#### TEST SERIES PAPER (CSAT - 2) 30.12.2023

#### **1.** Is x + y - z + t even?

I. x + y + t is even. II. t and z are odd. Statement I is sufficient to answer the question Statement II is sufficient to answer the question Both the Statements are sufficient to answer the question None of the Statement is sufficient to answer the question

(c)

This can be answered using both the statements.

**Statement I** suggest that (x + y + t) is even. Since the difference between an even and an odd number is always odd, (x + y + t) - z will be odd. **Statement II** suggests that both t and z are odd.

#### 2. What is the number x?

I. The LCM of x and 18 is 36.

**II**. The HCF of x and 18 is 2.

Statement I is sufficient to answer the question

Statement II is sufficient to answer the question

Both the Statements are sufficient to answer the question

None of the Statement is sufficient to answer the question

(c)

We know that product of two numbers = LCM × HCF =  $36 \times 2 = 72$ . So, x =  $\frac{72}{18} = 4$ .

Hence, both the statements are required to answer the question.

#### 3.What is the price of bananas?

I. With Rs.84, I can buy 14 bananas and 35 oranges.

**II**. If price of bananas is reduced by 50%, then we can buy 48 bananas in Rs.12.

Statement I is sufficient to answer the question

Statement II is sufficient to answer the question

Both the Statements are sufficient to answer the question

None of the Statement is sufficient to answer the question

(b)

Statement II in itself suggests the price of a banana.

Since we can buy 48 bananas in Rs.12, price of a banana = Re.0.25.

And since this price is after 50% reduction, the actual price of a banana = Re.0.5.

#### 4.What is the profit percentage?

I. The cost price is 80% of the selling price.II. The profit is Rs.50.

Statement I is sufficient to answer the question Statement II is sufficient to answer the question Both the Statements are sufficient to answer the question None of the Statement is sufficient to answer the question

(a) It is clear that only **Statement I** is required to answer the question, if CP = 0.8 SP, then SP =  $\frac{1}{0.8}$  CP.  $\therefore$ SP = 1.25 CP Thus, profit percentage is 25%.

5. Three bells ring at an interval of 18 min, 24 min and 32 min. At a certain time, they begin to ring together. What length of time will elapse before they ring together again?

a. 2 hr and 24 min b. 4 hr and 48 min c. 1 hr and 36 min d. 5 hr

(b)

The bells will chime together after a time that is equal to the LCM of 18, 24 and 32 = 288 min = 4 hr and 48 min.

6. Two positive integers differ by 4 and sum of their reciprocals is  $\frac{10}{21}$ . Then one of the numbers is

- a. 3 b. 1
- 0.1
- c. 5
- d. 21

(a)

Let one of the numbers be x. So, the other number would be (x + 4). According to the question, we have  $\frac{1}{x} + \frac{1}{(x+4)} = \frac{10}{21}$  or x = 3.

#### Hint: Please note that the sum of reciprocals is

 $basically = \left(\frac{\text{Sumof the in itegers}}{\text{Productof the integers}}\right)$ 

So, we have to find two integers whose sum is 10 and whose product is 21. So, x + (x + 4) = 10 or x = 3.

#### 7. A stockist wants to make some profit by selling sugar. He contemplates about various methods. Which of the following would maximise his profit?

I. Sell sugar at 10% profit.

**II**. Use 900 g of weight instead of 1 kg.

III. Mix 10% impurities in sugar and selling sugar at cost price.

IV. Increase the price by 5% and reduce weights by 5%.

a. I or III

b. II

c. II, III and IV

d. Profits are same

(b)

Profit percentage in each case is

- (i) 10%
- $\left(\frac{100\times100}{900}\right) = \frac{100}{9}\%$ (ii)
- $\frac{100 \times 1.1 100}{100 \times 1.1 100} \times 100 = 10\%$ (iii)

(iv) 
$$\left(\frac{10 \times 100}{95}\right) = \frac{200}{19}\%$$

8. I live X floors above the ground floor of a high-rise building. It takes me 30 s per floor to walk down the steps and 2 s per floor to ride the lift. What is X, if the time taken to walk down the steps to the ground floor is the same as to wait for the lift for 7 min and then ride down?

a. 4

b. 7

c. 14

- d. 15
- (d)

live X floors above the ground floor and it takes me 30 s per floor to walk down and 2 s per floor to ride the lift, it takes 30X s to walk down and 2X s to ride the lift after waiting 420 s.

Since I

 $\Rightarrow 30X = 2X + 420 \Rightarrow X = 15.$ 

Alternative method: X > 14 as time taken to walk has to be greater than 7 min.

9. Two typists undertake to do a job. The second typist begins working one hour after the first. Three hours after the first typist has begun working, there is still  $\frac{9}{20}$  of the work to be done. When the assignment is completed, it turns out that each typist has done half the work. How many hours would it take each one to do the whole job individually?

a. 12 hr and 8 hr

b. 8 hr and 5.6 hr

c. 10 hr and 8 hr

d. 5 hr and 4 hr

(c)

Let the first typist takes X hours and the second takes Y hours to do the whole job.

When the first was busy typing for 3 hr, the second was busy only for 2 hr.

Both of them did  $\frac{11}{20}$  of the whole work.

 $\therefore \frac{3}{x} + \frac{3}{y} = \frac{11}{20}.$ 

When the assignment was completed, it was revealed that each typist had done half the work.

: The first one spent  $\frac{x}{2}$  hr, and the second,  $\frac{y}{2}$  hr. And since the first had begun one hour before the second, we have  $\frac{x}{2} - \frac{y}{2} = 1$  $\Rightarrow X = 10$  hr. Y = 8 hr.

# 10. If a 4-digit number is formed with digits 1, 2, 3 and 5. How many numbers can be formed that are divisible by 25, if repetition of digits is not allowed?

a. 1

b. 2

c. 3

d. None of these

(b)

Total number of four-digit numbers that can be formed = 4 If the number is divisible by 25, then the last two digits are 25. So, the first two digits can be arranged in 2 ways. Hence, 2 numbers are there which are divisible by 25.

### 11. Three consecutive positive even numbers are such that thrice the first number exceeds double the third by 2, then the third number is

a. 10

b. 14

c. 16 d. 12

(b) If the numbers are (x - 2), x and (x + 2), then 3(x - 2) - 2 = 2(x + 2).  $\therefore x + 2 = 14$ .

12. In a race of 200 m run, A beats S by 20 m and N by 40 m. If S and N are running a race of 100 m with exactly same speed as before, then by how many metres will S beat N?

a. 11.11 m

b. 10 m

c. 12 m

d. 25 m

(a)

In the same time as A runs 200 m in the race, S runs 180 m and N runs 160 m. In other words, in the same time as S runs 180 m, N runs 160 m.

So, in the same time as S runs 100 m, N will run  $\left(100 x \frac{160}{180}\right) = 88.89m$ . Hence, in a 100 m race, S will beat N by (100 - 88.89) = 11.11 m.

