PART – B

DATA SUFFICIENCY

Exercise – 11

Directions for questions 1 to 25: Each question is followed by two statements, 1 and 2. Indicate your responses based on the following directions.

Mark (A) if the question can be answered using 1 alone but not using 2 alone.
Mark (B) if the question can be answered using 2 alone but not using 1 alone.
Mark (C) if the question can be answered using either statement alone.
Mark (D) if the question can be answered using 1 and 2 together but not using 1 or 2 alone.

1. In the island of Oslo, people use a new language. In that language, if every English word has a corresponding word, what is the code for 'who'?
1. The code for 'who is it' is "po so lo". The code for 'it is not good' is "no lo go po".
2. The code for 'who am I' is "so to do". The code for 'who are you' is "yo jo so".

2. All Ivy league colleges are located in cities. All the colleges located in cities have good placements. All Ivy league colleges are autonomous. No autonomous college has university affiliation. Is MII an Ivy league college?
1. MII has good placements.
2. MII has an university affiliation.

3. When a natural number is divided by 3d, the remainder is 14. What is the remainder when it is divided by d?
1. When it is divided by 2d, the remainder is 9.
2. When it is divided by 2d, the remainder is 4.

4. Find the values of the real numbers x, y and z.
1. $x + 2y + z = 8$; $3x + y + z = 8$; $2x + y + z = 7$.
2. $x^2 + y^2 + z^2 - 2x - 4y - 6z = -14$.

5. Five friends – A, B, C, D and E – decided to meet for lunch at a restaurant. A arrived at the restaurant first and took one of the five seats at a circular table. B joined him later, followed by C, D and E, in that order. Who sits to the immediate right of A?
1. No two friends who arrived successively occupied adjacent seats.
2. B is sitting to the immediate right of E.

6. Pavan spends 15% of his salary on groceries, 25% on house rent and 35% on education. The corresponding figures for Bharath are 30%, 40% and 20% respectively. Is the amount that Bharath spends on groceries more than the amount that Pavan spends on education?
1. The amount that Pavan spends on house rent is less than the amount that Bharath spends on education.
2. The amount that Bharath spends on education is more than twice the amount that Pavan spends on groceries.

7. The angle from the hour hand to the minute hand, measured in the clockwise direction, is 210°. What time is it?
1. The time is between 12:00 noon and 1:00 p.m.
2. The time is between 1:00 p.m. and 2:00 p.m.

8. Find the perimeter (in cm) of a triangle with integral sides (in cm) and having the largest side measuring 7 cm.
1. The perimeter (in cm) of the triangle is a prime number not less than 17.
2. The perimeter (in cm) of the triangle is a prime number less than 19.

9. A, B, C and D are four friends. A is the tallest of the four. Who is the shortest of the four?
1. The sum of the heights of A and B is less than the sum of the heights of C and D.
2. Four times the height of C is less than three times the height of B.

10. X is a four-digit number with non-zero digits. Find X.
1. X is a perfect square with the last digit being twice the first digit.
2. The third digit equals one-third the sum of the first and the fourth digits, while the sum of the first and the third digits equals the fourth digit, which, in turn, is six times the second digit.

11. A work can be completed by a woman in 36 days. Find the time taken by two men and three women to complete the work.
1. 2 men, 4 women and 4 boys take 3 days to complete the work. 4 men, 3 women and 6 boys take 2 days to complete the work.
2. 6 men and 4 boys take one-third the time which one woman and 2 men take to complete the work. 16 men and 12 boys take one-fourth the time which 5 men take to complete the work.

12. a, b, c and d are four integers. Is $ac + bd$ odd, given $b + c$ is even?
1. $ab + cd$ is even.
2. $ad + bc$ is odd.

13. Nine books – B_1, B_2, B_3, B_4, B_5, B_6, B_7, B_8 and B_9 - are placed in a 3 x 3 grid. Is book B_1 heavier than book B_9?
1. Among the heaviest books of each row, B_1 is the lightest.
2. Among the lightest books of each column, B_9 is the heaviest.

14. Six persons – A, B, C, D, E and F - were comparing their scores in a DST. Each of the scores is a different digit from 1 to 6. Is the difference in the scores of A and B even?
1. The difference in the scores of A and D is odd.
2. The difference in the scores of B and C is even and that of B and D is even.

