

INFOSYS PLACEMENT QUESTION PAPERS WITH SOLUTIONS ALL IN 6 PAPERS

1. What is the 8th term in the series 1, 4, 9, 18, 35, 68, . . .

Sol:

1, 4, 9, 18, 35, 68, . . .

The pattern is

$$1 = 2^1 - 1$$

$$4 = 2^2 - 0$$

$$9 = 2^3 + 1$$

$$18 = 2^4 + 2$$

$$35 = 2^5 + 3$$

$$68 = 2^6 + 4$$

So 8th term is $2^8 + 6 = 262$

2. USA + USSR = PEACE ; P + E + A + C + E = ?

Sol:

3 Digit number + 4 digit number = 5 digit number. So P is 1 and U is 9, E is 0.

Now S repeated three times, A repeated 2 times. Just give values for S. We can easily get the following table.

$$\text{USA} = 932$$

$$\text{USSR} = 9338$$

$$\text{PEACE} = 10270$$

$$P + E + A + C + E = 1 + 0 + 2 + 7 + 0 = 10$$

3. In a cycle race there are 5 persons named as J, K, L, M, N participated for 5 positions so that in how many number of ways can M make always before N?

Sol:

Say M came first. The remaining 4 positions can be filled in $4! = 24$ ways.

Now M came in second. N can finish the race in 3rd, 4th or 5th position. So total ways are $3 \times 3! = 18$.

M came in third. N can finish the race in 2 positions. $2 \times 3! = 12$.

M came in second. N can finish in only one way. $1 \times 3! = 6$

Total ways are $24 + 18 + 12 + 6 = 60$.

Shortcut:

Total ways of finishing the race = $5! = 120$. Of which, M comes before N in half of the races, N comes before M in half of the races. So $120 / 2 = 60$.

4. If $\text{POINT} + \text{ZERO} = \text{ENERGY}$, then $E + N + E + R + G + Y = ?$

Sol:

4 digit number + 5 digit number = 6 digit number. So $E = 1, P = 9, N = 0$

Observe $R + 0 = G$. But $R = G$ not possible. $1 + R = G$ possible. So R and G are consecutive. $G > R$.

$1 + I = R$, So I and R are consecutive. $R > I$. i.e., $G > R > I$. and G, R, I are consecutive. Now $O + T$ should give carry over and $O + Z$ also give carry over. So O is bigger number. Now take values for G, R, I as 8, 7, 6 or 7, 6, 5 etc. and do trial and error.

$\text{POINT} = 98504, \text{ZERO} = 3168$ and $\text{ENERGY} = 101672$.

So $E + N + E + R + G + Y = 1 + 0 + 1 + 6 + 7 + 2 = 17$

5. There are 1000 junior and 800 senior students in a class. And there are 60 sibling pairs where each pair has 1 junior and 1 senior. 1 student is chosen from senior and 1 from junior randomly. What is the probability that the two selected students are from a sibling pair?

Sol:

Junior student = 1000

Senior student = 800

60 sibling pair = $2 \times 60 = 120$ student

Probability that 1 student chosen from senior = 800

Probability that 1 student chosen from junior = 1000

Therefore, 1 student chosen from senior and 1 student chosen from junior

$$n(s) = 800 \times 1000 = 800000$$

Two selected student are from a sibling pair

$$n(E) = 120C_2 = 7140$$

Therefore

$$P(E) = n(E)/n(S) = 7140/800000$$

6. SEND + MORE = MONEY. Then what is the value of M + O + N + E + Y ?

Sol:

Observe the diagram. $M = 1$. $S + 1$ = a two digit number. So $S = 1$ and O cannot be 1 but 0. Also E and N are consecutive. Do trial and error.

$$\text{SEND} = 9567, \text{MORE} = 1085, \text{MONEY} = 10652$$

$$\text{SO } M + O + N + E + Y = 1 + 0 + 6 + 5 + 2 = 14$$

7. A person went to shop and asked for change for 1.15 paise. But he said that he could not only give change for one rupee but also for 50p, 25p, 10p and 5p. What were the coins he had ?

Sol:

50 p : 1 coin, 25 p : 2 coins, 10 p : 1 coin, 5 p : 1 coin, Total: 1.15 p

8. 1, 1, 2, 3, 6, 7, 10, 11, ?

Sol:

The given pattern is (Prime number - consecutive numbers starting with 1).

$$1 = 2 - 1$$

$$1 = 3 - 2$$

$$2 = 5 - 3$$

$$3 = 7 - 4$$

$$6 = 11 - 5$$

$$7 = 13 - 6$$

$$10 = 17 - 7$$

$$11 = 19 - 8$$

$$14 = 23 - 9$$

1. A Lorry starts from Bangalore to Mysore At 6.00 a.m, 7.00 a.m, 8.00 a.m.....10 p.m. Similarly another Lorry on another side starts from Mysore to Bangalore at 6.00 a.m, 7.00 a.m, 8.00 a.m.....10.00 p.m. A Lorry takes 9 hours to travel from Bangalore to Mysore and vice versa.

(I) A Lorry which has started At 6.00 a.m will cross how many Lorries.

(II) A Lorry which has started At 6.00 p.m will cross how many Lorries.

Sol:

I. The Lorry reaches Mysore by 3 PM so it meets all the Lorries which starts after 6 a.m and before 3 p.m. So 9 lorries. Also the Lorry which starts at night 10 p.m on the previous day at Mysore reaches

Bangalore in morning 7 a.m. So it also meets that Lorry. So the Lorry which starts at 6:00 am will cross 10 Lorries.

II. The lorry which has started at 6 p.m reaches destination by 3 a.m. Lorries which start at the opposite destination at 10 am reaches its destination at 7 pm. So all the lorries which starts at 10 am to 10 pm meets this lorry . So in total 13.

2. GOOD is coded as 164 then BAD coded as 21.if ugly coded as 260 then JUMP?

Sol:

Coding = Sum of position of alphabets x Number of letters in the given word

$$\text{GOOD} = (7 + 15 + 15 + 4) \times 4 = 164$$

$$\text{BAD} = (2 + 1 + 4) \times 3 = 21$$

$$\text{UGLY} = (21 + 7 + 12 + 25) \times 4 = 260$$

$$\text{So, JUMP} = (10 + 21 + 13 + 16) \times 4 = 240$$

3. If Ever + Since = Darwin then D + a + r + w + i + n is ?

Sol: Tough one as it has 10 variables in total. 4 digit number + 5 digit number = 6 digit number. So left most digit in the answer be 1. and S = 9, a = 0. Now we have to use trial and error method.

Here E appeared 3 times, I, R, N two times each. Now E + I or E + I + 1 is a two digit number with carry over. What could be the value of E and I here. 8 and 7 are possible. But from the second column, 8 + C = 7 or 17 not possible. Similarly with 7 and 6. If E = 5, then the remaining value can be filled like above.

$$5653 + 97825 = 103478$$

Answer is 23

4. There are 16 hockey teams. find :

(1) Number of matches played when each team plays with each other twice.

(2) Number of matches played when each team plays each other once.

(3) Number of matches when knockout of 16 team is to be played

Sol:

1. Number of ways that each team played once with other team = $16C2$. To play with each team twice = $16 \times 15 = 240$

2. $16C2 = 120$

3. Total 4 rounds will be played. Total number of matches required = $8 + 4 + 2 + 1 = 15$

5. 15 tennis players take part in a tournament. Every player plays twice with each of his opponents. How many games are to be played?

A. 190

B. 200

C. 210

D. 220

E. 225

Sol:

Formula: $15C2 \times 2$. So $15 \times (15 - 1) = 15 \times 14 = 210$

6. 1, 11, 21, 1211, 111221, 312211, what is the next term in the series?