13.  $\frac{2}{5}$  of the voters promise to vote for P and the rest promised to vote for Q. Of these, on the last day 15% of the voters went back of their promise to vote for P and 25% of voters went back of their promise to vote for Q, and P lost by 2 votes. Then the total number of voters is

100

b. 110

c. 90 d. 95

u. 9.

(a)

Let there be 100 voters in all. (Here, assuming X as variable or 100 will have same outcome)

Initially, 40 of these promised to vote for P, while 60 of them promised to vote for Q.

On the last day, (15% of 40) = 6 voters went back of their promise and voted for Q.

Also, 25% of 60 = 15 voters shifted their interest from Q to P.

So finally, P end up getting (40 - 6 + 15) = 49 votes and Q end up getting (60 - 15 + 6) = 51 votes.

Hence, margin of victory for Q = (51 - 49) = 2, which is true. Hence, there were 100 voters in all.

# 14. Boxes numbered 1, 2, 3, 4 and 5 are kept in a row, and they are to be filled with either a red or a blue ball, such that no two adjacent boxes can be filled with blue balls. Then how many different arrangements are possible, given that all balls of a given colour are exactly identical in all respects?

- 13
- b. 10
- c. 15
- d. 22
- (a)

#### Case 1:

If there are three blue balls, then they can be only in box 1, 3 and 5 = 1 case Case 2:

If there are two blue balls, then total number of cases  $= {}^{5}C_{2} = 10$ 

But in 4 cases the blue ball will be in adjacent boxes. These cases are when blue balls in boxes 1 and 2 or 2 and 3 or 3 and 4 or 4 and 5.

Therefore, total number of cases when there are two blue balls = 10 - 4 = 6 ways

Case 3:

If there are one blue ball, then total number of cases =  ${}^{5}C_{1} = 5$ 

Case 4:

If there are no blue ball, then total number of cases =  ${}^{5}C_{5} = 1$ Hence, total number of cases = 1 + 6 + 5 + 1 = 13.

### 15. The remainder obtained when a prime number greater than 6 is divided by 6 is

- a. 1 or 3
- b. 1 or 5
- c. 3 or 5
- d. 4 or 5

(b)

The best way to solve this question is by the method of simulation.

Choose any prime number greater than 6 and verify the result.

When 7 is divided by 6, it gives a remainder 1.

So, our answer could be (a) or (b). When 11 is divided by 6, it gives a remainder 5. Hence, our answer is (b).

### 16. For the product n(n + 1)(2n + 1), where, n belongs to Natural number, which one of the following is not necessarily true?

It is even Divisible by 3 Divisible by the sum of the square of first n natural numbers Never divisible by 237

I and III IV only II only I and II

(b)

Since n(n + 1) are two consecutive integers, one of them will be even and thus the product will always be even.

Also, sum of the squares of first 'n' natural numbers is given by  $\frac{n(n+1)(2n+1)}{6}$ . Hence, product will always be divisible by this. Also, you will find that the product is always divisible by 3 (you can use any value of n to verify this). However, we can find that option (d) is not necessarily true. E.g. If n = 118, (2n + 1) = 237 or if n = 236, then (n + 1) = 237 or if n itself is 237, etc.

17.  $(5^{6} - 1)$  is divisible by a. 13 b. 31 c. 5 d. None of these (a)  $5^{6} - 1 - (5^{3})^{2} - 1 - (125)^{2} - (125 - 1) - (125 - 1)$ 

$$5^{6} - 1 = (5^{3})^{2} - 1 = (125)^{2} - (1)^{2} = (125 + 1) (125 - 1)$$
  
= 124 × 126 = 31 × 4 × 126.

So, among the given answer choices, it is divisible by 31.

18. The number of votes not cast for the X Party increased by 25% in the National General Election over those not cast for it in the previous Assembly Polls, and the X Party lost by a majority twice as large as that by which it had won the Assembly Polls. If a total 2,60,000 people voted each time.

#### How many voted for the X Party in the Assembly Elections.

(a) 1,10,000

(b) 1,50,000

(c) 1,40,000

(d) 1,20,000

(c) Let x be the number of votes not cast for X Party in the previous polls. So, the number of votes not cast for the party in this assembly polls would be 1.25x.

Margin of victory in the previous polls

= (Votes cast) - (Votes not cast)

= (260000 - x) - x = (260000 - 2x).

Margin of loss in this year's polls

 $= 1.25 \mathrm{x} - (260000 - 1.25 \mathrm{x})$ 

=(2.5x - 260000).

As per the given information, margin of loss this year =  $2 \times Margin of victory$  last year.

Therefore, (2.5x - 260000) = 2(260000 - 2x).

∴ x = 120000.

So, the number of votes cast for the party in assembly election = 260000 - 120000 = 140000.

# 19. Two towns A and B are 100 km apart. A school is to be built for 100 students of town B and 30 students of Town A. Expenditure on transport is Rs. 1.20 per km per student. If the total expenditure on transport by all 130 students is to be as small as possible, then the school should be built at

(a) 33 km from Town A.

(b) 33 km from Town B

(c) Town A

(d) Town B

(d)

Option	Location	Expenditure	Expenditure	Total	
		of Town A of Town B E		Expenditure	
		students	students		
(a)	33km from	$33 \times 1.2 \times$	67×1.2×	1188+8040=9228	
	A	30 = 1188	100 = 8040		
(b)	33km from	67×1.2×	33× 1.2 ×	2412+3960=6372	
	В	30 = 2412	100 = 3960		
(c)	Town A	0	$100 \times 100 \times$	12000	
			1.2 = 12000		
(d)	Town B	30×100×	0	3600	
		1.2 = 3600			

Hence, we find that the least expenditure will be incurred if the school is located in town B.

HINT: Students, please note that since there are a greater number of students from Town B, to minimise the total expenditure the school should be located as closer to town B as possible.

20. A water tank has three taps A, B, and C. A fills four buckets in 24 minutes, B fills 8 buckets in 1 hour and C fills 2 buckets in 20 minutes. If all the taps are opened together a full tank is emptied in 2 hours. If a bucket can hold 5 litres of water, what is the capacity of the tank?

(a) 120 litres

(b) 240 litres

(c) 180 litres

(d) 60 litres

(b) Since a bucket holds 5 litres of water, water discharged in one minute by tap A, B and C is  $\frac{5}{6}$  litres,  $\frac{2}{3}$  litres and  $\frac{1}{2}$  litres respectively.

If A, B and C are all opened simultaneously, total discharge in one minute  $=\left(\frac{5}{6}+\frac{2}{3}+\frac{1}{2}\right)=2$  litres.

So, in 2 hours, the discharge would be 240 litres, that is the capacity of the tank.

21. Shyam went from Delhi to Shimla via Chandigarh by car. The distance from Delhi to Chandigarh is  $\frac{3}{4}$  times the distance from Chandigarh to Shimla. The average speed from Delhi to Chandigarh was half as much again as that from Chandigarh to Shimla. If the average speed for the entire journey was 49 kmph. What was the average speed from Chandigarh to Shimla?