15. Akash and Sagar sell n notebooks each. While Akash makes a profit of x%, Sagar incurs a loss of x%. If Akash's profit is equal to the selling price of m of his notebooks, and Sagar's loss is equal to the selling price of p of his notebooks, what is the value of p?
1. $nm = 1000$
2. $n - m = 90$

16. In triangle ABC, AB = 3 cm and AC = 4 cm, while X and Y are points on AB and AC respectively. What is the length of AY?
1. AX = 2.5 cm
2. $\angle AXY = \angle ACB$.

17. The total cost of 2 pencils, 3 erasers and 5 sharpeners is ₹37. What is the total cost of 19 erasers and 1 sharpener?
1. 3 pencils and 7 sharpeners cost ₹34 more than 5 erasers.
2. 3 pencils and 6 sharpeners cost ₹31 more than 4 erasers.

18. Exactly four persons – A, B, C and D – run a race. Find the person who wins the race.
1. When the winner finishes the race, the average of the distances run by A, B and C is equal to the average of the distances run by A and C.
2. When the winner finishes the race, the average of the distances run by A and D is equal to the sum of the average of the distances run by A, B and D and the average of the distances run by A and B.

19. If a is a real number, is $\sqrt[3]{a^2} < \sqrt[3]{a^4}$?
1. $a^4 > a^2$ and $a^3 > a^5$
2. $a^2 > a^3$ and $a^7 > a^5$

20. Seven persons – A, B, C, D, E, F and G - are sitting in a row facing East. Who is at the middle of the row?
1. A is three places away to the left of B, who is two places away to the left of C.
2. D, who is adjacent to neither A nor C, is not at the middle of the row.

21. Fifty students are standing in a queue. Is Rahul standing ahead of Vindhya?
1. Anil is among the first 10% of the students in the queue.
2. Of the total students, 40% are boys and Vindhya is among the last 50% of the girls. Anil is four places away from Rahul.

22. Is A a sister of B?
1. A's only sister-in-law's only sister-in-law is B.
2. A's mother's only son's wife's only sister-in-law is B.

23. Five persons – A, B, C, D and E - are comparing their heights. Each of them is of different height and A is taller than B as well as C. Who is the tallest person?
1. The number of persons taller than A is the same as the number of persons shorter than D, who is not the shortest.
2. A is shorter than only E.

24. A three-digit number equals 138 times the arithmetic mean of its digits. Is its units digit greater than 6?
1. Its tens digit is divisible by 3.
2. Its units digit leaves a remainder of 2 when divided by 4.

25. If x is a year, find x.
1. Anand got married in the year x. His age when he got married was the square root of his year of marriage. His year of birth occurred in the nineteenth century.
2. Ashok was born in year x. His year of birth was the square of his age at the time he got married. His marriage occurred in the nineteenth century.

Exercise – 12

Directions for questions 1 to 25: Each question is followed by two statements, 1 and 2. Indicate your responses based on the following directions.

Mark (A) if the question can be answered using 1 alone but not using 2 alone.
Mark (B) if the question can be answered using 2 alone but not using 1 alone.
Mark (C) if the question can be answered using 1 and 2 together but not using 1 or 2 alone.
Mark (D) if the question cannot be answered even using 1 and 2 together.

1. S is a set of exactly six integers and p is the sum of the products of all the possible pairs of integers in S. Is p odd?
1. The sum of the six integers in S is odd.
2. The number of odd integers in S is not equal to the number of even integers in S.

2. In a certain year, Vamshi's birthday fell on a Monday. Was that year a leap year?
1. In the next year, Vamshi's birthday falls on a Wednesday.
2. Four years ago, Vamshi's birthday fell on a Wednesday.

3. In a quadrilateral ABCD, AB and CD are parallel. CD = 10, AB < CD and the distance between AB and CD is 4. What is the length of AB?
1. AD = 5 and BC = 20/3.
2. AB > 10/3.

4. Ram and Shyam started simultaneously from the same point in the opposite directions on a circular track, 200 m long, with speeds of 5 m/sec and 1 m/sec respectively. After every meeting they exchanged their speeds and directions. Find the distance between the k^{th} meeting point and their starting point.
1. k leaves a remainder of 3 when divided by 6.
2. k is divisible by 3.