Sol:

We can understand it by writing in words

One

One time 1 that is = 11

Then two times 1 that is = 21

Then one time 2 and one time 1 that is = 1211

Then one time one, one time two and two time 1 that is = 111221

And last term is three time 1, two time 2, and one time 1 that is = 312211

So our next term will be one time 3 one time 1 two time 2 and two time 1

13112221 and so on

7. How many five digit numbers are there such that two left most digits are even and remaining are odd.

Sol:

$$N = 4 \times 5 \times 5 \times 5 \times 5 = 2375$$

Where

4 cases of first digit {2,4,6,8}

5 cases of second digit {0,2,4,6,8}

5 cases of third digit {1,3,5,7,9}

5 cases of fourth digit {1,3,5,7,9}

5 cases of fifth digit {1,3,5,7,9}

8. $13_46_8_180_210_75 = 64$. Use + and – in the empty places to make the equation holds good. Take m = number of + and n = number of – . Find $m - n$?

Sol:

$$13 - 46 - 8 - 180 + 210 + 75 = 64$$

$$m = 3$$

$$n = 4$$

$$m - n = -1$$

10. If a refrigerator contains 12 cans such that 7 blue cans and 5 red cans. In how many ways can we remove 8 cans so that atleast 1 blue can and 1 red can remains in the refrigerator?

Sol:

Possible ways of keeping atleast 1 blue and 1 red ball are drawing cans like (6,2) (5,3) (4,4)

$$(6,2) \Rightarrow {}^7C_6 \times {}^5C_2 \Rightarrow 7 \times 10 = 70$$

$$(5,3) \Rightarrow {}^7C_5 \times {}^5C_3 \Rightarrow 21 \times 10 = 210$$

$$(4,4) \Rightarrow {}^7C_4 \times {}^5C_4 \Rightarrow 35 \times 5 = 175$$

$$70 + 210 + 175 = 455$$

11. Find the 8th term in series?

2, 2, 12, 12, 30, 30, - - - - -

Sol:

$$1^2 + 1 = 2$$

$$2^2 - 2 = 2$$

$$3^2 + 3 = 12$$

$$4^2 - 4 = 12$$

$$5^2 + 5 = 30$$

$$6^2 - 6 = 30$$

So 7th term = $(7^2 + 7) = 56$ and 8th term = $(8^2 - 8) = 56$

Answer is 56

12. Find the next three terms of the series;

1, 4, 9, 16, 25 - - - - -

Sol:

$$1^2 - 1 = 0$$

$$2^2 + 0 = 4$$

$$3^2 + 1 = 9$$

$$24 + 2 = 18$$

$$25 + 3 = 35$$

$$\text{So } 26 + 4 = 68, 27 + 5 = 133, 28 + 6 = 262$$

Answer is 68, 133, 262

13. Rahul took a part in cycling game where $\frac{1}{5}$ ahead of him and $\frac{5}{6}$ behind him then total number of participants =

Sol:

Let x be the total number of participants including Rahul.

$$\text{Excluding rahul} = (x - 1)$$

$$15(x-1) + 56(x-1) = x$$

$$31x - 31 = 30x$$

$$\text{Total number of participants } x = 31$$

14. Data sufficiency question:

What are the speeds two trains travels with 80 yards and 85 yards long respectively? (Assume that former is faster than later)

a) they take 75 seconds to pass each other in opposite direction.

b) they take 37.5 seconds to pass each other in same direction

Sol:

Let the speeds be x and y

When moves in same direction the relative speed,

$$x - y = (85-80)37.5 = 0.13 \text{ ---- (I)}$$

$$\text{When moves in opposite direction the relative speed, } x + y = 165/75 = 2.2 \text{ ---- (II)}$$

$$\text{Now, equation I + equation II gives, } 2x = 0.13 + 2.2 = 2.33 \Rightarrow x = 1.165$$

$$\text{From equation I, } x - y = 0.13 \Rightarrow y = 1.165 - 0.13 = 1.035$$

Therefore the speeds are 1.165 yards/sec and 1.035 yards/sec.

15. Reversing the digits of father's age we get son's age. One year ago father was twice in age of that of his son? find their current ages?

Sol:

Let father's age = $10x + y$

Son's age = $10y + x$ (As, it is got by reversing digits of fathers age)

At that point

$$(10x + y) - 1 = 2\{(10y + x) - 1\}$$

$$\Rightarrow x = (19y - 1)/8$$

Let $y = 3$ then $x = 7$.

For any other y value, x value combined with y value doesn't give a realistic age (like father's age 120 etc)

So, this has to be solution. Hence father's age = 73.

Son's age = 37.

1. The hour hand lies between 3 and 4. The difference between hour and minute hand is 50 degree. What are the two possible timings?

Sol:

The angle between the hour hand and minute hand at a given time H:MM is given by

$$\theta = 30 \times H - 11 \times MM$$

The time after H hours, hour hand and minute hand are at

$$MM = | 11 \times ((30 \times H) \pm \theta) |$$

given $H = 3$, $MM = 50$

Substituting the above values in the formula

$$\theta = 8011, 28011$$

2. Jack and Jill went up and down a hill. They started from the bottom and Jack met Jill again 20 miles from the top while returning. Jack completed the race 1 min ahead of Jill. If the hill is 440 miles high and their speed while down journey is 1.5 times the up journey. How long it took for the Jack to complete the race ?

Sol:

Assume that height of the hill is 440 miles.

Let speed of Jack when going up = x miles/minute

and speed of Jill when going up = y miles/minute

Then speed of Jack when going down = $1.5x$ miles/minute

and speed of Jill when going up = $1.5y$ miles/minute

Case 1 :

Jack met Jill 20 miles from the top. So Jill travelled $440 - 20 = 420$ miles.

Time taken for Jack to travel 440 miles up and 20 miles down = Time taken for Jill to travel 420 miles up

$$440x + 20 \cdot 1.5x = 420y$$

$$681.5x = 420y$$

$$68y = 63x$$

$$y = \frac{63x}{68} \text{ ---(1)}$$

Case 2 : Time taken for Jack to travel 440 miles up and 440 miles down = Time taken for Jill to travel 440 miles up and 440 miles down – 1

$$440x + 440 \cdot 1.5x = 440y + 440 \cdot 1.5y - 1$$

$$440 \times 53(1y - 1x) = 1 \text{ -----(2)}$$

Substitute (2) in (1) we get

$$x = 440 \times 5 \times 53 \times 63$$

$$t = 440 \times 53(1x)$$

$$t = 12.6 \text{ min}$$

3. Data Sufficiency question:

A, B, C, D have to stand in a queue in descending order of their heights. Who stands first?

I. D was not the last, A was not the first.

II. The first is not C and B was not the tallest.

Sol:

D because A is not first neither C and B is not the tallest person. The only person will be first is D.

So option (C). We can answer this question using both the statements together.

4. One of the longest sides of the triangle is 20 m. The other side is 10 m. Area of the triangle is 80 m². What is the another side of the triangle?

Sol:

If a,b,c are the three sides of the triangle.

Then formula for Area = $\frac{1}{2}(s-a)(s-b)(s-c)$ -----√

Where $s = \frac{a+b+c}{2} = 12 \times (30+c)$

[Assume a = 20 , b = 10]

Now,

Check the options.

5. Data Sufficiency Question:

a and b are two positive numbers. How many of them are odd?

I. Multiplication of b with an odd number gives an even number.

II. $a^2 - b$ is even.

Sol:

From the 1st statement b is even, as when multiplied by odd it gives even

$$a^2 - b = \text{even}$$

$\Rightarrow a$ is even

Here none of a and b are odd

6. Mr. T has a wrong weighing pan. One arm is lengthier than other. 1 kilogram on left balances 8 melons on right, 1 kilogram on right balances 2 melons on left. If all melons are equal in weight, what is the weight of a single melon.

Sol:

Let additional weight on left arm be x .

Weight of melon be m

$$x + 1 = 8 \times m \quad \text{----- (1)}$$

$$x + 2 \times m = 1 \quad \text{----- (2)}$$

Solving 1 & 2 we get.

Weight of a single Melon = 200 gm.

7. $a, b, b, c, c, c, d, d, d, d, \dots$. Find the 288th letter of this series.

Sol:

Observe that each letter appeared once, twice, thrice They form an arithmetic progression.
 $1+2+3+\dots$

We know that sum of first n natural numbers = $\frac{n(n+1)}{2}$

$$\text{So } \frac{n(n+1)}{2} \leq 288$$

For $n = 23$, we get 276. So for $n = 24$, the given series crosses 288.

