Rs. 8000 from the Marketing department?
 (1) 9% (2) 11% (3) 13%
 (4) 15% (5) 17%
26. There was a mutual transfer of an employee between Marketing and Finance departments and transfer of one employee from Marketing to HR. As a result, the average age of Finance department increased by one year and that of Marketing department remained the same. What is the new average age of HR department?
 (1) 30 (2) 35 (3) 40
 (4) 45 (5) cannot be determined
27. If two employees (each with a basic pay of Rs. 6000) are transferred from Maintenance department to HR department and one person (with a basic pay of Rs. 8000) was transferred

from Marketing department to HR department, what will be the percentage change in average basic pay of HR department?

- (1) 10.5% (2) 12.5% (3) 15%
 (4) 30% (5) 40%

Directions for questions 28 to 30: Answer the questions on the basis of the information given below.

In a city, elections are conducted in a peculiar manner. There are three rounds of elections, each round separated by a gap of 4 months. So the candidate is voted for thrice in the election year. If the president of the current term wishes to be re-elected, he can stand only in the first round. If he secures the first place, the others bow out of the race. If he does not, the election process progresses into the second round and then the third. Each candidate is awarded points in every round equal to his position in the round. Finally the grand total of points is made and the candidate with the least total is declared the president elect.

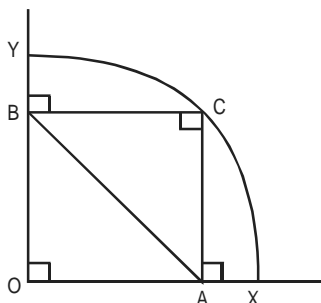
This year the president lost the elections. Of the five other candidates, the winner secured the first position only in the last round with a grand total of 7 points. Three candidates had equal total points and the highest scorer had 4, 5, 2 points in the first, second and third round respectively. There was no tie for any position in any round. In the entire election process, the same person never stood in the same position more than once.

28. How many points did the current president score?
 (1) 3 (2) 5
 (3) 6 (4) 4
29. Which of the following score is not possible to get for any candidate in the first, second and the third round respectively?
 (1) 1, 3, 5 (2) 3, 1, 5
 (3) 5, 1, 3 (4) 3, 2, 4
30. What is the score of the candidate with the lowest grand total of points in the first, second and the third round?
 (1) 2, 4, 1 (2) 4, 2, 1
 (3) 1, 2, 4 (4) None

Answers and Explanations

1	4	2	3	3	4	4	3	5	3	6	2	7	3	8	4	9	3	10	3
11	3	12	3	13	3	14	3	15	1	16	3	17	3	18	2	19	1	20	1
21	2	22	1	23	3	24	4	25	3	26	3	27	2	28	3	29	2	30	1

1. 4



Do not make the mistake of assuming O to be the centre of the circle. Since the centre is not known, knowing radius is not of great help. It can be observed that $\angle BCA$ is also 90° , as in the quadrilateral OBCA, the remaining three angles are 90° . So the quadrilateral can either be a square or a rectangle. As we do not know even this, we cannot make use of the second statement as well. Hence, both the statements are not sufficient to answer the question.

2. 3 LCM of 3, 5, 7, 9 = 315. Hence, all the multiples of 315 will be divisible by 3, 5, 7 and 9. These may be even or odd. Hence, the first statement in itself is not sufficient to answer the question. The second statement however suggests that the number is 315 itself (as it is the only multiple that lies between 0 and 400). Hence, n is indeed odd. We require both the statements together to answer this.

3. 4 P says he can see one black and one white hat. So either Q is wearing white and R is wearing black, or Q is wearing black and R is wearing white. Q also makes same statement. Still we cannot say the colour of the hat which P is wearing.

4. 3 If we solve the two given equations, we get the point of intersection as (3, 2). Let $A = (3, 2)$. The lines of our interest (let it be L_1 and L_2) also pass through A. One of the lines passes through (0, 4). Let L_1 passes through (0, 4), but it also passes through (3, 2). Hence, we

can find the slope of L_2 (which is equal to $-\frac{2}{3}$). Hence,

slope of L_2 will be $\frac{3}{2}$ since L_1 and L_2 are perpendicular.

Hence, equations of L_1 and L_2 can be obtained by using slope point form. (Students! we need not really find out the equations.) After getting both the equations, we can find the area bounded by L_1 and L_2 and coordinate axes.

