# CHAPTER – 12

ANALYTICAL PUZZLES – (Quant-Based)

Quant based Analytical Puzzles involve analytical thinking that the student has developed over multiple areas (Chapter 1 through Chapter 11) along with basic mathematical concepts and /or calculations.

Exercise – 12(a)

Directions for questions 1 and 2: Select the correct alternative from the given choices.

1. In the following diagram, A is the reserve station from which a lorry can take 100 units of liquid at a time to be supplied to B, C, D, E, F and G, whose requirements per day are 78, 61, 26, 42, 34 and 59 units respectively. Every day a lorry starts at A and supplies the requirements. In this process it moves back and forth from A to the other places and the location of all places is as shown in the diagram given below:
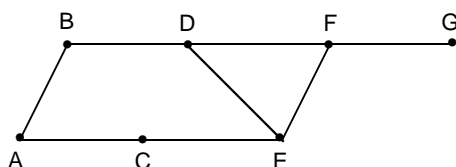
   In a day, how many times does the lorry start from A and what is the unused capacity of the lorry per day?
   (A) 4 times and 100 units.
   (B) 5 times and 200 units.
   (C) 3 times and zero units.
   (D) 5 times and zero units.

2. The following sets of weighing stones are available to measure weights.

Number of stones in the range	Weights in the range (in grams)	Interval between two successive weights
9	1.001,1.002…1.009	0.001 g
49	1.01, 1.02, 1.49	0.01 g
19	0.5, 1.0, 1.5, …9.5	0.5 g
9	10, 20, 30, …90	10 g

   What is the minimum number of stones required to weigh an item which weighs 68.892 g?
   (A) 6   (B) 5   (C) 3   (D) 4

Directions for questions 3 to 5: These questions are based on the following information.

Ravi, a retail dealer of Air-Tel prepaid cards, asked his brother Gopi to buy cards of denominations ₹200, ₹700, ₹1,000, ₹1,500 and ₹2,000. He asked Gopi to buy five cards each of exactly three of the above denominations and six cards each of the remaining denominations. However, Gopi forgot which denominations he was supposed to buy five and which he had to buy six of each. However, the wholesale dealer could figure out how many cards of each denomination were required as Ravi had sent an amount of ₹30,000, which was the exact amount required to buy the cards of Ravi's choice.

3. What is the ratio of the total number of cards of denominations ₹200 and ₹2,000 to those of all other cards purchased by Gopi?
   (A) 10 : 17 (B) 16 : 11 (C) 17 : 11 (D) 11 : 16

4. What is the total value of all those cards of which five each were bought?
   (A) 14400   (B) 12000
   (C) 18000   (D) 16000

5. If Gopi had told the shopkeeper that he required 6 cards each of the 3 denominations that his brother asked him to get 5 each of, and 5 cards each of the other denominations that his brother asked him to get 6 each of, then what is the amount that Gopi would have left with him or fall short of, from the total amount of ₹30,000 his brother had given him?
   (A) He was left with ₹600.
   (B) He fall short of ₹400.
   (C) He fall short of ₹600.
   (D) He was left with ₹400.

Directions for questions 6 to 9: These questions are based on the following information.

Narayan, Michael and Rusell participated in a car race. All three of them could drive the car for distinct time periods (because their fuel tanks got empty) and at different speeds (in km/hr). The person who drove the car for the maximum time period had driven at a minimum speed compared to the other two but covered the maximum distance. The person who drove at the maximum speed covered the minimum distance of 360 km, but he was not Michael, who drove at 150 km/hr. Russell drove the car for a time period, which was the same as the sum total of the time periods taken by the other two contestants. The total distance covered by all the three contestants is 1620 km. The speeds and the time taken by the contestants in their respective units (km/hr and hr) are integral numbers.

6. What is the distance covered by Russell?
   (A) 360 km   (B) 600 km
   (C) 810 km   (D) 660 km

7. What is the time taken by Michael?
   (A) 2 hours   (B) 3 hours
   (C) 4 hours   (D) 5 hours

8. Which of the following statements may be true?
   (A) Russell drove at a speed of 110 km/hr.
   (B) Narayan drove the car for 2 hours.
   (C) Russell drove at a speed of 132 km/hr.
   (D) More than one of the above

9. If no contestant drove the car at a speed beyond 200 km/hr, then what was the speed of Narayan?
   (A) 110 km/hr   (B) 132 km/hr
   (C) 180 km/hr   (D) 150 km/hr

Directions for questions 10 to 13: These questions are based on the following information.