5. If $x + 2y + 3z = 8$ and $2x + 3y + z = 5$, find the values of x, y and z.
1. x, y, z are non-negative integers.
2. x, y, z have distinct values.

6. Who won the election among A, B and C, if no two among them got the same number of votes?
1. A got more votes than C, who did not get more votes than B.
2. B didn't get less votes than A, who did not get less votes than C.

7. There are a total of 80 residents (men, women and children) in the three blocks – A, B and C – of a residential complex. If there are 25 women in blocks A and B put together, how many women are there in block C?
1. There are 20 and 30 residents in blocks A and C respectively.
2. There are 25 men and 20 children in all the three blocks put together.

8. Four distinct prime numbers have an average of 15. Find the greatest among them.
1. At most two of them exceed 5.
2. At least two of them exceed 5.

9. Is $(x - 2)^2 + (y - 3)^2 > 4$?
1. $x > 4$
2. $y < 2$

10. Four persons – A, B, C and D - came to a party in the given order. While leaving none of these four persons retained the position at which he came to the party. Who is the third person to leave the party?
1. A left the party at a position which is adjacent to that of neither C nor D.
2. C is not the first person to leave the party.

11. The population of country X increased by 5% from 2002 to 2003 and by 10% from 2003 to 2004, while that of country Y increased by 10% from 2002 to 2003 and by 5% from 2003 to 2004. What is the difference in the populations of X and Y in 2004?
1. The difference in the populations of X and Y in 2002 is 50,000.
2. The populations of X and Y in 2003 are equal.

12. If the GNP of India is greater than $400 bn and the GDP of China is 300 Yuan, the foreign investment flows into Asia. Is the GNP of India greater than $400 bn?
1. GDP of China is 450 Yuan.
2. Foreign investment flows into Asia.

13. Six persons – Amar, Balu, Chandu, Dev, Eshwar and Farooq – are seated around a circular table. Who are adjacent to Amar?
1. Balu and Chandu are adjacent to each other.
2. Dev is opposite Amar and adjacent to Eshwar.

14. There are three members – X, Y and Z – in a family. Each of them either always tells truth or always lies. Who is the lone truth teller in the family?
1. X said, "I am a truth teller".
2. Y said, "Z is a truth teller".

15. Anybody who can align the Rubik's cube can also solve Sam Loyd's puzzle. Of the 25 people in the office, how many can align the Rubik's cube?
1. 13 people in the office can solve Sam Loyd's puzzle.
2. The number of people in the office who can either align the Rubik's cube or cannot solve Sam Loyd's puzzle is 23.

16. If the last day of the previous month was Wednesday, then what day of the week is the first day of the next year?
1. The last day of this month is Thursday.
2. The last day of the next month is Sunday.

17. How much time does a cyclist take to cycle a distance of 24 km against the wind? (Assume that the wind blows at a uniform speed in a particular direction)
1. The time taken by the cyclist to cover a distance against the wind is three times the time he takes to cover the same distance with the wind.
2. The speed of the cyclist when there is no wind is 3 kmph more than the speed of the wind.

18. The shape of a structure is a cylinder perfectly surmounted by a hemisphere. What is the ratio of the volume of the hemisphere to that of the cylindrical portion?
1. The radius of the hemispherical portion is 4 cm.
2. The height of the cylindrical portion is twice the radius of the hemispherical portion.

19. Find the three-digit number in which the hundreds digit is less than the tens digit, which in turn is less than the units digit. Also, the hundreds digit, the tens digit and the units digit are in geometric progression.
1. The product of the hundreds digit and the units digit is a perfect square.
2. The product of the tens digit and the units digit is a perfect cube.

20. Among three men – A, B and C and three women – P, Q and R, three married couples exist. They are sitting around a circular table. Who is sitting opposite A?
1. No person is adjacent to his/her spouse. Q is sitting between P and R.
2. C is the husband of R but not adjacent to A.