- (a) 39.2 kmph
- (b) 63 kmph
- (c) 42 kmph
- (d) None of these

(c) It is clear that the ratio of the distances between

(Delhi-Chandigarh) : (Chandigarh-Shimla) = 3 : 4.

The ratio of the speeds between (Delhi-Chandigarh) : (Chandigarh-Shimla) = 1 : 2.

Let the distances be 3x and 4x respectively and speeds be 3y and 2y.

So, the time taken will be  $\left(\frac{x}{y}\right)$  and  $\left(\frac{2x}{y}\right)$  respectively. Average speed

$$=\frac{\text{(Total Distance)}}{\text{(Total Time)}} = \frac{(7x)}{\left(\frac{x}{y} + \frac{2x}{y}\right)} = \frac{7y}{3} = 49.$$

Hence, y = 21. So, the average speed from Chandigarh to Shimla = 2y = 42 kmph.

22. Along a road lie an odd number of stones placed at intervals of 10m. These stones have to be assembled around the middle stone. A person can carry only one stone at a time. A man carried out the job starting with the stone in the middle, carrying stones in succession, thereby covering a distance of 4.8 km. Then the number of stones is

- (a) 35
- (b) 15
- (c) 29 (1) 21
- (d) 31

(d) Let the number of stones be 'n'. As the person covers 4.8km, he covers 2.4km on one side and 2.4km on other side.

So, the total distance covered by him = 20 + 40 + 60 + 80 + 100 + 120 + 140 + 160 + 180 + 200 + 220 + 240 + 260 + 280 + 300.Hence, Total number of stones on One side = 15

Total number of stones = 15 + 15 + 1 = 31.

23. What is the smallest number which when increased by 5 is completely divisible by 8, 11 and 24?

- (a) 264
- (b) 259
- (c) 269
- (d) None of these

(b) Required number = LCM (8, 11, 24) - 5 = 259.

24. A and B walk from X to Y, a distance of 27 km at 5 kmph and 7 kmph respectively. B reaches Y and immediately turns back meeting A at Z. What is the distance from X to Z?

- (a) 25 km
- (b) 22.5 km
- (c) 24 km
- (d) 20 km
- (b) Let they meet at a distance x kms from X.

So, the total distance travelled by A = x at the speed of 5 kmph.

Total distance travelled by B = 27 + (27 - x) = (54 - x) at the speed of 7 kmph. Time taken by  $A = \frac{x}{5}$ .

Time taken by B =  $\frac{(54-x)}{7}$ .

Since they have met at the same time, they would have travelled for the same time.

Hence  $\frac{x}{5} = \frac{(54-x)}{7}$  or x = 22.5 kms.

### 25. Is the distance from the office to home less than the distance from the cinema hall to home?

I. The time taken to travel from home to office is as much as the time taken from home to the cinema hall, both distances being covered without stopping.II. The road from the cinema hall to home is bad and speed reduces, as compared to that on the road from home to the office.

Statement I is sufficient to answer the question Statement II is sufficient to answer the question Both the Statements are sufficient to answer the question None of the Statement is sufficient to answer the question

(c) **Statement I** tell us that the time taken to cover both distances is the same, but it does not tell us anything about the speeds at which these are covered.

This information is given by the **second statement**, which says the speed from cinema hall to home is less than that between home to the office.

Hence by using both the statements we can say that the distance between cinema hall to home is less than that between home to the office.

#### 26. A and B work at digging a ditch alternately for a day each. If A can dig a ditch in 'a' days and B can dig that ditch in 'b' days, will work get done faster if A begins the work?

I. n is positive integer such that  $n\left(\frac{1}{a} + \frac{1}{b}\right) = 1$ II. b > a

Statement I is sufficient to answer the question Statement II is sufficient to answer the question Both the Statements are sufficient to answer the question None of the Statement is sufficient to answer the question (a) If the total work is one unit, work done by A and B in one day will be  $\frac{1}{a}$  unit and  $\frac{1}{b}$  unit respectively.

### Using statement, I: $\frac{n}{a} + \frac{n}{b} = 1$

Since 'n' is an integer, if both A and B work for n days, work will be completed no matter who starts a work.

Using **statement II**, nothing can be concluded as total amount of work is not known.

# 27. If twenty sweets are distributed among some boys and girls such that each girl gets two sweets and each boy gets three sweets, what is the number of boys and girls?

I. The number of girls is not more than five.

**II**. If each girl gets 3 sweets and each boy gets 2 sweets, the number of sweets required for the children will still be the same.

Statement I is sufficient to answer the question Statement II is sufficient to answer the question Both the Statements are sufficient to answer the question None of the Statement is sufficient to answer the question

(b) 2g + 3b = 20.

Since b & g should be integers the values that satisfy this equation are (g = 10 & b = 0), (g = 7 and b = 2), (g = 4 & b = 4), and (g = 1 and b = 6).

From the statement I, we can shortlist the last two possibilities i.e. g = 4 or g = 1, but cannot get a unique answer.

The statement II suggests that the number of girls and boys have to be equal. Hence, we get a unique answer viz. g = 4 & b = 4. Only statement II is required to answer the question.

### 28. If the selling price were to be increased by 10%, the sales would reduce by 10%. In what ratio would profits change?

I. The cost price remains constant.

II. The cost price increased 10%.

Statement I is sufficient to answer the question Statement II is sufficient to answer the question Both the Statements are sufficient to answer the question None of the Statement is sufficient to answer the question (b) Profit(P) = (SP - CP) \* x Sales. From the data given in the question we can figure out that P1 = (1.1SP - CP) \* 0.9x Sales.

Hence  $=\frac{P}{P_1} = \frac{(SP-CP)*x}{(1.1SP-CP)*0.9}$  = From **Statement I**, this ratio can be concluded which is not sufficient to answer the question.

To find this ratio we need to eliminate the variables CP & SP.

#### From Statement II, the new CP in the case will be 1.1CP.

In other words, if the CP increases by 10%, as in that case our ratio will be  $\frac{(SP-CP)*x}{1.1(SP-CP)*0.9x} = 10/9$ Hence only Statement II is required to ensure the question

Hence only Statement II is required to answer the question.

### 29. What is the average weight of the 3 new team members who are recently included into the team?

I. The average weight of the team increases by 20 kg.

II. The 3 new men substitute earlier members whose weights are 64 kg, 75 kg and 66 kg.

Statement I is sufficient to answer the question Statement II is sufficient to answer the question Both the Statements are sufficient to answer the question None of the Statement is sufficient to answer the question

(d) As neither average weight of the original members is not mentioned nor the number of members in original team, question cannot be answered.

### **30.** Ten boys go to a neighbouring orchard. Each boy steals a few mangoes. What is the total number of mangoes they steal?

**I**. The first boy steals 4 mangoes and the fourth boy steals 16 mangoes and the eight boy 32 mangoes and the tenth boy steals 40 mangoes.