In a tournament, each of the six teams played every other team. In a match between two teams, the winner got two points, the loser got zero points and if it was a draw, then each team got one point. Scores of A, B, C, D, E and F were 9, 8, 7, 3, 2 and 1 point respectively. There were exactly two draws.

10. D had a tie with which of the following teams?
(A) A
(B) B
(C) F
(D) Cannot be determined

11. A had a tie with which of the following teams?
(A) D
(B) C
(C) F
(D) B

12. Which of the following lost the maximum number of matches?
(A) D
(B) E
(C) F
(D) Both E and F

13. Out of the following teams, A did not win against _____.
(A) B
(B) C
(C) D
(D) F

Directions for questions 14 to 17: These questions are based on the following information.

P, Q and R played a game and each scored some points. The number of points is an integer. When I asked four individuals A, B, C and D about the scores of P, Q, and R, they made the following statements.

A : Exactly two of P, Q and R together scored 10 points.
B : Exactly two of P, Q and R together scored 11 points.
C : Exactly two of P, Q and R together scored 12 points.
D : Exactly two of P, Q and R together scored 13 points.

I understood that at least one of A, B, C and D was lying and later I found out the names of the persons who could have lied.

14. Who was definitely not lying?
I. A   II. B   III. C   IV. D

(A) Only I and III
(B) Only II and IV
(C) Only I and IV
(D) Only II and III

15. If the average score of P, Q and R is an integer, then who lied?
(A) A
(B) B
(C) C
(D) D

16. Which of the following is the highest score?
(A) 6
(B) 7
(C) 8
(D) 9

17. Which of the following is the least score?
(A) 3
(B) 4
(C) 5
(D) Cannot be determined

Directions for questions 18 to 21: These questions are based on the following information.

Three brands of rice A, B, C are sold at distinct prices. A dealer bought distinct quantities of rice. He purchased 180 kg of the costliest brand. Brand B was purchased at ₹6/kg while the dealer spent a total for ₹540 on the brand which was the cheapest. Had the dealer purchased rice of brand C at the price of brand A, (with the quantities of brand C purchased remaining unchanged) he would have spent ₹360 less. If the dealer purchased a quantity of A which is equal to that of brand B (with the price for brand A remaining unchanged) the dealer would have spent ₹180 more. The quantities of each of the brands bought is a three-digit number, while the prices (in ₹/kg) of each of the brands is a natural number. The maximum total expenses are incurred on the costliest brand.

18. Find the total expenses incurred on the costliest brand.
(A) ₹1,800 (B) ₹1,080 (C) ₹1,260 (D) ₹1,440

19. Find the quantity (in kg) for the brand which is neither the cheapest nor the costliest.
(A) 108
(B) 144
(C) 180
(D) Cannot be determined

20. Which of the following statements must be false?
(A) The price of brand B is ₹6/kg.
(B) The quantity of brand A purchased is 108 kg.
(C) The quantity of brand B purchased is 144 kg.
(D) The price for brand C is ₹5/kg.

21. If the dealer purchased a quantity of brand A which is equal to that of brand C (with the price for brand A remaining unchanged), then what would have been the total expenses for brand A?
(A) ₹900 (B) ₹1,404 (C) ₹1,800 (D) ₹756

Directions for questions 22 to 25: These questions are based on the following information.

A computer helps in finding out a four-digit code number in the following way.
When a four digit number is keyed in, the computer indicates the number of digits in the keyed in number which are correct and are also in correct position as in the code, in column R. The number of digits which are not there in the code is given in column W.
To construct a code number only digits from 1 to 6 are used.
The following three numbers are selected to find out the code.

Sl.No	Selected Number	R	W
1	3425	2	2
2	3625	1	2
3	3426	2	1

22. If 6 is the first digit from the left in the code number then which of the following is the second digit from right?
(A) 1
(B) 2
(C) 3
(D) 4

23. If 6 is the second digit from the right which of the following is the first from the left in the code number?
(A) 1
(B) 2
(C) 3
(D) 4

24. Which of the following digits is definitely not in the code number?
(A) 2
(B) 3
(C) 5
(D) 4

25. Which of the following cannot be the code number?
I. 6421   II. 3461   III. 3416
(A) Only I
(B) Only III
(C) Only II
(D) Both I and III

Directions for questions 26 to 30: These questions are based on the following information.