Ans is X

8. If $ABC = C^3$ and $CAB = D^3$, Then find $D^3 \div B^3$

Sol:

$$ABC = C^3$$

So, look for a number, that has a 3 digit cube, and the last digit of the cube is same as the number itself:

$$5^3 = 125$$

$$\text{So, } CAB = 512 = 8^3$$

$$D = 8 \text{ and } B = 5$$

$$8^3 \div 5^3$$

$$\text{Answer} = 64.$$

9. There are three trucks A, B, C. A loads 10 kg/min. B loads $13 \frac{1}{3}$ kg/min. C unloads 5 kg/min. If three simultaneously works then what is the time taken to load 2.4 tones?

Sol:

$$\text{Work done in 1 min} = 10 + 40\frac{1}{3} - 5 = 55\frac{1}{3} \text{ kg/min}$$

$$\text{For 1 kg} = \frac{3}{55} \text{ min}$$

$$\text{For 2.4 tonnes} = \frac{3}{55} \times 2.4 \times 1000 = 130 \text{ mins} = 2\text{hrs } 10\text{min}$$

10. If $A = x^3y^2$ and $B = xy^3$, then find the HCF of A, B

Sol:

$$A = x^3y^2$$

$$B = xy^3$$

To find the HCF of the above numbers, take minimum power of x and y in both the numbers.

$$\text{HCF} = \text{Common terms from both A \& B and minimum powers} = xy^2$$

11. HERE = COMES – SHE, (Assume s = 8)

Find value of R + H + O

Sol:

HERE = COMES – SHE

HERE

+ SHE

COMES

$$E + E = S = 8 \Rightarrow E = 4$$

3 digit no. + 4 digit no. = 5 digit no. $\Rightarrow C = 1, O = 0, H = 9$ etc

$$\text{So } 9454 + 894 = 10348$$

10348

– 894

9454

$$R + H + O = 5 + 9 + 0 = 14$$

12. A person is 80 years old in 490 and only 70 years old in 500 in which year is he born?

a) 400

b) 550

c) 570

d) 440

Sol:

He must have born in BC 570

Hence in BC 500 he will be 70 years

And in BC 490 he will be 80 years

13. Lucia is a wonderful grandmother and her age is between 50 and 70. Each of her sons have as many sons as they have brothers. Their combined ages give Lucia's present age. what is the age?

Sol:

The question basically states that if Lucia were to have say 10 sons, then each son would have 9 sons (Lucia's grandsons – since each son has 9 brothers). So the total in this case would be 9×10 grandsons + 10 sons = 100.

Let us assume Lucia has got x sons. Now each son has $(x - 1)$ sons. So total = $x + (x - 1) x$. For $x = 8$ we get 64 which is in between 50 and 60. (7×8 grandsons + 8 sons = 64)

14. A family X went for a vacation. Unfortunately it rained for 13 days when they were there. But whenever it rained in the mornings, they had clear afternoons and vice versa. In all they enjoyed 11 mornings and 12 afternoons. How many days did they stay there totally?

Sol:

Clearly 11 mornings and 12 afternoons = 23 half days

since 13 days raining means 13 half days.

so $23 - 13 = 10$ half days (not affected by rain)

so 10 half days = 5 full days

Total no. of days = $13 + 5 = 18$ days.

15. Find the unit digit of product of the prime number up to 50 .

Sol:

Prime number up to 50 are

2,3,5,7,11,...,43,47

Product = $2 \times 3 \times 5 \times 7 \times 11 \times \dots \times 43 \times 47$

There's a term $2 \times 5 = 10$

So unit digit of product = 0

16. HOW + MUCH = POWER Then P + O + W + E + R =

Sol:

$$\begin{array}{r} \text{HOW} \\ + \text{MUCH} \\ \hline \text{POWER} \\ \hline \end{array}$$

Here $p = 1$ and $M = 9$ because after adding carry bit it gives result 10. Hence $O = 0$, here three digits 0, 1, 9 have been used.

Now, put all remaining value in 3rd column and check which value is suitable for H, U and W and we get $H = 7, U = 8$ and $W = 5$ and 1 carry which will be added in 4th column.

Now in first column we have $W + H = R$ means $5 + 7 = 2$ and 1 carry will add in 2nd column

in 2nd column, $0 + C = E, 0 + 3 + 1 = 4$ so $C = 3, E = 4$

Therefore,

$$\begin{array}{r} 9837 \\ + 705 \\ \hline 10542 \\ \hline \end{array}$$

so $P + O + W + E + R = 1 + 0 + 5 + 4 + 2 = 12$

17. Complete the series..

2 2 12 12 30 30 ?

Sol:

Answer is 56.

It follows the series as:

$$1 \times 2 = 2$$

$$2 \times 1 = 2$$

$$3 \times 4 = 12$$

$$4 \times 3 = 12$$

$$5 \times 6 = 30$$

$$6 \times 5 = 30$$

$$7 \times 8 = 56$$

This is the required number for the series.

$$1. \text{ X Z Y + X Y Z = Y Z X.}$$

Find the three digits

Sol:

$$\text{2nd column, } Z + Y = Z \text{ shows a carry so, } Z + Y + 1 = 10 + Z \Rightarrow Y = 9$$

$$\text{1st column, } X + X + 1 = 9 \Rightarrow X = 4 \text{ so, } Z = 5$$

$$459 + 495 = 954$$

$$X = 4, Y = 9, Z = 5$$

2. In a 5 digit number, 3 pairs of sum is 11 each. last digit is 3 times first one, 3rd digit is 3 less than 2nd, 4th digit is 4 more than the second one. Find the number.

Sol:

$$\text{1st Digit} \Rightarrow a$$

$$\text{2nd Digit} \Rightarrow b$$

$$\text{3rd Digit} \Rightarrow (b - 3)$$

$$\text{4th digit} \Rightarrow (b + 4)$$

5th Digit $\Rightarrow 3a$

So the number is : $(a)(b)(b-3)(b+4)(3a)$

Now, Let's analyze 1st and the 5th digit :

Possible combinations -

1 - 3

2 - 6

3 - 9

(Since 4 will yield 12 which is obviously more than 2 digits)

Now Let's analyze 2nd,3rd and 4th Digits :

Possible Values of 2nd Digit i.e 'b' is :

5,4,3

As, $(b-3) > 0$ i.e 3rd Digit and $(b+4) 1+3+7=11$

Similarly, 24186 for $4-1-8$ and $6+4+1=11$

3rd Combination $5-2-9$ will get no possible match.

Hence, 2 solutions : 13073 and 24186

If Repetitions not allowed then Ans should be 24186

3. GOOD is coded as 164 then BAD as 21. If UGLY coded as 260 then JUMP?

Sol:

$$G O O D = 7 + 15 + 15 + 4 = 41$$

$$41 \times 4 = 164$$

Similarly

$$B A D = 2 + 1 + 4 = 7$$

$$7 \times 3$$

$$U G L Y = 21 + 7 + 12 + 25 = 65$$

$$65 \times 4$$

Similarly,

$$J U M P = 10 + 21 + 13 + 16 = 60$$

$$60 \times 4 = 240$$

4. Supposing a clock takes 7 seconds to strike 7. How long will it take to strike 10?

Sol:

7 strike of a clock have 6 intervals

While 10 strikes have 9 intervals.

Required time = (7×9) seconds = $10 \frac{1}{2}$ seconds.

Because time is only moving ahead ! so when we say between 1 to 2 hours, that means we assume only 1 hours not 2 hours.

5. An escalator is descending at constant speed. A walks down and takes 50 steps to reach the bottom. B runs down and takes 90 steps in the same time as A takes 10 steps. How many steps are visible when the escalator is not operating?

Sol:

Lets suppose that A walks down 1 step / min and

escalator moves n steps/ min

It is given that A takes 50 steps to reach the bottom

In the same time escalator would have covered $50n$ steps

So total steps on escalator is $50 + 50n$.

Again it is given that B takes 90 steps to reach the bottom and time

taken by him for this is equal to time taken by A to cover 10 steps i.e

10 minutes. So in this 10 min escalator would have covered $10n$ steps.