**II**. The first boy stole the minimum number of mangoes and the tenth boy stole the maximum number of mangoes.

Statement I is sufficient to answer the question Statement II is sufficient to answer the question Both the Statements are sufficient to answer the question None of the Statement is sufficient to answer the question (d) From the **statement I**, we can only find the number of mangoes stolen by 4 out of the 10 boys.

The **statement II** suggests that the number of mangoes stolen by each of the remaining six boys is more than 4 and less than 40.

Although from the two statements that are given it is tempting to assume that the number of mangoes stolen by the boys must be in AP, since it is not mentioned explicitly, we cannot answer the question.

31. Direction (Q no31-35): Answer the questions based on the following information. The data given in the table shows the investment details in country 'X' by companies A, B, C, D, E and F. Figures in the table are in US dollars in billions.

	А	В	С	D	Е	F
Year	2.5	4.6	5.8	3.11	10.6	7.8
1						
Year	6.7	7.5	12.5	5.6	17.4	25.3
2						
Year	11.5	18.7	21.2	7.7	29.8	60.1
3						1-1-1

What is the percentage increase in investment of B, C, D and E from year 1 to year 3?

- a. 121%
- b. 321%
- c. 221%
- d. 300%

(c) Amount invested on B, C, D and E in year 1

= 4.6 + 5.8 + 3.11 + 10.6 = 24.11

Amount invested on B, C, D and E in year 3

= 18.7 + 21.2 + 7.7 + 29.8 = 77.4

∴ Percentage increase

$$=\frac{77.4-24.11}{24.11}\times100\approx221\%$$

**32. What is the ratio of investments of E to F for the years 1 to 3**? a. 31 : 19

b. 19 : 31
c. 20 : 29
d. 41 : 53
(b) Company E's investment for years 1 to 3 = 10.6 + 17.4 + 29.8 = 57.8
Company F's investment for years 1 to 3 = 7.8 + 25.3 + 60.1 = 93.2
∴ Ratio = 57: 93 = 19: 31

33. What is D's contribution as a percentage of total investments in year 2?

a. 8.2%
b. 4.5%
c. 7.4%
d. 9.2%
(c) Total investment in year 2
= 6.7 + 7.5 + 12.5 + 5.6 + 17.4 + 25.3 = 75
D's contribution in year 2 = 5.6

: Percentage contribution  $=\frac{5.6}{75}$  7.4%

#### 34. For which company is investment not increased from year 1 to year 3?

a. C

b. D

**c**. F

d. None of these

(d) As we can see from the table, investment by all the companies has increased from year 1 to year 3.

### 35. What is the percentage difference in investments of companies A, B, C and companies D, E, F in year 2?

a. 75% b. 81% c. 67.5% d. 42.3% (b) In year 2, A + B + C = 6.7 + 7.5 + 12.5 = 26.7D + E + F = 5.6 + 17.4 + 25.3 = 48.3Percentage difference  $=\frac{48.3 - 26.7}{26.7} = 80.8\% \approx 81\%$ 

**36.** If a number **774958A96B** is to be divisible by 8 and 9, the respective values of A and B will be

a. 7 and 8b. 8 and 0c. 5 and 8d. None of these

(b) For the number to be divisible by 9, the sum of the digits should be a multiple of 9. We find that the sum of all the digits (excluding A and B) = (7 + 7 + 4 + 9 + 5 + 8 + 9 + 6) = 55. The next higher multiple of 9 is 63 or 72. Hence, the sum of A and B should either be 8 or 17.

We find that (a) and (c) cannot be the answer.

For a number to be divisible by 8, the number formed by its last three digits should be divisible by 8.

The last three digits are 96B. The multiples of 8 beginning with 96 are 960 and 968.

Hence, B can either be 0 or 8. Both of which satisfy our requirement of the number being divisible by 9 as well.

Therefore, A and B could either be 0 and 8 or 8 and 0 respectively.

37. The cost of diamond varies directly as the square of its weight. Once, this diamond broke into four pieces with weights in the ratio 1: 2: 3: 4. When the pieces were sold, the merchant got Rs. 70,000 less when sold without breaking it. Find the original price of the diamond.

a. Rs. 1.4 lakh

b. Rs. 2 lakh

c. Rs. 1 lakh

d. Rs. 2.1 lakh

(c) Let the original weight of the diamond be 10x. Hence, its original price will be  $k(100x^2) \dots$  where k is a constant.

The weights of the pieces after breaking are x, 2x, 3x and 4x.

Therefore, their prices will be  $kx^2$ ,  $4kx^2$ ,  $9kx^2$  and  $16kx^2$ .

So the total price of the pieces =  $(1 + 4 + 9 + 16) kx^2 = 30kx^2$ .

Hence, the difference in the price of the original diamond and its pieces =  $100kx^2 - 30kx^2 = 70kx^2 = 70000$ .

Hence,  $kx^2 = 1000$  and the original price =  $100kx^2 = 100 \times 1000 = 100000 = Rs$ . 1 lakh.

#### **38.** If n is any odd number greater than 1, then n $(n^2 - 1)$ is

- a. divisible by 96 always
- b. divisible by 48 always
- c. divisible by 24 always
- d. None of these

(c)  $n(n^2-1) = (n-1)n(n+1)$ .

If you observe, this is the product of three consecutive integers with middle one being an odd integer.

Since there are two consecutives even numbers, one of them will be a multiple of 4 and the other one will be multiple of 2.

Hence, the product will be a multiple of 8.

Also, since they are three consecutive integers, one of them will definitely be a multiple of 3.

Hence, this product will always be divisible by  $(3 \times 8) = 24$ .

**39.** Once I had been to the post office to buy five-rupee, two-rupee and onerupee stamps. I paid the clerk Rs. 20, and since he had no change, he gave me three more one-rupee stamps. If the number of stamps of each type that I had ordered initially was more than one, what was the total number of stamps that I bought?

- a. 10
- b. 9
- c. 12
- d. 8

(a) Since I paid Rs. 20 and because of lack of change, the clerk gave me Rs. 3 worth of stamps, it can be concluded that the total value of the stamp that I wanted to buy is Rs. 17.

Since I ordered initially a minimum of 2 stamps of each denomination, if I buy exactly 2 stamps each, my total value is 2(5 + 2 + 1) = Rs. 16.

The only way in which I make it Rs. 17 is buying one more stamp of Re 1. Hence, the total number of stamps that I ordered = (2 + 2 + 3) = 7. In addition, the clerk gave me 3 more. Hence, the total number of stamps that I bought = (7 + 3) = 10 (viz. 2 five-rupee, 2 two-rupee and 6 one-rupee stamps).