21. Does the equation, $ax^2 + bx + c = 0$ (where a, b, and c are real numbers) have a real root?
1. $4a + 2b < -c$
2. $9a + 3b > -c$

22. Each of the four persons – A, B, C and D – are of a different height and a different weight, if it is known that the tallest person is the lightest, who is the shortest person?
1. A is shorter than B, who is heavier than C and shorter than D.
2. The heaviest person is the third tallest person.

23. Seven persons – P, Q, R, S, T, U and V – are sitting in a row facing the same direction. Who is sitting to the immediate left of Q?
1. P and R are sitting at the ends of the row and are equidistant from S.
2. T is to the immediate right of U and V is not adjacent to S.

24. Six persons – P, Q, R, S, T and U – are sitting around a circular table. P and Q are neither adjacent nor opposite each other. Who is sitting opposite R?
1. R is sitting between P and T.
2. S is two places away to the right of U, who is opposite T.

25. An island is inhabitated by two tribes – truth-tellers, who always tell the truth and liars, who always lie. P, Q and R belong to that island. P says, "Neither Q nor R is a liar". Find the tribes of P, Q and R.
1. R says, "Neither P nor Q is a truth-teller".
2. Q says, "Exactly one of P and R is a liar".

Exercise – 13

Directions for questions 1 to 25: Each question is followed by two statements, 1 and 2. Indicate your responses based on the following directions.

Mark (A) if the question can be answered using one of the statements alone, but cannot be answered using the other statement alone.
Mark (B) if the question can be answered using either statement alone.
Mark (C) if the question can be answered using 1 and 2 together but not using 1 or 2 alone
Mark (D) if the question cannot be answered even using 1 and 2 together.

1. Given that X is an integer, find X.
1. $12X^2 – 9X$ is prime.
2. $X^2 – X^3$ is prime.

2. Seven children – A, B, C, D, E, F and G – have 4, 6, 8, 9, 12, 16 and 18 marbles, not necessarily in that order. How many marbles does B have?
1. The difference between the number of marbles with D and G is 6 and the number of marbles with B is 4/3 times that with C.
2. The number of marbles with B is 3/2 times that with C and the number of marbles with D is 4/3 times that with F.

3. Did Shivani qualify in AIMCAT601, which had five sections in it?
1. Shivani qualifies in all those AIMCATs that have not more than three sections in them.
2. Shivani fails to qualify in an AIMCAT unless the AIMCAT does not have five sections in it.

4. Is the population of Country X more than that of Country Y?
1. Four years ago, the population of country X was less than 80% of that of country Y, and since then the populations of X and Y have grown by 12% p.a. and 8% p.a. respectively.
2. Four years ago, the population of country Y was less than 80% of that of country X, and since then the populations of X and Y have grown by 10% p.a. and 20% p.a. respectively.

5. Two persons start running around a circular track. They start running in the same direction, from the same point and at the same time. The distance covered by the faster person is how much more than that covered by the slower person, when they meet for the sixth time (excluding the start)?
1. The ratio of their speeds is 5 : 3.
2. The length of the track is 500 m.

6. What is the difference between m and n, given that they are positive integers?
1. If all the numbers between m and n, including m and n, are considered, then there are a total of five even numbers.
2. If all the numbers between m and n + 1, including m and n + 1, are considered, then there are a total of six odd numbers.

7. Who scored the maximum number of points among three players – A, B and C – where each player played exactly four games with every other player? (In each game, the winner gets two points while the loser loses one point and no game ends in a tie. Further, no two players scored the same number of points).
1. The number of matches that A won is one more than half of the number of points that he scored.
2. C won three points more than B, who won the least number of matches.

8. In a three-digit number, the hundreds digit, the tens digit and the units digit are in arithmetic progression and in ascending order. Find the ratio of its middle digit and the common difference.
1. If each digit in it is multiplied by the sum of the other two digits and the results are added, the final result will be the sum of 7/4 times the product of the sum of its digits and its middle digit and the square of its common difference.
2. The sum of the products of its digits taken two at a time is 11/30 times the ratio of the product of the sum of its digits taken two at a time and its middle digit.

9. The lengths of trains A and B are 400 m and 350 m respectively. What is the speed of train B?
1. Train B crosses train A which is travelling at 60 km/hr in 22 seconds.
2. The speed of train B is more than the speed of train A.