So total steps on escalatro is $90 + 10n$

Again equating $50 + 50n = 90 + 10n$ we get $n = 1$

Hence total number of steps on escalator is 100.

6. Albert and Fernandes have two leg swimming race. Both start from opposite ends of the pool. On the first leg, the boys pass each other at 18 m from the deep end of the pool. During the second leg they pass at 10 m from the shallow end of the pool. Both go at constant speed but one of them is faster. Each boy rests for 4 seconds at the end of the first leg. What is the length of the pool?

Sol:

The solution is :Let the length of swimming pool be : D

let their speed be x and y. So according to question the fast swimmer (let x) would start from shallow end.

Thus

Let they first meet after time: t_1

$$x \times t_1 = D - 18 \quad (1)$$

$$y \times t_1 = 18 \quad (2)$$

(2) / (1) we get

$$y/x = 18/(D-18) \quad \text{--- (3)}$$

Let t_2 be the time after which they meet 2nd time (the 4 sec delay is cancelled as both wait for 4 sec)

So

$$x \times t_2 = 2D - 10 \quad \text{---- (4)}$$

(as x travelled one length complete to deep end + length from deep end to 10 m before shallow end)

$$4y \times t_2 = D + 10 \quad \text{----- (5)}$$

(as y travelled one length complete to shallow end + 10 m from shallow end)

(5) / (4) we get

$$y/x = (D+10)/(2D-10) \quad \text{----- (6)}$$

from (3) and (6)

$$18(D-18)=(D+10)(2D-10)$$

solving we get

$$D \times (D - 44) = 0$$

Since D cannot be zero

So D = 44 m answer.

7. 16, 36, 100, 324, _ ?

Find the next term.

Sol:

This sequence can be written as a sequence of squares of numbers as...

42,62,102,182

The differences between the successive numbers are in geometric progression

which is of

2,4,8,?

21,22,23,24

The next number = $(18+16)^2 = 1156$

8. How many ways can one arrange the word EDUCATION such that relative positions of vowels and consonants remains same?

Sol:

The word EDUCATION is a 9 letter word with none of letters repeating

The vowels occupy 3,5,7th & 8th position in the word & remaining five positions are occupied by consonants

As the relative position of the vowels & consonants in any arrangement should remain the same as in the word EDUCATION

The four vowels can be arranged in 3rd,5th,7th & 8th position in 4! ways.

similarly the five consonants can be arranged in 1st,2nd,4th,6th & 9th position in 5! ways

Hence the total number of ways = $5! \times 4! = 120 \times 24 = 2880$

9. There are 8 digits and 5 alphabets. In how many ways can you form an alphanumeric word using 3 digits and 2 alphabets?

Sol:

Select 3 digits from 8 digits i. e. 8C_3 ways

And also select 2 alphabets from 5 alphabets i.e., 5C_2 ways

Now to form an alphanumeric word of 5 characters we have to arrange the 5 selected digits.

So the answer is ${}^8C_3 \times {}^5C_2 \times 5! = 43200$

10. In an Octagon the number of possible diagonals are?

Sol:

Formula : Number of diagonals for n sided regular polygon = $\frac{n(n-3)}{2}$

For Octagon $n = 8$

Number of diagonals = $\frac{8(8-3)}{2} = 20$

11. What is the next number of the following sequence 7, 14, 55, 110, _ ?

Sol:

In that sequence first number is 7

$$7 + 7 = 14$$

$$14 + 41 = 55$$

$$55 + 55 = 110$$

$$110 + 111 = 221$$

in that sequence = 221

Next number

12. How many numbers are divisible by 4 between 1 to 100

Sol:

Sequence of numbers that are divisible by 4 between 1 to 100 are as follows

4,8,12,16, ----- , 96

The series forms an Arithmetic Progression with

First number = $a = 4$

Common difference, $d = 4$

Last number = $l = 96$

Number of terms = n

Formula for last number in A.P. $l = [a + (n - 1) \times d]$

$$96 = 4 + (n - 1) \times 4$$

$$n = 24$$

13. 5 cars are to be parked in 5 parking slots. there are 3 red cars, 1 blue car and 1 green car. How many ways the car can be parked?

Sol:

Total ways to park the cars having same color = $5!$

But according to question ,there are 3 red cars,so no. of ways for parking

3 red cars= $3!$

and both blue & green in 1 ways

so, $5! \times 3! \times 1! = 20$ ways

Hence correct answer is 20 ways.

14. 12 persons can complete the work in 18 days. after working for 6 days, 4 more persons added to complete the work fast. in how many more days they will complete the work?

Sol:

Total work $12 \times 18 = 216$ units

After 6 days, work finished $6 \times 12 = 72$ units

Remaining work $216 - 72 = 144$ units

Remaining days = $144(12+4)$

Answer is 9 days

15. A set of football matches is to be organized in a "round-robin" fashion, i.e., every participating team plays a match against every other team once and only once. If 21 matches are totally played, how many teams participated?

Sol:

Consider number of teams be n

n th has to with $(n-1)$ matches

$(n-1)$ th team has to play $(n-2)$ matches, since every

participating team plays a match against every other team once and only once.

Sequence follows as

$(n-1), (n-2), (n-3) \dots, 1$

Formula for summation(x) for n terms = $n(n+1)/2$

But we have $(n-1)$ terms so formula becomes $n(n-1)/2$

Equating formula to 21

$n^2 - n - 42 = 0$

Factors = $7, -6$

Number of teams = 7

16. Next term in series 3, 32, 405, _

Sol:

First term $3 \times 12 = 3$

Second term $4 \times 23 = 32$

Third term $5 \times 34 = 405$

Fourth term $6 \times 45 = 6144$

17. A cube is divided into 729 identical cubelets. Each cut is made parallel to some surface of the cube . But before doing that the cube is colored with green color on one set of adjacent faces ,red on the other set of adjacent faces, blue on the third set. So, how many cubelets are there which are painted with exactly one color?

Sol:

Total cubes created are 729

So a plane of big cube has 9×9 cubes

Out of that $(n - 2) \times (n - 2) = 7 \times 7 = 49$ are painted only one side

and a cube has six sides $= 6 \times 49 = 294$

18. Find the radius of the circle inscribed in a triangle ABC. Triangle ABC is a right-angled isosceles triangle with the hypotenuse as $62\sqrt{2}$ cm.

Sol:

Since hypotenuse is $62\sqrt{2}$ cm.

Sides are 6 cm each as it is an isosceles triangle.

Now, if we have an inscribed circle the property is the point where the circle touches the sides are exactly $\frac{2}{3}$ rd of the length of sides, i.e, $\frac{2}{3} \times 6 = 4$ cm.

Now, if you drop 2 radii on the sides of triangle then they act as perpendiculars on sides. So, it forms a small square of $(6 - 4) = 2$ cm each side.

Thus, radius of the circle is 2 cm.

19. How many boys are there in the class if the number of boys in the class is 8 more than the number of girls in the class, which is five times the difference between the number of girls and boys in the class.

Sol:

Let number of boys = b

Number of girls = g

then

given

$$b = 8 + g = 5(b - g) \quad [b - g = 8 \text{ from given equation}]$$

$$b = 5 \times 8$$

$$b = 40$$

20. If dolly works hard then she can get A grade

1. If dolly does not work hard then she can get A grade
2. If dolly gets an A grade then she must have worked hard
3. If dolly does not get an A grade then she must not have worked hard
4. Dolly wishes to get A grade

Sol:

Option 3 is correct as it is contrapositive of the given statement.

1. 4, 6, 10, 14, 22, 26, 34, 38, 46, _ ? what is next term in the series.

Sol:

Divide each number by 2. Then we get 2, 3, 5, 7, 11, 13,, 23. This is a prime number series. So next number will be $2 \times 29 = 58$

2. y, _?, q, m, i

1. w
2. u
3. t
4. l

Sol:

Difference of 3 is in between two alphabets

$$i + 3 = m \text{ (j,k,l)}$$

$$m + 3 = q \text{ (n,o,p)}$$

$$q + 3 = u \text{ (r,s,t)}$$

u is the answer.