### 40. What is the salary of R, in a group of P, Q, R, S and T whose average salary is ₹45980?

I. Total of the salary of P and T is ₹90670.

**II**. Total of the salary of Q and S is ₹76540.

Only Statement I is necessary to answer the question

Only Statement II is necessary to answer the question

Both the Statements are necessary to answer the question

None of the Statement is sufficient to answer the question

c

 $P + Q + R + S + T = 45980 \times 5 = 229900 \dots (i)$ 

I. P + T = 90670 ...(ii)

II. Q + S = 76540 ...(iii)

Adding (ii) and (iii) and subtracting from (i), we get R = 229900 - (90670 + 76540) = 229900 - 167210 = 62690. Thus, both I and II together give the answer. Correct answer is (c).

#### 41. What is the value of the two-digit number ab?

I. The difference between its digits is 2.

II. The sum of its digits is 4.

Only Statement I is necessary to answer the question Only Statement II is necessary to answer the question Both the Statements are necessary to answer the question None of the Statement is sufficient to answer the question (d) I. gives, a - b = 2 .....(i) or b- a = 2 ....(ii) II. gives, a + b = 4 .....(iii) Solving (i) and (iii), we get- a = 3 and b = 1. Solving (ii) and (iii), we get: a = 1 and b = 3So, the required number is either 13 or 31. Thus, even both I and II together do not give the answer. The correct answer is (d).

#### 42. How old is C now?

I. Three years ago, the average of A and B was 18 years. II. With C joining them now, the average be- comes 22 years.

Only Statement I is necessary to answer the question Only Statement II is necessary to answer the question Both the Statements are necessary to answer the question None of the Statement is sufficient to answer the question (c)

I. 3 years ago,  $\frac{1}{2}(A + B) = 18$   $\Rightarrow$  3 years ago, (A + B) = 36Now, (A + B) = (36 + 3 + 3) = 42  $\Rightarrow A + B = 42$  ...(i) II. Now,  $\frac{1}{3}(A + B + C) = 22$  A + B + C = 66...(ii)From (i) and (ii), we get C = (66-42) = 24. Thus, I and II both together give the answer.

43. There are 5 members A, B, C, D, E are sitting on a circular table. Here, C is the host and will sit at a fixed place on table. In how many ways A, B, D, E can sit around C.

- (a) 24
- (b) 20
- (c) 21
- (d) 22

**(b)** Total number of persons = 5

Host can sit in a particular seat in one way.

Now, remaining positions are defined relative to the host. So, the remaining can sit in 4 places in  $4 \times 3 \times 2 \times 1 = 24$  ways.

44. 2 men and 1 woman board a bus in which 5 seats are vacant, one of these 5 seats is reserved for ladies. A woman may or may not sit on the seat reserved for ladies. In how many different ways can the five seats be occupied by these passengers?

- (a) 15
- (b) 36
- (c) 48
- (d) 60

(b) Case I If lady sits on the reserved seat, then 2 men can occupy seats from 4 vacant seats in =  $4 \times 3 = 12$  ways

**Case II** If lady does not sit on reserved seat, then 1 woman can occupy a seat from four seats in 4 ways.

1 man can occupy a seat from 3 seats in 3 ways, also 1 man left can occupy a seat from remaining two seats in 2 ways.

Total ways =  $4 \times 3 \times 2 = 24$  ways

From case I and case II, total number of ways = 12 + 24 = 36

45. In a locality, two-thirds of the people have cable TV, one-fifth have VCR, and one-tenth have both. What is the fraction of people having only cable -TV or only VCR?



46. I bought 5 pens, 7 pencils and 4 erasers. Rajan bought 6 pens, 8 erasers and 14 pencils for an amount which was half more what I had paid. What per cent of the total amount paid by me was paid for the pens? a. 37.5%

b. 62.5%
c. 50%
d. None of these
(b) Let us look at the two equations. Let (5 pens + 7 pencils + 4 erasers) cost Rs. x.

Hence, (6 pens + 14 pencils + 8 erasers) will cost Rs. 1.5x.

Had, in the second case, Rajan decided to buy 10 pens instead of 6, the quantity of each one of them would have doubled over the first case and hence it would have cost me Rs. 2x. So (10 pens + 14 pencils + 8 erasers) = Rs. 2x.

Now subtracting the second equation from the third, we get 4 pens cost Rs. 0.5x. Since 4 pens cost Re 0.5x, 5 of them will cost Re 0.625x.

This is the amount that I spent on pens. Hence, fraction of the total amount paid = 0.625 = 62.5%.

47. A selection is to be made for one post of principal and two posts of viceprincipal. Amongst the six candidates called for the interview, only two are eligible for the post of principal while they all are eligible for the post of vice-principal. The number of possible combinations of selectees is

- (a) 4
- (b) 12
- (c) 18
- (d) None of these
- (d) Total number of ways =  ${}^{2}C_{1}$ .  ${}^{5}C_{2} = 2 \times \frac{5!}{3!2!} = 2 \times 10 = 20$

48. A student has to opt for 2 subjects out of 5 subjects for a course, namely Commerce, Economics, Statistics, Mathematics I and Mathematics II. Mathematics II can be offered only if Mathematics I is also opted. The number of different combinations of two subjects which can be opted, is

- (a) 5
- (b) 6

(c) 7 (d) 8

(c) Number of ways of opting a subject other than Mathematics  $I = {}^{4}C_{2}$  $=\frac{4\times3\times2!}{2!\times2}=6$ Number of ways of selection of Mathematics II = 1: Total number of ways = 6+1=7

49. In a mile race, Akshay can be given a start of 128 m by Bhairav. If Bhairav can give Chinmay a start of 4 m in a 100 m dash, then who out of Akshay and Chinmay will win a race of one and half miles, and what will be the final lead given by the winner to the loser? (One mile is 1,600 m.)

- a. Akshay,  $\frac{1}{12}$  mile b. Chinmay,  $\frac{1}{32}$  mile
- c. Akshay,  $\frac{1}{24}$  mile
- d. Chinmay,  $\frac{1}{16}$  mile
- (d) In a mile race, Akshay can be given a start of 128 m by Bhairav.

This means that Bhairav can afford to start after Akshay has travelled 128 m and still complete one mile with him.

In other words, Bhairav can travel one mile, i.e. 1,600 m in the same time as Akshay can travel (1600 - 128) = 1,472 m.

Hence, the ratio of the speeds of Bhairav and Akshay = Ratio of the distances travelled by them in the same time  $=\frac{1600}{1472} = 25:23.$ 

Bhairav can give Chinmay a start of 4 miles.

This means that in the time Bhairav runs 100 m, Chinmay only runs 96 m. So, the ratio of the speeds of Bhairav and Chinmay  $=\frac{100}{96}=25:24.$ Hence, we have B: A = 25: 23 and B:C = 25: 24.

So A : B : C = 23 : 25 : 24.

This means that in the time Chinmay covers 24 m, Akshay only covers 23 m.

In other words, Chinmay is faster than Akshay.

So, if they race for  $1\frac{1}{2}$  miles = 2,400 m, Chinmay will complete the race first and by this time Aksahy would only complete 2,300 m.

In other words, Chinmay would beat Akshay by 100 m =  $\frac{1}{16}$  mile.