10. Find a and b, given that they are non-negative single -digit integers, and $a + b > 1$.
1. $(a + b) = (a – b)!$
2. $2(a – b) = (a + b)!$

11. A group had N workers. They were assigned a job. They started it. The i^{th} worker where $1 \le i \le N$ left the job at the end of the i^{th} day. The i^{th} worker can complete i units / day. The job was completed at the end of N^{th} day. Find N.
1. The job to be done was a total of 385 units.
2. The number of units of the job completed on the first day was 45 more than that completed on the last day.

12. How many craters are there on moon?
1. The number of craters on the moon is equal to the number of pins in a box packed with pins.
2. A box packed with pins weighs 16 kg and each pin weighs 0.005 kg.

13. Is $x + 1 < y$?
1. $x^2 + 4x + 3 > y^2 + 2y$
2. $x^3 - 6x^2 + 12x - 7 > y^3 - 3y^2 + 3y$

14. What is the value of $\frac{2xy^2 + 3x^2z + 4y^2z + 5xyz}{6xyz + 7xz^2 + 8xy^2 + 9yz^2}$?
1. $(2x + 3y) : (3y + 4z) : (4z + 2x) = 3 : 5 : 6$
2. $x : y = 3 : 1$ and $z = 4$

15. What is the length of the train?
1. The train crosses a pole, 20 m high, in 20 seconds and a tunnel, 450 m long, in 50 seconds.
2. The train crosses a bridge, 300 m long, in 40 seconds and a platform, 600 m long, in 60 seconds.

16. An article was marked up by a certain amount. What is the percentage by which the article was marked up?
1. If the discount percentage is equal to the mark-up percentage, the loss percentage will be half the discount percentage.
2. If the discount percentage is half the mark-up percentage, the profit percentage will be half the discount percentage.

17. Was the year X a leap year?
1. In the year X, there was no month which did not have at least one day of the week occurring at least five times.
2. If only the days in the year X are considered, then there was no day which had as many days before it as after it.

18. Amar took x days to complete a job. Bhavan took y days less than him to complete it. Chetan took y days more than Amar to complete it. David took x. × y days to complete it and Eswar took x. × y^2 days to complete it. Is the combined efficiency of Bhavan and Chetan less than that of David and Eswar?
1. $y \geq 1$
2. $y \leq 1$

19. A four-digit number has its thousands digit, hundreds digit, tens digit and units digit in the descending order. The sum of its digits is a perfect cube. Find its units digit.
1. At least two of its digits are prime.
2. At most two of its digits are prime.

20. An island is inhabitated by three tribes – truth-tellers, who always tell the truth, liars, who always lie and alternators, who always alternate between a true and a false statement, in any order. A, B and C belong to that island. A says "Both B and C are liars. I am an alternator". To which tribe does C belong to?
1. B says, "Both A and C are truth-tellers. I am not a truth-teller".
2. C says, "Both A and B are alternators. I am not a liar".

21. How many children does X have?
1. Y, X's daughter has twice the number of brothers as sisters.
2. Z, X's son has twice the number of sisters as brothers.

22. Did Ramu play cricket today?
1. If Ramu goes to school, then he plays cricket. If it is not raining, then Ramu goes to school. It is raining today.
2. If Ramu plays cricket, then he does not attend the class. If Ramu wakes up early, then he attends the class. Ramu woke up early today.

23. All the students of a class are made to stand in a queue. What is the position of D in the queue from the front end, if D is ahead of her brother C?
1. D is the fifth girl from the front end and eighth girl from the rear end.
2. The number of boys ahead of C is two and the number of girls between C and D is two.

24. Who is the topper among A, B, C, D and E?
1. C got more marks than B, who got less marks than D.
2. A, who is not the topper, got more marks than E.

25. In a queue, there are ten persons between Vijay and Suman. How many persons are there in the queue?
1. Three-fourths of the persons in the queue are ahead of Vijay and 16 persons are behind Suman.
2. Two-thirds of the persons in the queue are behind Suman and eighteen persons are ahead of Vijay.

Exercise – 14

Directions for questions 1 to 25: Each question is followed by two statements, 1 and 2. Indicate your responses based on the following directions.