3. What is the next number in the series 3,7,13,19....

Sol:

Prime numbers from 3 onwards are 3, 5, 7, 11, 13, 17, 19, 23, 29 . . .

Write alternate prime numbers starting from 3.

3, 7, 13, 19, 29

Answer is 29

4. Data Sufficiency Question:

Is w a Whole number?

Statement 1: $3w$ is an Odd number.

Statement 2: $2w$ is an Even number

Sol:

Statement 2 is enough to solve this

$3w$ is Odd means w may be Odd or Fraction like $5/3$ we can not guess what w is from the first statement.

$2w$ is Even.

So must and should w either Odd or Even

i.e. which is whole number.

No Fraction will give Even output.

5. Joe's age, Joe's sister's age and Joe's father's age sums up to a century. When son is as old as his father, Joe's sister will be twice as old as now. When Joe is as old as his father then his father is twice as old as when his sister was as old as her father. Age of her father ?

Sol:

$$\text{Joe} + \text{sister} + \text{father} = 100$$

After x years let us consider Joe's age is equal to his father

$$\text{Joe} + x = \text{father}$$

Therefore,

$$\text{sister} + x = 2 \times \text{sister}$$

$$\Rightarrow \text{sister} = x$$

$$\text{Joe} + \text{sister} = \text{father}$$

Therefore,

$$2 \times \text{father} = 100$$

$$\text{Hence, Father} = 50$$

6. The sum of series represented as

$$1/(1 \times 5) + 1/(5 \times 9) + 1/(9 \times 13) + \dots + 1/(221 \times 225) \text{ is}$$

a) $28/221$

b) $56/221$

c) $56/225$

d) None of these

Sol:

$$11 \times 5 + 15 \times 9 + 19 \times 13 + \dots + 221 \times 225$$

$$= 14 \times [(5-1)1 \times 5 + (9-5)5 \times 9 + (13-9)9 \times 13 + \dots + (225-221)221 \times 225]$$

$$= 14 \times [(1-15) + (15-19) + (19-113) + \dots (1221-1225)]$$

$$= 14 \times (1-1225)$$

$$= 14 \times 224225$$

$$= 56225$$

7. What are the next three terms in the series 3, 6, 7, 12, 13, 18, 19, 24, _ _ _?

Sol:

This is a mixed series. 6, 12, 18, 24, . . . form a series. Adding 1 to 6, 12, 18, forms another series. So next three terms are 25, 30, 31.

8. What is the next number in the series. a, b, d, h, _?

Sol:

$$a = 1$$

$$b = 2$$

$$d = 4$$

$$h = 8$$

This is a 2^n series starting with $n = 0, 1, 2, \dots$

$$24 = 16 \text{ which is } p.$$

$$\text{Ans} = p$$

9. Find the letter that comes in the place of " - "

b, _ , d, d, e, d, f, g, d.

Sol:

[b c] d [d e] d [f g] d [h i] d....

The series follow above manner. Answer will be c.

10. The number of zeros at the end of the product of all prime numbers between 1 and 1111 is?

Sol:

Prime numbers between 1 & 1111 are 2,3,5,7,11,...

There is no other prime no. ending with 5 as unit digit, except one '5'

$2 \times 5 = 10$ gives only one zero in the product of all prime numbers

So, number of zeros at the end of the product = 1

11. A train goes from stations A to B. One day there is a technical problem at the very beginning of the journey & hence the train travels at $\frac{3}{5}$ of its original speed and so it arrives 2 hours late. Had the problem occurred after 50 miles had been covered, the train would have arrived 40 min earlier(i.e., only $120-40 = 80$ min late). What is the distance between the 2 stations?

Sol:

For 1 mile the train is late by $40 / 50$ min or $\frac{4}{5}$ minutes. Or it is late by 1 minute for every $\frac{5}{4}$ miles.

For 120 minutes late it has to travel $120 \times \frac{5}{4} = 150$ miles.

12. Due to some defect in our elevator, I was climbing down the staircase. I'd climbed down just 7 steps when I saw a man on the ground floor. Continuing to walk down, I greeted the man and I was surprised to see that when I was yet to get down 4 steps to reach the ground floor, the man had already finished climbing the staircase. He perhaps climbed up 2 steps for every 1 of mine. How many steps did the staircase have?

Sol:

Let us consider x be the number of steps

$$7 + x + 4 = 2x$$

As old man takes 2 steps for every one steps he takes and he has to complete 4 steps,

$$\text{So } x = 11 \text{ and total steps} = 2x = 22$$

Q. A card board of size 34×14 has to be attached to a wooden box and a total of 35 pins are to be used on the each side of the card box. find the total number of pins used.

Sol:

Total 35 pins are there and 4 sides of card board.

So $35 \times 4 = 140$

Now in the rectangle 4 vertices have 4 pins which is common to the sides.

So $140 - 4 = 136$.

13. In the Garbar Jhala, Ahmadabad a shopkeeper first raises the price of Jewellery by $x\%$ then he decreases the new price by $x\%$. After one such up down cycle, the price of a Jewellery decreased by Rs. 21025. After a second updown cycle the jewellery was sold for Rs. 484416. What was the original price of the jewellery.

Sol:

Let the original price be "p":

I cycle:

Up by $x\%$ means new price is $p + px100$

Down by $x\%$ on current price means new price is $(p + px100) - (p + px100) \times x100$

Price after one up down cycle is $(p - 21025)$

Thus, $(p + px100) - (p + px100) \times x100 = (p - 21025) = p' \text{ ----- (1)}$

II cycle:

Up by $x\%$ means new price is $p' + p'x100$

Down by $x\%$ on current price means new price is

$(p' + p'x100) - (p' + p'x100) \times x100$

Price after second up down cycle is 484416.

Thus, $(p' + p'x100) - (p' + p'x100) \times x100 = 484416 \text{ ----- (2)}$

Putting value of $p' = p - 20125$ in equation (2) and dividing (1) & (2) to eliminate x .

We get a quadratic equation in p:

$$p^2 - 526466p - (21025)^2 = 0$$

The equation has real roots in the form 525625 ± 841 .

14. Three football teams are there. Given below is the group table. Fill in the x's

P - Played

W - Won

L - Lost

D - Draw

F - Goals For

A - Goals Against

	P	W	L	D	F	A
A	2	2	x	x	x	1
B	2	x	x	1	2	4
C	2	x	x	x	3	7

Sol:

P W L D F A

A 2 2 0 0 7 1

B 2 0 1 1 2 4

C 2 0 1 1 3 7

Total goals for = Total goals against

$$1 + 4 + 7 = 3 + 2 + x$$

$$x = 7$$

A has played two and won 2 therefore lost = 0, draw = 0

B has played 2 but one is draw as A has 0 draw, it should be against C i.e C draw = 1

C played 2 draw = 1 therefore lost = 1 because A has won both matches played against them.

So we can conclude that each team has played a match with every other team.

15. A dog takes 4 leaps for every 5 leaps of hare but 3 leaps of dog is equal to 4 leaps of hare compare speed?

Sol:

Dog and hare speeds according to the number of leaps = 4 : 5

But their leap lengths are in the ratio = 4 : 3 ($3 \times D = 4 \times H$)

Multiplying number of leaps and leap lengths we get their speeds as = $4 \times 4 : 5 \times 3 = 16 : 15$

Answer = 16 : 15

16. A bird keeper has got P pigeons, M mynas and S sparrows. The keeper goes for lunch leaving his assistant to watch the birds. Suppose $p = 10$, $m = 5$, $s = 8$ when the bird keeper comes back, the assistant informs the x birds have escaped. The bird keeper exclaims: "Oh no! All my sparrows are gone."

How many birds flew away?

When the bird keeper comes back, the assistant told him that x birds have escaped. The keeper realized that atleast 2 sparrows have escaped.

What is minimum no of birds that can escape?

Sol:

This question can be solved using the pigeonhole principle.

I guess the answer for the first question is 23 ($10 + 5 + 8$).

Since if all the birds are escaped, then only he can be sure that all sparrows are gone.

And for the second one, answer is 17 ($10 p + 5 m + 2 s$).