50. A person ordered 5 pairs of black socks and some pairs of brown socks. The price of a black pair was thrice that of a brown pair. While preparing the bill, the bill clerk interchanged the number of black and brown pairs by mistake which increased the bill by 100%. What was the number of pair of brown socks in the original order?

(a) 10

(b) 15

(c) 20

(d) 25

(d)

{ x pair – Brown Shocks – 'R' Rupees.} {5 pair – Black Shocks – '3R' rupees}

Total = (xR + 15R) Rupees

New  $\rightarrow$  (3x + 5R) Rupees

According to Question  $\rightarrow \frac{(3x+5R)-(XR+15R)}{xR+15R} = \frac{100}{100}$ x = 25

Hence, the original pair of brown socks = 25.

51. There are 5 tasks and 5 persons. Task 1 cannot be assigned to either person 1 or person 2. Task 2 must be assigned to either person-3 or person 4. Every person is to be assigned one task. In how many ways can the assignment be done?

(a) 6			
(b) 12			
(c) 24 (d) 144			
(c)			
$T_1$ $T_2$ $T_3$ $T_4$			
Task 2 must be assigned	to P4 or P3 = $2$ way	ys	
For task 1, only 2 person	is i.e. P <sub>3</sub> or P <sub>4</sub> and P	$_{5} = 2$ ways.	
(c) $T_1$ $T_2$ $T_3$ $T_4$ Task 2 must be assigned For task 1, only 2 person	to P4 or P3 = 2 way as i.e. $P_3$ or $P_4$ and P	ys $_5 = 2$ ways.	

Task 3 only 3 persons available = 3 ways

For task 4, only 2 persons available = 2 ways For task 5, only 1 person left = 1 way  $\therefore$  Total number of ways = 2 x 2 x 3 x 2 x 1 = 24 ways.

## 52.A man travels three-fifths of a distance AB at a speed 3a, and the remaining at a speed 2b. If he goes from B to A and return at a speed 5c in the same time, then

a.  $\frac{1}{a} + \frac{1}{b} = \frac{1}{c}$ b. a + b = cc.  $\frac{1}{a} + \frac{1}{b} = \frac{2}{c}$ d. None of these

(c)Let the total distance be x. So, the man travels a distance  $\frac{3x}{5}$  at a speed 3a.

Therefore, total time taken to travel this distance  $=\frac{3x}{(15a)}=\frac{x}{(5a)}$ 

$$\left[time = \frac{distan \ ce}{speed}\right]$$

He then travels a distance  $\frac{2x}{5}$  at a speed 2b. Hence, time taken to travel this distance  $=\frac{2x}{(10b)}=\frac{x}{(5b)}$ 

So total time taken in going from A to  $B = \frac{x}{(5a)} + \frac{x}{(5b)}$ .

Now he travels from B to A and comes back. So total distance travelled = 2x at an average speed 5c.

Hence, time taken to return =  $\frac{2x}{(5c)}$ .

Since the time taken in both the cases remains the same, we can write  $\frac{x}{5a} + \frac{x}{5b} = \frac{2x}{5c}$ .

Therefore,  $\frac{1}{a} + \frac{1}{b} = \frac{2}{c}$ .

53. Out of two-thirds of the total number of basketball matches, a team has won 17 matches and lost 3 of them. What is the maximum number of matches that the team can lose and still win more than three fourths of the total number of matches, if it is true that no match can end in a tie?

a. 4 b. 6 c. 5

d. 3

(a) The team has played a total of (17 + 3) = 20 matches.

This constitutes  $\frac{2}{3}$  of the matches.

Hence, total number of matches played = 30.

To win  $\frac{3}{4}$  of them, a team has to win 22.5, i.e. at least win 23 of them.

In other words, the team has to win a minimum of 6 matches (since it has already won 17) out of remaining 10.

So, it can lose a maximum of 4 of them.

54.A two-member committee comprising of one male, one female member is to be constituted out of five males and three females. Amongst the females, Ms A refused to be a member committee in which Mr B is taken as the member. In how many different ways can the committee be constituted?

- (a) 11
- (b) 12
- (c) 13
- (d) 14

(d) For each visualisation let us name the females and males.

Females (3)	Males (5)
Α	В
С	D
E	F
	G
	Н

Since, A cannot go with B, she will make team with four males in four ways AD, AF, AG, AH.

Since, there is no compulsion with females C and E.

They can make team with 5 males in 5 different ways each.

: Total number of ways = 4 + 5 + 5 = 14

55. A man travels from A to B at a speed x km/hr. He then rests at B for x hours. He then travels from B to C at a speed 2x km/hr and rests for 2x hours. He moves further to D at a speed twice as that between B and C. He thus reaches D in 16 hr. If distances A-B, B-C and C-D are all equal to 12 km each, the time for which he rested at B could be

a. 3 hr

b. 6 hr

c. 2 hr d. 4 hr

(a) Total time taken by the man to travel from A to D = 16 hr and total distance travelled = 36 km.

The time that he would have taken had he not rested in between will be (16 - x - 2x) = (16 - 3x).

But this time should be equal to the addition of the times that he takes to travel individual segments.

This is given as  $:\frac{12}{x} + \frac{12}{2x} + \frac{12}{4x} = \frac{84}{4x} = \frac{21}{x}.$ 

Therefore,  $\frac{21}{x} = (16 - 3x)$ . So, we get the equation  $3x^2 - 16x + 21 = 0$ . Solving this equation, we get x = 3 or  $x = \frac{7}{3}$ . This should be the time for which he rested at B.

#### 56. What is the present age of Tanya?

I. The ratio between the present ages of Tanya and her brother Rahul is 3 : 4 respectively.

II. After 5 years the ratio between the ages of Tanya and Rahul will be 4 : 5. III. Rahul is 5 years older than Tanya.

(a) I and II only

(b) II and III only

(c) I and III only

(d) Any two of the three

(d)

I. Let the present ages of Tanya and Rahul be 3x years and 4x years respectively. II. After 5 years, (Tanya's age): (Rahul's age) = 4 : 5. III. (Rahul's age) = (Tanya's age) + 5. From I and II, we get  $\frac{3x+5}{4x+5} = \frac{4}{5}$  This gives x.

Tanya's age = 3x can be found. Thus, I and II give the answer.

From I and III, we get 4x = 3x + 5. This gives x.

Tanya's age = 3x can be found. Thus, I and III give the answer.

From III: Let Tanya's present age be t years. Then, Rahul's present age  $=\frac{t+5}{t+10}=\frac{4}{5}$ . years. This gives t. Thus, II and III give the answer. Correct answer is (d).

#### 57. What is the third number of 8 consecutive numbers?

I. Product of the numbers is 121, 080, 960.

II. Sum of numbers is 84.

Statement I is sufficient to answer the question Statement II is sufficient to answer the question Both the Statements are necessary to answer the question None of the Statement is sufficient to answer the question

(b)

Let the 8 consecutive real numbers be x, (x + 1), (x + 2), (x + 3), (x + 4), (x + 5), (x + 6) and (x + 7).