Mark (A) if the question can be answered using one of the statements alone, but cannot be answered using the other statement alone.
Mark (B) if the question can be answered using either statement alone.
Mark (C) if the question can be answered using 1 and 2 together but not using 1 or 2 alone
Mark (D) if the question cannot be answered even using 1 and 2 together.

1. Is $|x| < 1$?
1. $x^5 > x^3$
2. $x^2 > x^3$

2. In a class, how many boys play cricket?
1. The total number of boys in the class is 100. The number of boys who learn music and play cricket is 51.
2. All boys who learn music, also play cricket.

3. On a certain item, a discount of x% on the marked price gives a trader a profit of 2x% on the cost price. Is his profit more than 40% of the cost price?
1. The marked price is more than 1.8 times the cost price.
2. The marked price is less than 1.7 times the cost price.

4. Find the value of the sum of a and b, *if* $a > b$, and a and b are positive integers
1. $a^2 + b^3 = 145$
2. $a^3 + b^3 = 1729$

5. Are the points A, B and C collinear?
1. AC < BC + AB.
2. AC > BC and AC > AB.

6. If ABCD is a cyclic quadrilateral, is ABCD a rectangle?
1. AB is parallel to CD.
2. $\angle A + \angle C = 180°$

7. Is the difference between the two-digit number 'XY' and the number 'YX' more than 69?
1. The remainder when 'XY' is divided by 11 is 3.
2. The remainder when 'XY' is divided by 11 is 4.

8. P, Q and R are single digit natural numbers with Q < P < R.
$(P^2 + R^2)\ x^2 - 2P\ (Q + R)\ x + (P^2 + Q^2) = 0$ has real roots. Find Q.
1. $P + Q + R \geq 15$.
2. $P + Q + R \leq 15$.

9. If a and b are integers, is $(a^2 - b^2)/2$ an even integer?
1. ab is even.
2. ab is odd.

10. C_1 is a circle with radius 5 cm and C_2 is another circle with radius 2 cm. If C_2 is internally tangent to C_1 at P, while X and Y are points on C_1 such that PX = PY, does XY intersect C_2?
1. PX < 6
2. PX > 7

11. The series S_i is obtained from the series of natural numbers t_i by the relation $S_n = \sum_{(i=1)}^{n} t_i$. Are there more than two even terms from t_1 to t_9?
1. Of the terms S_1 to S_9, six are even.
2. Of the terms S_1 to S_9, five are even.

12. What is the time shown by the clock given that the two hands are together?
1. The time is between 11:00 p.m. and 1:00 a.m.
2. The time is between 1:00 p.m. and 3:00 p.m.

13. There are two geometric progressions – A and B – with common ratios 1.1r and r respectively. Is the third term of A greater than the third term of B?
1. The first term of A is 0.9 times the first term of B.
2. The second terms of both A and B are positive.

14. If $a > bd$ and a, b and d are real, is $b < 0$?
1. $\frac{d}{b} > 0$
2. $a < d$

15. There are three different solutions – A, B, and C – of salt in water. The ratio of the weights of water in B and C is 4 : 3 respectively. What is the ratio of the weights of water in A and B?
1. The ratio of the weights of salt in A, B, and C is 4 : 3 : 2.
2. The ratio of the total weights of A, B and C is 14 : 23 : 17.

16. In a triangle, k denotes the ratio of the product of its circumradius and inradius to the square of its perimeter. Is the triangle equilateral?
1. $k \geq \frac{1}{54}$.
2. $k \leq \frac{1}{54}$.

17. Ram had N chocolates with him. Find N.
1. He can distribute all the chocolates with him among the children of group B such that each child gets as many chocolates as the number of children in it. If he had 9 chocolates less, he could have distributed all the chocolates with him among the children of group A such that each child gets as many chocolates as the square of the number of children in it.
2. He can distribute all the chocolates with him among the children of group C such that each child gets as many chocolates as the number of children in it. If he had 28 more chocolates he could have distributed all the chocolates with him among the children of group D such that each child gets as many chocolates as the square of the number of children in it.

18. In a football game between teams X and Y how many goals did X score?
1. In the first half, X scored one goal more than Y and in the second half Y scored one goal more than X.
2. The score of Y is 5 goals.

19. If triangle ABC is right-angled at B, is the length of AC less than 11 cm?
1. The area of triangle ABC is 32 sq.cm.
2. The area of triangle ABC is 36 sq.cm.