If 17 birds escaped then best case such that least number of sparrows escaped will be like 10 pigeon, 5 myna and 2 sparrows escaped.

17. 3,4,7,10,13,16,19,22, . . . Find 10th term in series

Sol:

3

$$3 \times 1 = 3 + 1 = 4$$

$$3 \times 2 = 6 + 1 = 7$$

$$3 \times 3 = 9 + 1 = 10$$

$$3 \times 4 = 12 + 1 = 13$$

$$3 \times 5 = 15 + 1 = 16$$

$$3 \times 6 = 18 + 1 = 19$$

$$3 \times 7 = 21 + 1 = 22$$

$$3 \times 8 = 24 + 1 = 25$$

$$3 \times 9 = 27 + 1 = 28$$

$$10\text{th term} = 28$$

18. a,d,i,p,? what is next term

a) q

b) r

c) s

d) t

Sol:

$$a = 1 \times 1$$

$$d = 2 \times 2$$

$$i = 3 \times 3$$

$$p = 4 \times 4$$

Next will be

$$5 \times 5 = 25 = Y$$

19. Marbles are to be distributed. Ann gets 1, Mary gets 2, Rose gets 3 and Lisa gets 4. John Brown gets as much as his sister. Tim Smith gets 2 times as much as his sister. Neil Johnson gets 3 times as much as his sister. Sam Paul gets 4 times as much as his sister. Find the surnames of Ann, Mary, Rose and Lisa ?

Sol:

Ann's brother is Neil John ($1 \times 3 = 3$).

Mary 's brother Sam paul ($2 \times 4 = 8$).

Rose's brother John Brown ($3 \times 1 = 3$).

Lisa's Brother is Tim Smith ($4 \times 2 = 8$).

$$1 + 2 + 3 + 4 + 3 + 8 + 3 + 8 = 32$$

20. A shop has 4 shelf, 3 wardrobes, 2 chairs and 7 tables for sell. You have to buy

- a. 1 shelf
- b. 1 wardrobe
- c. either 1 chair or 1 table

How many selection can be made?

Sol:

The way to answer this question

$$4C1 \times 3C1 \times 2C1 + 4C1 \times 3C1 \times 7C1 = 108$$

1. 125 small but identical cubes are put together to form a large cube. This large cube is now painted on all six faces.

(i) How many of the smaller cubes have no face painted at all.

- (a) 27
- (b) 64
- (c) 8
- (d) 36

(ii) How many of the smaller cubes have exactly three faces painted?

- (a) 98
- (b) 100
- (c) 96
- (d) 95

(iii) How many of the smaller cubes have atleast one side painted?

- (a) 4
- (b) 8
- (c) 9
- (d) 27

Sol:

Side of larger cube is $125 \implies \sqrt[3]{125} = 5$

I) No face painted will be in the interior part of the cube.

Interior part will be a cube of side $(5 - 2) = 3$.

Hence no. of cubes with no face painted will be $3^3 = 27$

Ans : (a) 27

II) Cubes with 3 faces painted will be the vertices of the cube.

There will be 8 such cubes

Ans : 8 [Wrong options... 3rd options should come here]

III) Atleast 1 face painted \Rightarrow greater than or equal to 1

Cube with 1 face painted + cube with 2 side painted + cube with 3 side painted

Cube with 1 face painted will be the outermost layer of larger cube but not on the edges.

i.e. $(5-2)^2 = 9$ cubes on 1 side

So totally $6 \times 9 = 54$ cubes

Cube with 2 face painted will be edges of the larger cube but

$(5 - 2) = 3$.

Since a cube has 12 edges, totally $12 \times 3 = 36$ cubes

Cube with 3 sides painted = 8 cubes

Totally $54 + 36 + 8 = 98$ cubes

Ans : 98

2. Directions : Study the following information and answer the question given below:

In a certain code, the symbols for 0 (zero) is @ and for 1 is \$. There are no other symbols for all other number greater than one. The numbers greater than 1 are to be written only by using the two symbols given above. The value of the symbol for 1 doubles itself every time it shifts one place to the left. Study the following examples:

'0' is written as @, '1' is written as \$, '2' is written as #, '@3' is written as # #

'4' is written as #@@@ and so on

=> Which of the following represents 14?

(a) #@@@

(b) ###@

(c) ##@@

(d) ##@#

Sol:

Answer (b) ###@

The given pattern is nothing but binary. In binary $2 = 10$; $3 = 11$

Thus $14 = 1110$

So $14 = ###@$

3. 7528 : 5306 :: 4673 : ?

a) 2367

b) 2451

c) 2531

d) 2489

Sol:

Answer is 2451.

As there is a difference of 2222.

$$7528 - 2222 = 5306.$$

$$\text{So } 4673 - 2222 = 2451$$

4. $x^2 - y^2 = 16$ and $xy = 15$ so find out $x + y$?

Sol:

$$x^2 - y^2 = 16$$

$$(x+y)(x-y) = 16$$

So 16 comes in following table

$$1 \times 16, 2 \times 8, 4 \times 4$$

Using 2×8 equation

$$x+y=8 \text{ and } x-y=2$$

$$\text{So } x = 5 \text{ or } 3 \text{ and } y = 3 \text{ or } 5$$

So answer is 8.

5. Census population of a district in 1981 was 4.54 Lakhs, while in year 2001 it was 7.44 Lakhs. What was the estimated mid-year population of that district in year 2009.

Sol:

1981 \Rightarrow 4.54

2001 \Rightarrow 7.44

Difference (year) = 20

Difference (population) = 2.9

So population per year = $2.9/20 = 0.145$

2009 \Rightarrow x = ?

Hence x = $7.44 + 8 \times 0.145 = 8.6$ Lakhs

6. Based on the statement in the question, mark the most logical pair of statement that follow

"Either he will shout or they will fire".

(1) He shouted.

(2) He did not shout.

(3) They fired

(4) They did not fire

(a) 1,4

(b) 2,3

(c) 4,1

Sol:

Either or condition is true atleast one of the condition should happen. Answer is option C because according to the given sentence.

"Either he will shout or they will fire"

One of the two must happen whether he shouting or they firing.

If one of them happens, the other will not happen.

So if he did not shout then the firing should happen,so they fired.

If they did not fire it means the first thing has happened, so he shouted.

7. Gautham passes through seven lane to reach his school. He finds that YELLOW lane is between his house and KAMA lane. The third lane from his school is APPLE lane. PEACOCK lane is immediately before the PARK lane. He passes ASH lane at the end. KAMA lane is between YELLOW lane and PEACOCK lane. The sixth lane from his house is RAO lane.

I. How many lane are there between KAMA lane and RAO lane ?

- a) one
- b) two
- c) three
- d) four

II. After passing the park lane how many lane does Gautham cross to reach the school ?

- a) 4
- b) 3
- c) 2
- d) 1

III. After passing the YELLOW lane how many lane does Gautham cross to reach the school ?

- a) 4
- b) 6
- c) 2
- d) 1

IV. Which lane is between PARK lane and RAO lane ?

- a) YELLOW lane
- b) KAMA lane
- c) APPLE lane

d) PEACOCK lane

V. If the house of Gautham, each lane and his school are equidistant and he takes 2 min to pass one lane then how long will he take to reach school from his house ?

a) 18 min

b) 16 min

c) 14 min

d) 12 min

Sol:

1. 3 Lanes between KAMA lane and RAO lane

2. Answer is 2 because after passing the PARK lane Gautham cross 3 lane to reach the school.

3. After passing the YELLOW lane Gautham cross 6 lane to reach the school.

4. APPLE lane

5. 16 minutes

8. Find the maximum value of n such that $50!$ is perfectly divisible by 2520^n .

Sol:

$$2520 = 2^3 \times 3^2 \times 5 \times 7$$

Here 7 is the Highest prime So find the number of 7's in $50!$ only.

$$\text{Number of 7's in } 50! = [50/7] + [50/49] = 7 + 1 = 8$$

For $n(\max) = 8$, $50!$ is perfectly divisible by 2520^8 .