I. gives, x (x + 1) (x + 2) (x + 3) (x + 4) (x + 5) (x + 6) (x + 7) = 121,080,960This equation cannot be solved for x.

II. gives, x + (x + 1) + (x + 2) + (x + 3) + (x + 4) + (x + 5) + (x + 6) + (x + 7) = 84  $\Rightarrow 8x + 28 = 84$   $\Rightarrow 8x = 56 \Leftrightarrow x = 7.$ Third number = x + 2 = 7 + 2 = 9.

Thus, II alone gives the answer. The correct answer is (b).

#### 58. Deepak's marks in Hindi are 15 more than the average marks obtained by him in Hindi, Economics, Sociology and Philosophy. What are his marks in Philosophy?

I. The total marks obtained by him in Hindi and Philosophy together is 120.II. The difference between the marks obtained by him in Sociology and Economics is 120.

Statement I is sufficient to answer the question Statement II is sufficient to answer the question Both the Statements are necessary to answer the question None of the Statement is sufficient to answer the question

(d)

$$H = \frac{(H + E + S + P)}{4} + 15$$
  

$$\Leftrightarrow 4 (H - 15) = H + E + S + P$$
  

$$\Leftrightarrow 3H - 60 = E + S + P \qquad \dots (i)$$
  
I. H+ P = 120  $\dots (ii)$   
II. S - E = 120  $\dots (iii)$ 

From (i), (ii) and (iii), we cannot find P. Correct answer is (d).

### **59.** What is the two-digit number where the digit at the unit's place is smaller?

I. The difference between the two digits is 5.

**II**. The sum of the two digits is 7.

Statement I is sufficient to answer the question

Statement II is sufficient to answer the question

Both the Statements are necessary to answer the question None of the Statement is sufficient to answer the question

(c) Let the ten's and unit's digits be x and y respectively, where x > y. I. gives, x - y = 5 ...(i) **Possibilities**: (6,1), (7, 2).....

II. gives, x + y = 7 ...(ii) C Leas Possibilities: (4, 3), (6, 1)..... Solving (i) and (ii), we get: x = 6 and y = 1.

So, the required number is 61. Thus, both I and II together give the answer. The correct answer is (c).

### 60. The price of a Maruti car rises by 30% while the sales of the car come down by 20%. What is the percentage change in the total revenue?

a. -4% b. -2% c. +4%

d. +2%

(c) This can simply be solved by multiplying the two multiplication factors to get the effective multiplication factor. e.g. multiplication factor for 30% increase = 1.30.

Multiplication factor for 20% decrease = 0.8.

Hence,  $1.30 \times 0.8 = 1.04$ .

This multiplication factor (i.e. 1.04) indicates that there is a 4% increase in total revenue. So, the answer is +4.

61. In a watch, the minute hand crosses the hour hand for the third time exactly after every 393 minutes of watch time. What is the time gained or lost by this watch in one day (approx)?

700 min (gained) 720 min (lost) 740 min (gained) 760 min (lost)

(b) In a watch that is running correct, the minute hand should cross the hour hand once in every  $65 + \frac{5}{11}$  min.

So, they should ideally cross three times once in  $3 \times \left(\frac{720}{11}\right) = \frac{2060}{11}$  min = 196.36 min.

But in the watch under consideration, they meet after every 393 minutes.

In other words, our watch is actually losing time (as it is slower than the normal watch).

Hence, when our watch elapsed 393 minutes, it actually should have elapsed 196.36 min.

So, in a day, when our watch will elapse  $(60 \times 24) = 1440$ , it should actually elapse  $\left(1440 \times \frac{196.36}{393}\right) = 720$  min.

Hence, the amount of time lost by our watch in one day = (1440 - 720) = 720min (approximately).

# 62. I sold two watches for Rs. 300 each, one at the loss of 10% and the other at the profit of 10%. What is the percentage of loss (–) or profit (+) that resulted from the transaction?

- a. (+)10
- b. (-)1
- c. (+)1
- d. (-)10

(b) In this case, we need not use the data that SP = Rs. 300 each.

This has to be used only to figure out that the SP of both the articles is the same.

Also, since the profit percentage on one is equal to the loss percentage on the other, viz. 10% effectively, it will be a loss given by  $\frac{(10)^2}{100} = 1\%$ . Hence, the correct answer is (–)1.

63. If a, b and c are integers, is (a - b + c) > (a + b - c)?
b is negative.
c is positive.

Statement I is sufficient to answer the question Statement II is sufficient to answer the question Both the Statements are necessary to answer the question None of the Statement is sufficient to answer the question (c) This question can be answered by using the two statements. Given (a - b + c) > (a + b - c). It is nothing but is (-b + c) > (b - c). Since b is negative and c is positive,  $\Rightarrow c > b$ Using both statements c > 0b < 0c > bSo always (a - b + c) > (a + b - c).

### 64. What is the cost price of the article, if the selling price of the article is 100?

I. After selling the article, a loss of 25% on cost price is incurred.

**II**. The selling price is three-fourths of the cost price.

Either of the Statements is sufficient to answer the question Statement II is sufficient to answer the question Both the Statements are necessary to answer the question None of the Statement is sufficient to answer the question

(a) using **Statement I**:  $(CP - SP)/CP = 25/100 \Rightarrow CP = 400/3$ & By using **Statement II**,  $SP = \frac{3}{4} * CP \Rightarrow CP = 400/3$ 

65. In a monthly test, the teacher decides that there will be three questions, one each from ex-7, 8 and 9 of the text-book. There are 12 questions in ex-7, 18 in ex-8 and 9 in ex-9. In how many ways can the three questions be selected?

(a) 1944

- (b) 2094
- (c) 1894
- (d) 2194

(b) Number of ways selecting 1 question from  $ex-7={}^{12}C_1$ Number of ways selecting 1 question from  $ex-8={}^{18}C_1$ Number of ways selecting 1 question from  $ex-9={}^{9}C_1$ Total number of ways  $={}^{12}C_1 \times {}^{18}C_1 \times {}^{9}C_1$  $= 12 \times 18 \times 9= 1944$ 

66. If there are 12 persons in a party and each of them shakes hands with each other, how many handshakes do happen in the party?

(a) 77

(b) 66

(c) 44

(d) 55

(b) First person will shake hands with 11 other persons.

Second person will shake hands with 10 other persons.

Third person will shake hands with 9 other persons and so on.

So, total handshakes

=1+2+3+4+5+6+7+8+9+10+11=66

#### **Alternate Method**

2 persons are to be chosen from 12 persons to have a handshake.

: Possible ways =  ${}^{12}C_2 = \frac{12!}{2!(12-2)!} = -66$ 

#### 67. How old is Sachin in 1997?

**I**. Sachin is 11 years younger than Anil whose age will be a prime number in 1998.

II. Anil's age was a prime number in 1996.

Statement I is sufficient to answer the question

Statement II is sufficient to answer the question

Both the Statements are necessary to answer the question

None of the Statement is sufficient to answer the question

(d) We cannot answer the question using both the statements.

