

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  $\sqrt[3]{125}$   
 $= 5$

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.

$7528 - 2222 = 5306$ .

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  $2 \times 8$  equation

$x+y=8$

and  $x-y=2$

So  $x = 5$  or  $3$  and  $y = 3$  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.

$$\text{Number of 7's in } 50! = [50/7] + [50/7^2]$$

$$= 7 + 1 = 8$$

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

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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  $= {}^{6+5-1}C_{5-1} = {}^{10}C_4 = 210$ .

If all the toffees are different, then each toffee can be distributed to any of the five. So total ways are  $5^6$

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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  $\rightarrow$

$$d/s = t \Rightarrow d = t \times s$$

$$d/s + 6$$

$$= t - 4$$

$$t \times s/s + 6$$

$$= t - 4$$

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

$$6t - 4s - 24 = 0 \rightarrow$$

$$(1)$$

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

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

$$-6t + 6s - 36 = 0 \rightarrow$$

$$(2)$$

Solving (1) and (2), v 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 the 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  $\Rightarrow 2x/4 \Rightarrow x/2$

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

$3x/2$

of B contains water

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

Wine portion in C =  $x/3$

of "A" +  $x/2$

of "B"

$x/2$  portion of wine

Water portion in C =  $x/3$

of "A" +  $3x/2$

of "B"

$\Rightarrow 4x/2 \Rightarrow 2x$

portion of water

So portion of wine in C is

$x/3x = 1/3$

portion of wine

if  $1/3$  expressed in %

$1/3 \times 100$

= 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

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

$$t = 1415$$

i.e. 56 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, ....., 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:

$$x/15 = 1/5$$

$$x = 3$$

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