9. Find the no of ways in which 6 toffees can be distributed over 5 different people namely A,B,C,D,E.

Sol:

We assume that all the toffees are similar. Then Number of ways are $(n+r-1)C_{r-1}$. Here $A + B + C + D + E = 6$

Here $r = 5$, $n = 6$

Number of ways = ${}^6P_5 - 1 = {}^{10}C_4 = 210$.

If all the toffees are different, then each toffee can be distributed to any of the five. So total ways are 56.

10. A train covered a distance at a uniform speed .if the train had been 6 km/hr faster it would have been 4 hour less than schedule time and if the train were slower by 6 km/hr it would have been 6 hrs more.find the distance.

Sol:

Let t be the usual time taken by the train to cover the distance

Let d be the distance, s be the usual speed

Usual time taken $\rightarrow d/s = t \Rightarrow d = t \times s$

$$d/s + 6 = t - 4$$

$$t \times s + 6 = t - 4$$

$$ts = ts + 6t - 4s - 24$$

$$6t - 4s - 24 = 0 \rightarrow (1)$$

$$d/(s - 6) = t + 6$$

$$ts = ts - 6t + 6s - 36$$

$$-6t + 6s - 36 = 0 \rightarrow (2)$$

Solving (1) and (2), we get

$$s = 30 \text{ km/h}$$

$$t = 24 \text{ hrs}$$

$$d = t \times s$$

$$d = 30 \times 24 = 720 \text{ km}$$

Ans : 720 km

11. A girl leaves from her home. She first walks 30 metres in North-west direction and then 30 metres in South-west direction. Next, she walks 30 metres in South-east direction. Finally, she turns towards her house. In which direction is she moving?

Option

A) North-east

B) North-west

C) South-east

D) South-west

E) None of these

Sol:

A.North-east

12. There are two containers on a table. A and B. A is half full of wine, while B, which is twice A's size, is one quarter full of wine. Both containers are filled with water and the contents are poured into a third container C. What portion of container C's mixture is wine?

Sol:

Let d size of container A is "x"

then B's size will be "2x"

A is half full of wine $\Rightarrow x/2$

So remaining " $x/2$ " of A contains water

B is quarter full of wine $\Rightarrow 2x/4 = x/2$

So remaining $\Rightarrow 2x - x/2 = 3x/2$

$3x/2$ of B contains water

Totally C has A's content + B's Content = $x/2 + 3x/2 = 2x$

Wine portion in C = $x/2$ of "A" + $x/2$ of "B"

$x/2$ portion of wine

Water portion in C = $x/2$ of "A" + $3x/2$ of "B"

$\Rightarrow 4x2 \Rightarrow 2x$ portion of water

So portion of wine in C is

$x3x=13$ portion of wine

if $1/3$ expressed in %

$13 \times 100 = 33.33\%$

Ans : 33.33% of wine

13. Four persons A,B,C,D were there. All were of different weights. All Four gave a statement. Among the four statements only the person who is lightest in weight of all others gave a true statement.

A Says : B is heavier than D.

B Says : A is heavier than C.

C Says : I am heavier than D.

D Says : C is heavier than B.

Find the lightest and List the persons in ascending order according to their weights ?

Sol:

A says $B > D$

B says $A > C$

C says $C > D$

D says $C > B$

Since the person with lightest weight tells the truth

C lies (If C tells the truth, then C is not the lightest and then C lies)

$\Rightarrow D > C$ is the true statement.

So D is also not the lightest person and D lies.

$B > C$

So from A and B only one is telling the truth and that is not B because

$B > C$, so B is not the lightest

A is the lightest

Ans: A

14. There is well of depth 30 m and frog is at bottom of the well. He jumps 3 m in one day and falls back 2 m in the same day. How many days will it take for the frog to come out of the well?

Sol:

28 days

Frog jumps 3 m in day & falls back 2 m at night

so, frog will be $3 - 2 = 1$ m up in a day.

Thus, in 27 days it will be 27 m up

On 28th day it will be at top i.e $27 + 3 = 30$ m & will not fall down.

15. Find the next term in the given series

47, 94, 71, 142, 119, 238, _ ?

a. 331

b. 360

c. 320

d. 340

Sol:

Ans : 215, 430

(47, 94) (71, 142) (119, 238) (X, Y)

$$47 \times 2 = 94$$

$$94 - 23 = 71$$

$$71 \times 2 = 142$$

$$142 - 23 = 119$$

$$119 \times 2 = 238$$

$$238 - 23 = 215$$

$$215 \times 2 = 430$$

So the next 2 terms are 215 , 430

16. A train leaves Meerut at 5 a.m. and reaches Delhi at 9 a.m. Another train leaves Delhi at 7 a.m. and reaches Meerut at 10.30 a.m. At what time do the two trains travel in order to cross each other ?

Sol:

Let the total distance be x

So the speed of 1st train is $x/4$ and 2nd train $x/3.5$

In 2 hours 1st train covers half of the total distance .

So remaining is only half of the total distance (ie $x/2$).

Let t be the time taken

$$t \times x/4 + t \times x/3.5 = x/2$$

$$t = 1415 \text{ i.e. } 56 \text{ min}$$

i.e. Total time taken = 2 hrs + 56 min

Time they cross each other is 7:56 am (5+2.56)

Answer 7:56 am

17. 'A' and 'B' started a business in partnership investing Rs 20000/- and Rs 15000/- respectively. After six months 'C' joined them with Rs 20000/-. What will be B's share in the total profit of Rs 25000/- earned at the end of two years from the starting of the business?

Sol:

$$A:B:C = (20000 \times 24):(15000 \times 24):(20000 \times 18) = 4 : 3 : 3$$

$$B's \text{ Share} = 3 \times 25000 / (4+3+3) = 7500$$

18. b,x,e,u,h,_?

Sol:

We know that $a = 1, b = 2, \dots, z = 26$

Convert the alphabets into numbers. we get number series as follows

2, 24, 5, 21, 8

In these (2,5,8) belong to one group as they have common difference of 3

(24,21,_) these are of one group as they have difference of -3 .

So the next number is $21 - 3 = 18$.

If we convert 18 into alphabet it is "r".

Since $r = 18$.

19. 3,5,11,29,83,245, _ ?

Sol:

We have to find the differences between the given numbers and then by applying that number with 3 we can get the result

$$5 - 3 = 2$$

See here the result is 2, then multiply it with 3

$$11 - 5 = 6$$

$$29 - 11 = 18$$

$$83 - 29 = 54$$

$$245 - 83 = 162$$

$$731 - 245 = 486$$

$$5 - 3 = 2$$

$$11 - 5 = 6 (2 \times 3)$$

$$29 - 11 = 18 (6 \times 3)$$

$$83 - 29 = 54 (18 \times 3)$$

$$245 - 83 = 162 (54 \times 3)$$

$$731 - 245 = 486 (162 \times 3)$$

20. A Jar contains 18 balls. 3 blue balls are removed from the jar and not replaced. Now the probability of getting a blue ball is $\frac{1}{5}$ then how many blue balls jar contains initially ?

Sol:

$$\frac{x}{15} = \frac{1}{5}$$

$$x = 3$$

$$3 + 3 \text{ (removed 3 blue balls)} = 6$$

1. Jake left point A for point B. 2 hours and 15 minutes later, Paul left A for B and arrived at B at the same time as Jake. Had both of them started simultaneously from A and B travelling towards each other, they would have met in 120 minutes. How much time (hours) did it take for the slower one to travel from A to B if the ratio of speeds of the faster to slower is 3:1?

Ans: x x

Sol: It seems there is some problem with this question.

Let the distance between A and B is D km. As Paul is faster, take the speeds of Jake and Paul are s and 3s kmph.

As the speeds are in the ratio of 1 : 3, times taken by them should be 3 : 1. Take the times taken by them are $3x$, x . But We know that $3x - x = 2 \text{ hour } 15 \text{ min}$. So $2x = \frac{9}{4} \text{ hours}$, $x = \frac{9}{8} \text{ hours}$. So time taken by the slower one (Jake) takes $3x$ time = $3 \times \frac{9}{8} = \frac{27}{8} \text{ hours} = 202.5 \text{ minutes}$.

(Or)

Take Jake speed = j and Paul = p kmph.