For questions 5 to 9:

- In order to allot alphabet to cubes we need to pick up those words which have most alphabets in common. So, we pick up LAZY and GAZE as they have two alphabets in common.
- Given the word LAZY, we arbitrarily assign L to cube 1, A to cube 2, Z to cube 3, and Y to cube 4.
- From GAZE, E can't be on cube 2 or cube 3; while from POLE, E can't be on cube 1. So E is on cube 4 with Y and G in GAZE is on cube 1.
- From POLE, O isn't on cube 1 with L or on cube 4 with E; while from ROAD, O isn't on cube 2 with A, so O is on cube 3. Then the P in POLE is on cube 2.
- The R in CRAG isn't on cube 1 or cube 2, nor is it on cube 3 (ROAD), so R is on cube 4 and the C in CRAG is on cube 3. From ROAD we get D is on cube 1.
- F isn't on cube 1 or cube 4 (FLEW), nor is F on cube 3 (FOUR); so F is on cube 2, with U on cube 1 (FOUR) and W on cube 3 (FLEW).
- From WHIP, I isn't on cube 2 or cube 3, while from MIKE I isn't on cube 4, so I is on cube 1 and H from WHIP is on cube 4.
- The K in MIKE isn't on cube 1 or cube 4 and isn't on cube 3 (TUCK); so K is on cube 2, M is on cube 3 (MIKE) and the T on cube 4 (TUCK).

So at the end we get the following result:

1	2	3	4
L	A	Z	Y
G	P	O	E
D	F	C	R
U	K	W	H
I		M	T

5. 3 6. 2 7. 3

8. 4 N isn't on cube 1, cube 2 (JUNK), or cube 3 (SWAN) and completes cube 4, with the J in JUNK completing 3.
9. 3 From JOIN we get J and N are in cube 2 and 4 or vice versa.
From SAVE we get S and V are in cube 1 and 3 or vice versa and B is in cube 2.
So one of J and N will be on cube 4 and E is also on cube 4 so JUNE is not possible.
10. 3 Statements I and II alone are not sufficient. But the two combined together is sufficient to find the height.
- $$\text{Height} = 225 \sin 45^\circ = \frac{225}{\sqrt{2}} \text{ ft.}$$
11. 3 From statement I, x and y are of opposite sign.
z and y are of same sign.
Statement II does not give information about z.
But combining statements I and II, we can get the sign of z. (and of x and y as well.)
13. 3 Statement I alone is not sufficient to find the area. It only tells
- $$\text{Area} = \sqrt{(s-a)(s-b)(s-c)(s-d)}$$
- Statement II gives the length of all the sides.
Combining statements I and II, we can find the area
13. 3 Statement I or II alone does not help to answer the question.
Combine statements I and II. If 1 kg mangoes and one dozen oranges respectively cost Rs. m and Rs. a, then statement I gives $10m + 2a = 252$ or $5m + a = 126$.
Statement II gives $2m = a$.
Solving, we get $m = 18$. So 1 kg mangoes cost Rs. 18.

For questions 14 to 17:

According to given data, we can draw the following eight possibilities:

	1 and 2	3 and 4	5 and 6	7 and 8
A + B + C	3 + 9 + 1	9 + 3 + 1	6 + 5 + 2	5 + 6 + 2
C + D + E	1 + 8 + 4	1 + 8 + 4	2 + 7 + 4	2 + 7 + 4
E + F + G	4 + 7 + 2	4 + 7 + 2	4 + 8 + 1	4 + 8 + 1
G + H + I	2 + 6 + 5 or 2 + 5 + 6	2 + 6 + 5 or 2 + 5 + 6	1 + 9 + 3 or 1 + 3 + 9	1 + 9 + 3 or 1 + 3 + 9

14. 3 From the table, in each case the value of E is 4.
15. 1 The sum of C + E + G = 1 + 4 + 2 = 2 + 4 + 1 = 7.
16. 3 A + D + F + I = 3 + 8 + 7 + 6 or 3 + 8 + 7 + 5 or 9 + 8 + 7 + 5 or 9 + 8 + 7 + 6, i.e. 24 or 23 or 29 or 30.
So, the four different sum's are possible.

17. 3 Check the choice (3), the value of B can be 3, 9, 5 or 6 and the value of C can be 1 or 2.
So, B is never less than C.

For questions 18 to 20:

From (I) Saptarsh has atleast 3 balls and the number of balls can be 3, 6, 9, 12, 15, 18, 21 ...
From (II) Rushat has atleast 4 balls and the number of balls can be 4, 8, 12, 16, 20, ...
From (III) Trivendra has atleast 5 balls and the number of balls can be 5, 7, 9, 11, 13, 15
The total number of balls is atleast 12 and atmost 24.
If total number of balls is even, then Saptarsh must have an odd number of balls and vice versa.
Make different combinations:
The total number of balls cannot be 13 because then the sum of the number of balls with them cannot be 13.
Total cannot be 12, 14, 15, 16 and 17 because then the number of balls with each would be known.
∴ Contradicting statement (IV)
Total number of balls cannot be 18, 20, 21, 22, 23 or 24 because then the exact number of balls cannot be known for anybody.
Contradicting statement (IV). So, the total number of balls is 19.
If the total is 19, then Saptarsh must have an even number of balls which is less than $19 - (4 + 5) = 10$.
∴ Saptarsh must have 6 balls. Rushat and Trivendra together have 13 balls. Rushat can have either 4 or 8 balls. Trivendra can have either 9 or 5 balls.
∴ The number of balls with Rushat and Trivendra cannot be known. Hence, the speaker is Saptarsh.