XYZ Ltd. manufactures a product "Q" and sends it to five of its outlets A, B, C, D and E. Cost of production is ₹10,000 per unit. To transport one unit of Q to A, B, C, D and E, XYZ Ltd. spends ₹1,000, ₹2,000 ₹3,000, ₹4,000, and ₹5,000, not necessarily in that order. Selling price of Q is ₹20,000 at three of the outlets, ₹21,000 at one of the

outlets and ₹22,000 at another. Two of the outlets sell 40 units each per month and the remaining outlets sell 30 units, 45 units and 50 units per month. Sum of the cost of production and cost of transportation is subtracted from the selling price to arrive at profit per unit. Product of profit per unit and sales in units per month is profit per month. The following additional information is available.

I.   One of the outlets earns ₹5,000 as profit per unit and it gets the least profit per month.
II.   Exactly two outlets earn the same amount of profit per unit.
III. None of the outlets earn ₹11,000 profit per unit.
IV.   Profit of outlet E per month is ₹3,20,000.
V.   Profit per unit at outlet D is more than that at outlet E but its profit per month is less than that at outlet E.
VI.   Profit of outlet B per month is ₹10,000, which is more than that of another outlet.
VII. Profit of outlet A per month is more than that of outlet C.
VIII. There is exactly one outlet which earns more profit per month than that of outlet E.
IX.   Selling prices at outlets A, D and E are distinct.

26. What is the profit per month earned by the outlet B?
    (A) ₹2,70,000   (B) ₹4,50,000
    (C) ₹4,05,000   (D) ₹2,80,000

27. What is the selling price of the outlet E?
    (A) ₹20,000   (B) ₹21,000
    (C) ₹22,000   (D) Cannot be determined

28. If the selling price at outlet A is more than that at outlet D, then what is the transportation cost per unit at outlet A?
    (A) ₹1,000   (B) ₹2,000
    (C) ₹3,000   (D) ₹4,000

29. If the number of units sold by the outlet A is more than those sold by the outlet C, then what is the profit per month of C?
    (A) ₹2,50,000   (B) ₹2,70,000
    (C) ₹2,25,000   (D) ₹2,80,000

30. What is the profit per unit at the outlet E?
    (A) 8,000   (B) 9,000
    (C) 10,000   (D) None of these

Exercise – 12(b)

Directions for questions 1 to 5: These questions are based on the following information.

A, B, C are three marketing consultants in an organization, each of them earning different incomes. The information below gives the savings and expenses of each person. Each of the incomes, expenses and savings (as measured in ₹lakh / annum) is a single digit natural number. The person with the highest income is saving the most while the person with the lowest expenses is also saving the least.

The income of B is the average of the incomes of A and C while the expenses for C is same as the sum total of expenses for A and B. A's income is the same as B's savings.

1. Find the income (₹lakh / annum) of C.
    (A) 6   (B) 7
    (C) 9   (D) Cannot be determined

2. Find the expenses (in ₹lakh / annum) of B.
    (A) 1   (B) 3
    (C) 2   (D) Cannot be determined

3. Find the savings (₹lakh / annum) of A.
    (A) 4   (B) 5
    (C) 6   (D) Cannot be determined

4. Which of the following statements must be true?
    (A) A's expenses is ₹1 lakh / annum.
    (B) B's expenses is ₹3 lakh / annum.
    (C) C's expenses is ₹4 lakh / annum.
    (D) None of the above

5. How many possible arrangements exist for the salaries of 3 persons?
    (A) 0   (B) 1
    (C) 2   (D) More than 2

Directions for questions 6 to 10: These questions are based on the following information.

In a game show – 'Graded Answer' there were five contestants – Kamal, Ranjit, Ajay, Varun and Sashank.

In each round a question was given to all the contestants.

For each question the computer has ten predetermined answers. In each round, every contestant gave one answer from these predetermined answers and no contestant is aware of the answers given by the other contestants. Each set of answers were given distinct grades by the computer. In each round, the computer awards points to the contestants based on the grade of the answer given by them. The contestant whose answer has the lowest grade among the five answers, gets one point and the points for other contestants increase by one as the grade goes on increasing. In the first round the five contestants gave five different answers. The table given below shows some of the cumulative scores of the contestants at the end of different rounds.