Now given that

D

j

-

D

p

$$= 2 \text{ hr } 15 \text{ min} = 2$$

1

4

$$\text{hrs} = 9/4 \text{ hrs}$$

Also both of them together covered D distance in 2 hours. So

D

j

+

D

p

$$= 2$$

Adding these two equations will give us

$$2D$$

j

=

9

4

$$+2=$$

$$17$$

$$4$$

$$= 4 \text{ hours } 15 \text{ minutes.}$$

So in the above problem, some part is redundant.

2. A completes a work in 2 days, B in 4 days, C in 9 and D in 18 days. They form group of two such that difference is maximum between them to complete the work. What is difference in the number of days they complete that work?

Ans: $14/3$ days.

Sol: If C and D form a pair and A and B form a pair the difference is maximum.

Now C and D together can complete the work =

$$9 \times 18$$

$$9 + 18$$

$$= 6 \text{ days.}$$

A and B together can complete the work =

$$2 \times 4$$

$$2 + 4$$

$$= 4/3 \text{ days.}$$

$$\text{Difference} = 6 - 4/3 = 14/3 \text{ days.}$$

3. How many 4 digit numbers contain number 2.

- a. 3170
- b. 3172
- c. 3174
- d. 3168

Ans: D

Sol:

Total number of 4 digit numbers are 9000 (between 1000 and 9999).

We find the numbers without any two in them. So total numbers are $8 \times 9 \times 9 \times 9 = 5832$

So numbers with number two in them = $9000 - 5832 = 3168$

4. How many three digit numbers abc are formed where at least two of the three digits are same.

Ans: 252

Sol:

Total 3 digit numbers = $9 \times 10 \times 10 = 900$

Total number of 3 digit numbers without repetition = $9 \times 9 \times 8 = 648$

So number of three digit numbers with at least one digit repeats = $900 - 648 = 252$

5. How many kgs of wheat costing Rs.24/- per kg must be mixed with 30 kgs of wheat costing Rs.18.40/- per kg so that 15% profit can be obtained by selling the mixture at Rs.23/- per kg?

Ans: 12

Sol:

S.P. of 1 kg mixture = Rs.23. Gain = 15%.

C.P. of 1 kg mixture = $\text{Rs.}[(100/115) \times 23] = \text{Rs.}20$

Let the quantity of wheat costing Rs.24 is x kgs.

Using weighted average rule =

$$x \times 24 + 30 \times 18.4$$

$$x + 30$$

$$= 20$$

Solving we get $x = 12$

6. What is the next number of the following sequence

7, 14, 55, 110,?

Ans: 121

Sol:

Next number = Previous number + Reverse of previous number

So

$$7, 7+7=14, 14+41=55, 55+55=110, 110+011=121$$

7. How many numbers are divisible by 4 between 1 to 100

Ans: 24

Sol: There are 25 numbers which are divisible by 4 till 100. ($100/4 = 25$). But we should not consider 100 as we are asked to find the numbers between 1 to 100 which are divisible by 4. So answer is 24.

8. $(11111011)_2 = ()_8$

Ans: 373

Sol: $11111011_2 = (251)_{10} = (373)_8$

or

You can group 3 binary digits from right hand side and write their equivalent octal form.

9. There are 1000 junior and 800 senior students in a class. And there are 60 sibling pairs where each pair has 1 junior and 1 senior. One student is chosen from senior and 1 from junior randomly. What is the probability that the two selected students are from a sibling pair?

Ans: $714 / 800000$

Sol:

Junior students = 1000

Senior students = 800

60 sibling pair = $2 \times 60 = 120$ student

One student chosen from senior = $800C1 = 800$

One student chosen from junior = $1000C1 = 1000$

Therefore, one student chosen from senior and one student chosen from junior $n(s) = 800 \times 1000 = 800000$

Two selected students are from a sibling pair $n(E) = 120C2 = 7140$

therefore, $P(E) = n(E) / n(S) = 7140 / 800000 = 714 / 80000$

10. $161 \pm 85 \pm 65 \pm 89 = 100$, then use + or - in place of ? and take + as m, - as n then find value of m-n.

Ans: - 1

Sol:

$$161 - 85 - 65 + 89 = 100$$

$$\text{so } m's = 1, n's = 2 \Rightarrow (m - n) = - 1$$

11. In a cycle race there are 5 persons named as J, K, L, M, N participated for 5 positions so that in how many number of ways can M finishes always before N?

Ans: 60

Sol: Total number of ways in which 5 persons can finish is $5! = 120$ (there are no ties)

Now in half of these ways M can finish before N.

12. Rahul took a part in cycling game where $\frac{1}{5}$ ahead of him and $\frac{5}{6}$ behind him excluding him. Then total number of participants are

Ans: 31

Sol:

Let the total no of participants including Rahul = x

Excluding rahul=(x-1)

1

5

(x-1)+

5

6

(x-1) = x

31x - 31 = 30x

Total no. of participants x = 31

13. If a refrigerator contains 12 cans such that 7 blue cans and 5 red cans. In how many ways can we remove 8 cans so that atleast 1 blue can and 1 red can remains in the refrigerator.

Ans:

Sol:

Possible ways to draw 8 balls from the refrigerator which contains atleast 1 blue and 1 red can after the drawing are (6,2) (5,3) (4,4).

For (6, 2) = $\Rightarrow {}^7C_6 * {}^5C_2 \Rightarrow 7 * 10 = 70$

For (5, 3) = $\Rightarrow {}^7C_5 * {}^5C_3 \Rightarrow 21 * 10 = 210$

For (4, 4) = $\Rightarrow {}^7C_4 * {}^5C_4 \Rightarrow 35 * 5 = 175$

So Total ways = 70+210+175=455

14. There are 16 people, they divide into four groups, now from those four groups select a team of three members, such that no two members in the team should belong to same group.

Ans: 256

Sol:

We can select any three of the 4 groups in 4C_3 ways. Now from each of these groups we can select 1 person in 4 ways.

So total ways = $4 \times 4 \times 4 \times 4 = 256$

15. How many five digit numbers are there such that two left most digits are even and remaining are odd and digit 4 should not be repeated.

Ans: 2375

Sol:

We have

4 cases of first digit {2,4,6,8}

5 cases of second digit {0,2,4,6,8}

But 44 is one case we have to omit. So total ways for leftmost two digits are $4 \times 5 - 1 = 19$

5 cases of third digit {1,3,5,7,9}

5 cases of fourth digit {1,3,5,7,9}

5 cases of fifth digit {1,3,5,7,9}

So total ways = $19 \times 5 \times 5 \times 5 = 2375$

16. 7 people have to be selected from 12 men and 3 women, Such that no two women can come together. In how many ways we can select them?

Ans: 2772

Sol:

We can select only one woman, and remaining 6 from men.

So $12C6 \times 3C1 = 2772$

17. Tennis players take part in a tournament. Every player plays twice with each of his opponents. How many games are to be played?

Ans: 210

Sol:

We can select two teams out of 15 in $15C2$ ways. So each team plays with other team once. Now to play two games, we have to conduct $15C2 \times 2 = 210$ games.

18. Find the unit digit of product of the prime number up to 50 .

Ans: 0

Sol: No need to write all the primes upto 50. There are two primes 2, 5 gives unit digit of 0. So the entire product has unit digit 0.

19. If $[x^{(1/3)}] - [x^{(1/9)}] = 60$ then find the value of x.

Ans: 49

Sol:

Let $t = x^{1/9}$

So,

$t^3 - t = 60$

Therefore, $(t-1) \times t \times (t+1) = 60 = 3 \times 4 \times 5$.

therefore, $t = x^{1/9} = 4$.

hence, $x = 49$

20. A family X went for a vacation. Unfortunately it rained for 13 days when they were there. But whenever it rained in the mornings, they had clear afternoons and vice versa. In all they enjoyed 11 mornings and 12 afternoons. How many days did they stay there totally?

Ans: 18

Sol:

Total they enjoyed on 11 mornings and 12 afternoons = 23 half days

It rained for 13 days. So 13 half days.

So total days = $(13 + 23) / 2 = 18$