18. 2

19. 1

20. 1 As per the information given in the question, the number of balls with Trivendra would be 9 and therefore number of balls with Rushat would be $13 - 9 = 4$.

21. 2 Number of children with age ≤ 9 years = 48

Number of children with height ≤ 135 cm = 45
Therefore, the number of children of age 9 years or less whose height does not exceed 135 cm will be the common of the two (age ≤ 9 years and height ≤ 135 cm) = minimum(48, 45) = 45.

22. 1 Number of children aged more than 10 years
= $100 - 60 = 40$
Number of children taller than 150 cm = $100 - 75 = 25$
Number of children with weight more than 48 kg
= $100 - 91 = 9$
These 9 children are surely included in the 25 children taller than 150 cm and more than 10 years of age because of the assumption given.
Thus, $25 - 9 = 16$ children satisfy the given condition.

23. 3 Number of children older than 6 years but not exceeding 12 years = $77 - 22 = 55$
 Number of children with weights not exceeding 38 kg = 33

These 33 children includes the 22 children with age not exceeding 6 years.

Therefore, the remaining $(33 - 22) = 11$ comes from the 55 children of ages older than 6 years but not exceeding 12 years.

Therefore, $55 - 11 = 44$ children satisfy the given condition.

24. 4 Number of children between 8 years and 13 years = $86 - 42 = 44$.

Now, there are 14 children whose age is greater than 13 years. Therefore, the height of these 14 children will also be greater than 145 cm.

Now, the total number of children whose height is greater than 145 cm is 38.

∴ If we subtract 14 children of age > 13 from these 38 children, we get 24 children whose age is between 8 and 13 and height is greater than 145 cm.

∴ The remaining $44 - 24 = 20$ children of age between 8 and 13 years are not taller than 145 cm.

25. 3 Average gross pay of HR department before transfer

$$= \text{Rs. } 5000 \times 1.7 = \text{Rs. } 8500$$

Basic pay of the transferred person = Rs. 8000

New allowance of the transferred person = $(80 + 10) = 90\%$ of the basic pay

New Gross pay of the transferred person

$$= \text{Rs. } 8000 \times 1.9 = \text{Rs. } 15,200$$

New average gross pay of HR dept.

$$= \text{Rs. } 8500 + \left(\frac{15200 - 8500}{6} \right) = \text{Rs. } (8500 + 1116)$$

$$\text{Percentage change} = \frac{1116}{8500} \times 100 \approx 13\%$$

26. 3 Since increase in average age of the Finance department. is one year, the age of the person moving from Marketing to Finance is more than that moving from Finance to Marketing, by $1 \times 20 = 20$ years.

Hence, due to this transfer, cumulative age of Marketing department has gone down by 20 yrs. But since the average age of Marketing department remaining unchanged, the person moving from Marketing to HR has age = (Avg. age of Marketing) - 20 = 15 years.

$$\text{New average age of HR dept.} = \frac{(5 \times 45) + (1 \times 15)}{5 + 1} = 40 \text{ yrs.}$$

27. 2 Total basic pay of HR
 $= 5 \times 5000$ (existing) + 2×6000 (from Maintenance)
 $+ 1 \times 8000$ (from Marketing) = Rs. 45,000

$$\text{New average} = \frac{45,000}{8} = \text{Rs. } 5,625$$

$$\text{Percentage change} = \frac{625}{5000} \times 100 = 12.5\%.$$

For questions 28 to 30:

From the given data in the second paragraph, we can make the following table

Candidate name	Position	1st round	2nd round	3rd round	Total
A	1	2	4	1	7
B					
C					
D					
E	5	4	5	2	

We cannot conclude the position of president because he has lost in the first round. So, we can only say that his point is not one for first round.

As, for winner, sum of the lowest grand total = 7 (given)

So, 1st round + 2nd round = 6

$$\begin{array}{rcl} \text{Cases} & 3 & \times \\ & 2 & \checkmark \\ & 5 & \times \end{array}$$

Here, two cases rejected because same person cannot stand at the same position for more than once.

So, the points for the lowest grand total would be (2, 4, 1).

As for the remaining three candidates the grand total points will be equal, so the total must be greater than 7 and less than 11.

But the grand total cannot be 8, as for scoring total of 8 each of these three has to score 1 point in one of the three rounds which is not possible.

So, on the given condition, by rejecting possibilities, we get the following result.

Candidate name	Position	1st round	2nd round	3rd round	Total
A	1	2	4	1	7
B		5	1	3	9
C		3	2	4	9
D		1	3	5	9
E	5	4	5	2	11
Current president	6				

28. 3 Current presidents score = 6

29. 2 From the given option, we can say that values given in option (2) does not satisfy.

30. 1 From the table above, points scored by the winner in each round is 2, 4, 1.