No.	Kamal	Ranjit	Ajay	Varun	Sashank
1	5	2			4
2	6		3		
3					5
4	7	7	7		7
5		9			11
6			9		
7	13	14		15	

In any round if a group of contestants (i.e., two or more) give the same answer, the cumulative scores at the end of that round of each contestant in the group, is reduced to the least of the cumulative scores of the contestants of this group at the end of the previous round. The rest of the contestants get points starting from 1 depending on the grades as explained earlier.

We know the following additional information about the proceedings of the game.

(i)   The cumulative scores of at least two contestants are equal at the end of the second round onwards until at the end of the sixth round (both the rounds included).

(ii) If two or more persons give the same answer in a round, in the next round the answers given by the contestants are distinct.

(iii) The game ended in the seventh round, at the end of which the cumulative scores are distinct.
(iv) Each contestant's answer matches with that of another contestant in at least one round in the game.
(v) The averages of cumulative scores for the five contestants at the end of each of the round 1 and 2 are the same.
(vi) In the sixth question, only Kamal and Varun gave the same answers.
(vii) Total of cumulative scores of the contestants at the end of the fifth round was 51 and that at the end of the seventh round was 71.
(viii) In the fourth round, Varun gave the least graded answer.
(ix) The person with the highest cumulative score at the end of the game was the winner.

6. Who was the winner?
(A) Ajay (B) Varun
(C) Sashank (D) Either (A) or (B)

7. Who gave the same answer in the second round?
(A) Varun and Sashank
(B) Ajay and Sashank
(C) Ranjit and Sashank
(D) Ranjit, Varun and Sashank

8. What was the score of Ranjit at the end of the third round?
(A) 3 (B) 5
(C) 4 (D) Either (A) or (C)

9. What was the score of Kamal and Varun at the end of the sixth round?
(A) 10, 10 (B) 11, 11
(C) 12, 12 (D) Either (B) or (C)

10. Who gave the highest graded answer in the fifth round?
(A) Kamal (B) Sasankh
(C) Varun (D) Ajay

Directions for questions 11 to 14: These questions are based on the following information.

125 small and identical cubes are numbered 1 to 125 and are assembled together to form a larger cube.
(i) The front face is laid out first from the bottom row left to right, then the row above it left to right and so on.
(ii) This process in continued until the rear face is laid out in a similar manner.

11. What is the sum of the series of numbers on the diagonal starting from the bottom left cube on the rear face to the top right cube of the rear face?
(A) 495 (B) 445 (C) 535 (D) 565

12. What is the sum of the series of numbers forming the body diagonal starting from the top left corner of the front face to the bottom right corner of the rear face?
(A) 300 (B) 315 (C) 350 (D) 325

13. What is the sum of numbers forming the column right at the middle of the cube?
(A) 300 (B) 315 (C) 350 (D) 325

14. What is the sum of the series of numbers forming the face diagonal on the right side, starting from top right corner of the front face to the bottom right corner of the rear face?
(A) 300 (B) 315 (C) 350 (D) 325

Directions for questions 15 to 18: These questions are based on the following information.

Four wealthy people – Ozwald Henry, Princess Stephanie, Gennady Yuganov and Henry Ford III each bought one of four different classic watches – a Louis Ulysse Chopard, a Breguet Dupuis, a Piaget Sunmaster and a Rolex Mercator at the annual Sotheby's auction. The following information is available about the person, the watch purchased and their prices.
(i) The total amount paid for these four watches was $8,40,000 and the costliest watch was priced $1,20,000 more than the cheapest.
(ii) Ozwald did not purchase the costliest watch and neither did he purchase a Piaget.
(iii) Gennady did not buy the costliest or the cheapest watch but had paid $1,80,000 for his watch.
(iv) The Rolex Mercator is the costliest and the Chopard the cheapest among the watches.
(v) Princess Stephanie purchased the Breguet Dupuis and had paid $40,000 more than what Gennady Yuganov had paid.

15. Which watch did Ozwald Henry purchase and at what price?
(A) Louis Ulysse Chopard at $2,20,000.
(B) Rolex Mercator at $1,80,000.
(C) Louis Ulysse Chopard at $1,60,000.
(D) Rolex Mercator at $1,60,000.

16. What is the difference in the cost of the watches purchased by Henry Ford III and Gennady Yuganov?
(A) $80,000 (B) $1,00,000
(C) $1,20,000 (D) $1,10,000

17. Which of the following statements is true?
(A) Princess Stephanie bought the cheapest watch.
(B) Ozwald Henry did not purchase the Louis Ulysse Chopard.
(C) Henry Ford III bought a watch that was priced $60,000 more than the Piaget Sunmaster.
(D) The watches bought by Ozwald Henry and Henry Ford III cost more than the watches bought by Gennady Yuganov and Princess Stephanie.