Given that Anil's ages are prime numbers in 1998 and 1996.

It is of difference 2.

There are so many prime numbers with difference 2. They are (17, 19), (41, 43) . . . so on.

So, we cannot find out exact age of Sachin.

68. Three boys and three girls are to be seated around a table in a circle. Among them the boy X does not want any girl neighbour and the girl Y does not want any boy neighbour. How many such arrangements are possible?

- (a) 5
- (b) 6
- (c) 4
- (d) 2

(c) The different ways of arrangements are shown. So, in total there are 4 such ways.



69. A beats B by 100 m in a race of 1200 m and B beats C by 200 m in a race of 1600 m. Approximately by how many meters can A beat C in a race of 9600 m?

(a) 1600 m (b) 1800 m

```
(c) 1900 m
(d) 2400 m
c
Ratio of Speed of A : B =12:11
And ratio of speeds of B : C = 8 : 7
Therefore ratio of speeds of A : B : C =96 :88 : 77
So, in 9600 m race A will beat C by 1900 m.
```

70. A motor boat takes 12 hours to go downstream and it takes 24 hours to return the same distance. What is the time taken by boat in still water?

(a) 15 h

(b) 16 h

(c) 8 h

(d) 20 h

b

If t1 and t2 are the upstream and downstream times. Then time taken in still water is given by

 $\frac{2 \times t_1 \times t_2}{t_1 \times t_2} = \frac{2 \times 12 \times 24}{36} = 16h$ Alternatively,  $D = (B + S) \times 12$ And  $D = (B - S) \times 24$ Where (B+S) is downstream speed and (B-S) is upstream speed  $\Rightarrow \frac{B + S}{B - S} = \frac{2}{1}$   $\Rightarrow \frac{B}{S} = \frac{3}{1}$  (by componendo and dividendo) Now,  $D = 4S \times 12 = 48S$ D = 48S = 16B (Distance = Time × speed)

Required time =16h

**Direction for questions 71 to 73:** Answer the questions based on the following information.

There are 60 students in a class. These students are divided into three groups A, B and C of 15, 20 and 25 students each. The groups A and C are combined to form group D.

#### 71. What is the average weight of the students in group D?

a. More than the average weight of A

b. More than the average weight of C

c. Less than the average weight of C

d. Cannot be determined

(d)

Although the number of students in group D is more than in any other group, we still cannot say anything about the average weight of this group as nothing is

mentioned about the average weights of any of the groups or of the individual students.

### 72. If one student from group A is shifted to group B, which of the following will be true?

a. The average weight of both groups increases

b. The average weight of both the groups decreases

c. The average weight of the class remains the same

d. Cannot be determined

(c)

Although one student is shifted from group A to group B, the number of students in the class and the total weight of the students remain the same. Therefore, the average weight of the class remains the same.

### 73 .If all the students of the class have the same weight, then which of the following is false?

a. The average weight of all the four groups is the same

b. The total weight of A and C is twice the total weight of B

c. The average weight of D is greater than the average weight of A

d. The average weight of all the groups remains the same even if a number of students are shifted from one group to another

(c)

The total weight of any group will vary according to the number of students in that group.

Hence, the total weight of group A and C which has (15 + 25) = 40 will be twice that of students in group B which has 20 students.

However, it is clear that if all the students are of same weight, then the average weight of all groups remains same irrespective of how many students are present in each group.

Hence, clearly the statement 3 is false

74. A motor boat takes 2 hours to travel a distance of 9 km downstream and it takes 6 hours to travel the same distance against the current. The speed of the boat in still water and that of the current (in km/h) respectively are:

(a) 6,5

(b) 3, 1.5

- (c) 8,5
- (d) 9,3 (b)

 $D_s = \frac{9}{2} = 4.5 km/h$   $U_s = \frac{9}{2} = 1.5 km/h$ Speed of boat in still water =  $\frac{4.5+1.5}{2} = 3km/h$ And, Speed of river in still water =  $\frac{4.5+1.5}{2} = 1.5 km/h$ 

75. P and Q are two positive integers such that PQ = 64. Which of the following cannot be the value of P + Q?

a. 20

b. 65

c. 16

d. 35

(d) If we were to express 64 as product of two positive integers, we can get the following combinations:  $(64 \times 1)$ ,  $(32 \times 2)$ ,  $(16 \times 4)$ ,  $(8 \times 8)$ . Thus, we find that P + Q cannot be 35.

76. The average marks of a student in 10 papers are 80. If the highest and the lowest scores are not considered, the average is 81. If his highest score is 92, find the lowest.

55

b. 60

c. 62

d. Cannot be determined

(b)

Total marks scored by the student in 10 papers =  $(80 \times 10) = 800$ .

If we exclude the papers in which he scored the highest and the lowest marks, then the total marks scored by him in remaining 8 papers =  $(81 \times 8) = 648$ .

Hence, his total in these two papers in which he scored the highest and the lowest marks = (800 - 648) = 152.

Since his highest score is 92, his lowest score is (152 - 92) = 60.

### 77. If m and n are integers divisible by 5, which of the following is not necessarily true?

a. m - n is divisible by 5 b.  $m^2 - n^2$  is divisible by 25 c. m + n is divisible by 10 d. None of these (c) The best way to solve this is the method of simulation, e.g. let m = 10 and n = 5. Therefore m - n = 5, which is divisible by 5.  $m^2 - n^2 = 100 - 25 = 75$ , divisible by 25. m + n = 10 + 5 = 15 is not divisible by 10. Hence, the answer is (c).

**78. Direction for questions 78-80:** Answer the questions based on the following information.

A survey of 200 people in a community who watched at least one of the three channels — BBC, CNN and DD — showed that 80% of the people watched DD, 22% watched BBC and 15% watched CNN.

### What is the maximum percentage of people who can watch all the three channels?

a. 12.5%

- b. 8.5%
- c. 15%
- d. Data insufficient

(c)

To maximize g, in equation (v), we put d = e = f = 0

: Maximum value of  $g = \frac{34}{2} = 17$ 

$$\therefore$$
 Required percentage =  $\frac{17}{200} \times 100 = 8.5\%$ 

### 79. If 5% of people watched DD and CNN, 10% watched DD and BBC, then what percentage of people watched BBC and CNN only?

a. 2%

b. 5%

c. 8.5%

d. Cannot be determined

(a) 5% of people watch DD and CNN implies f + g = 10 ...(vi)

10% of people watch DD and BBC implies d + g = 20 ...(vii)

(v) - (vi) - (vii) gives

: Required percentage =  $\frac{4}{200} \times 100 = 2\%$ 

### 80. Referring to the previous question, what percentage of people watched all the three channels?

a. 3.5% b. 0% c. 8.5% d. Cannot be determined (d) From equation (v), we have (d+4+f) + 2g = 34 $\Rightarrow (d+f) + 2g = 30$ Since we cannot find the values of d and f, the value of g cannot be ascertained.