20. There are 200 students in a class. 80 students play football. How many students play at most one of football and cricket?
1. 100 students play exactly one of the two games.
2. 60 students play only cricket.

21. Five persons – A, B, C, D and E - are sitting around a circular table. Who is sitting to the immediate left of A?
1. The number of persons between A and B is the same as that between A and C.
2. C is to the immediate left of D.

22. Six persons – P, Q, R, S, T and U - are sitting in a row facling the same direction. Who are sitting at the extreme ends?
1. No two of P, Q and R are adjacent to each other.
2. S is adjacent to both Q and R, R is adjacent to both S and T.

23. Two persons A and B played 21 games of Chess. In every game that A wins, B gives ₹3 to A and in every game that B wins, A gives ₹2 to B. There were no draws. How much money did each of them have when they started the first game?
1. No person won any two consecutive games.
2. By the end of the last game, A has ₹10 and B has ₹15.

24. A bowl has coins of three denominations – ₹5, ₹2 and ₹1 coins. If the total number of coins is 13, what is the number of coins of each denomination?
1. The total value of ₹5 coins is less than that of ₹2 coins, which in turn is less than that of ₹1 coins.
2. The difference in the number of ₹5 coins and ₹2 coins is less than the difference in the number of ₹2 coins and ₹1 coins.

25. In a city, each person either always tells truth or always lies. A person from another city met three persons P, Q and R from the city one of whom is the mayor of the city. Who is the mayor of the city?
1. P said, "Q always tells truth. R is the mayor".
2. R said, "The mayor always lies. Q is the mayor".

Exercise – 15

Directions for questions 1 to 25: Each question is followed by two statements, 1 and 2. Indicate your responses based on the following directions.

Mark (A) if the question can be answered using one of the statements alone, but cannot be answered using the other statement alone.
Mark (B) if the question can be answered using either statement alone.
Mark (C) if the question can be answered using 1 and 2 together but not using 1 or 2 alone
Mark (D) if the question cannot be answered even using 1 and 2 together.

1. Two men Viru and Prasad have a total of ₹200 with them. Find the amount with Viru.
1. If Viru gives ₹10 to Prasad, the difference of the amounts with them would be ₹20.
2. If Prasad gives ₹20 to Viru, the difference of the amounts with them would be ₹40.

2. Eshwar, Ganesh and Harish ran a race. Who is the winner?
1. The average of the speeds of the three exceeds the average of the speeds of Eswar and Ganesh by one fourth the sum of the average of the speeds of Eswar and Harish and the average of the speeds of Ganesh and Harish.
2. $\frac{10}{9}$ times the average of the speeds of the three equals the excess of the sum of the average of the speeds of Eswar and Ganesh and the average of the speeds of Ganesh and Harish over the average of the speeds of Eswar and Harish.

3. Find the value of x.
1. $\log_{(x+3)}(2x^2 + 3x - 9) + \log_{(2x-3)}(2x^2 + 3x - 9) = 4$
2. $x^3 + 12x - 6 - 6x^2 = 2$

4. Find the minimum value of the quadratic expression $ax^2 + bx + c$, if a is a non-negative integer and b and c are positive single-digit integers.
1. $a = 2b - 16c$.
2. $c^3 - 19 = 4b^2$ and $a = b - c$.

5. ABCD is a quadrilateral with its sides AB, BC, CD and DA forming tangents to the circle inscribed in it at E, F, G and H respectively. If the perimeter of ABCD is 68 cm, find the length of AB.
1. ABCD is a parallelogram.
2. AEGD and EGCB are both cyclic quadrilaterals and EG is the diameter of the inscribed circle.

6. The area of a right-angled triangle is 6 sq.cm. Find the inradius.
1. The circumradius of the triangle is 2.5 cm.
2. The value of sum of the reciprocals of the lengths (in cm) of the perpendicular sides is $\frac{7}{12}$.

7. The average of four distinct prime numbers is 10. Find the largest among them.
1. At most two of them are single digit numbers.
2. Two of the four prime numbers have a sum equal to that of the other two.