18. Which of the following watches was purchased by Gennady Yuganov?
(A) The watch that was priced $40,000 less than the one bought by Henry Ford III.
(B) The watch that was the cheapest of all.
(C) The watch that was called Piaget Sunmaster.
(D) The watch that was called Breguet Dupuis.

Directions for questions 19 to 22: These questions are based on the following information:

Six friends are comparing their expenses on a recent trip to Goa. Each of them spent a different amount. The following information is known about their expenses.
(i) Piyush spent ₹3783.
(ii) Saket spent ₹4640, which is ₹600 more than how much Uday spent.
(iii) The difference between the expenses of Uday and Tomar is ₹535.
(iv) The maximum difference between the expenses of any two of the six is ₹1135, whereas the minimum difference between the expenses of any two persons is ₹167.
(v) The difference between the expenses of Qureishi and Raina is ₹246.
(vii) Raina spent ₹4227.

19. How much did Qureishi spend?
(A) ₹4473 (B) ₹4493 (C) ₹3981 (D) ₹4040

20. Whose expense was the highest?
(A) Qureishi (B) Saket (C) Raina (D) Tomar

21. What is the difference between the expenses of Raina and Uday?
(A) ₹167 (B) ₹246 (C) ₹187 (D) ₹257

22. Which of them spent the third least amount?
(A) Tomar (B) Uday (C) Raina (D) Qureishi

Directions for questions 23 to 26: These questions are based on the following information:

In sports gambling's, fractional odds are often used. If a bookmaker is offering odd of 10/1 on a particular team, it means that for every ₹1 that a gambler puts at stake, he earn ₹10, in addition to the original stake being returned to him. If the team loses, the gambler, of course, does not win anything and loses his stake on a particular day, three football matches are taking place. Match I is between teams A and B, Match II between teams C and D, match III between teams E and F. A bookmaker has offered the following odds on different teams:

Match	Odds	Odds
I	A -1/4	B-10/1
II	C – 2/5	D -7/2
III	E – 20/1	F – 1/5

An 'upset' happens when a team beats an opposing team, which had better chance of winning. The Bookmaker offers worse odds on teams that are expected to win.
For eg: A team with odds 2/7 has a better chance of winning than a team with 7/2 odds.

23. Amit put ₹100 at sake in each of the three matches (one team per match). What is the maximum possible amount that he can receive, if there is only one match that results in an upset?
(A) 2365 (B) 2745 (C) 2435 (D) 2565

24. If there was no upset in any of the three matches and Bhasker bet ₹20, ₹40 and ₹60 in each match (in any order), and he ended up earning the maximum possible amount, then what are his total earnings?
(A) 158 (B) 162 (C) 170 (D) 188

25. If Ravi bet equal amounts on all the six teams, which results are most favourable to him if there are 2 upsets? Pick the option with the winning teams.
(A) B, C, E (B) A, D, E (C) B, D, E (D) B, C, F

26. Suresh has a strong feeling that team F will win and he bought stake ₹50 on it. He bought a stake ₹50 in one of the teams playing match II. What is the difference between the maximum and minimum earnings?
(A) 285 (B) 250 (C) 265 (D) 295

Directions for questions 27 to 30: Select the correct alternatives from the given choices.

In a school every student from classes one, two and three is a member of one of the clubs among chess, caroms and checkers.
Each club has divisions namely one, two and three which represents students from class one, two and three respectively.
Number of students in any division of any club is a distinct number less than ten.
There is at least one student in every division of any club.
The number of students in the three divisions of the caroms club are two, seven and nine not necessarily in that order.
The total number of students in division two of the checkers club is equal to sum of other two divisions in that club.
The number of students in division two of the chess club is one more than the sum of other two divisions in that club.
Number of students from class II in all the three clubs is 16.
Number of students in division one of all the clubs is less than number of students in division three of that respective club.

Directions for questions 27 to 30: Write your answer in the box provided below the question.

27. What is the total number of students in class one?

28. If number of students in division two of chess club is greater than division two of checkers club, what is the total number of students in chess club?

29. What is the total number of students in class three?

30. If number of students in division two of chess club is less than division two of checkers club, what is the total number of students in division one of the chess club?

Key

Exercise – 12(a)

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

Exercise – 12(b)

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