8. A scalene triangle has the length of each side (in cm) as an integer. Its largest side is 40 cm. Its perimeter (in cm) is prime. The sum of the lengths of its shorter two sides (in cm) is also prime. Find the length of its shortest side.
1. The shorter two sides differ by 1 cm and one of them, measured in cm, is a prime number.
2. Neither of the shorter two sides, measured in cm, is a perfect square.

9. Everytime her grandmother visits Hyderabad, Shivmala goes to a movie provided she is also in Hyderabad. How many movies would Shivmala have seen in 1995?
1. Shivmala's grandmother visits Hyderabad once every month.
2. Shivmala was in Hyderabad for the whole of 1995, except for the complete month of December.

10. A certain english word has three vowels (not necessarily distinct). What is the number of O's in the word?
1. The word has two vowels in common with the word – dinner.
2. The word has no letter in common with the word – republic day.

11. What is the value of {2 log x + 4 log xy} in terms of a?
1. $a^2 . x^{3/2} . y^{3/4} = (a^{3/2} . x^{1/2} . y^{1/2}) (a^{-1/2} . x^4 . y^{9/4})$
2. $a^2 . x^{1/2} . y^{3/2} = (a^{2/3} . x^2 . y) (a^{4/3} . x^{-3/2} . y^{1/2})$

12. A three-digit perfect square N has its non-adjacent digits equal. The sum of its digits is S. If none of the digits is zero, then find the middle digit of N.
1. S is a perfect square.
2. N is divisible by its units digit.

13. If m and n are positive integers, is $m > n$?
1. $4m + 5n = 87$
2. $m^3 < 45n$

14. If m and n are integers, is n even?
1. $2^m + 3^n$ is divisible by 4.
2. $17^n + 19^m$ is divisible by 9.

15. What is the index of the highest power of 7 in K!?
1. The index of the highest power of 2 in K! is 46.
2. The index of the highest power of 2 in K! is 42.

16. What day of the week will it be on the same date next year?
1. The same date this year is Tuesday.
2. The same date last year was Sunday.

17. In a football match, the *Golden Foot* award is given to the player who scored the maximum number of goals. In case of a tie, the player (out of those locked in the tie) who has saved the highest number of goals for his team is chosen. Even after this if there is a tie, the player (out of those locked in the tie) who has dropped the least number of chances (of making a goal for his team) is chosen.
In a match there were exactly three contenders – Amar, Binod and Kamal – for the *Golden Foot* award. It is known that Binod dropped two chances more than Amar did and he saved exactly two goals. If Kamal dropped three chances and Amar dropped more than one, then who received the *Golden Foot* award in that match?
1. The number of goals scored by each of Amar and Binod is four more than that by Kamal.
2. The number of chances dropped by Binod is one more than the number of goals saved by Amar.

18. All the employees in an organisation contributed equally to pay a total of ₹10,000 towards tsunami victims. How much did each employee contribute?
1. If there had been five more employees in the organisation, each employee would have contributed ₹100 less.
2. There were not more than 20 employees in the organisation and no one contributed more than ₹500.

19. Is the golden ball heavier than the iron ball?
1. Among the golden ball, the iron ball and the silver ball, exactly two have the same weight.
2. The silver ball is lighter than the iron ball.

20. A cube is painted using three colours red, blue and green on one, two and three faces respectively. What is the colour of the face opposite to the face painted in red?
1. The faces painted in blue are adjacent to each other.
2. Two of the faces painted in green are opposite to each other.

21. Is P a sister of Q?
1. Q is the only aunt of R.
2. Q is the sister of P.

22. Jagan invited his three friends – Varun, Kiran and Ravi – to a party. Varun did not attend the party. Did Kiran attend the party?
1. If and only if Kiran attends the party, Ravi attends the party.
2. Unless Varun attends the party, Ravi did not attend the party.

23. Did Arvind pass in Maths?
1. Arvind passed in only one of Maths and Physics.
2. Arvind got 40% of marks in Physics.

24. X has four children – P, Q, R and S. How is P related to S?
1. S has twice as many brothers as sisters.
2. P has twice as many sisters as brothers.

25. What is the angle between the hands of a clock?
1. The angle between the hands of the clock after 10 minutes will be 70°.
2. The angle between the hands of the clock after 20 minutes will be 15°.