6

factors

No. that are less or equal to given number 6
- 1
- 2
- 3
- 6

or

from which the given number is divisible by

multiple

6, 12, 18, 24 ... come in the table of the number.

Prime factorisation

2	18
3	9
3	3
	1

$= 2 \times 3 \times 3$

or

2×3^2 → this number will always be even in case of perfect square

Q. 18 × □ = least perfect square

2	18
3	9
3	3
	1

$= 2^1 \times 3^2$ → To make this perfect square we need to convert it into

$2^2 \times 3^2$

$= 4 \times 9$

$= 36$

Total no. of the
Product of factors

$(\text{The number})^{\frac{TNF}{2}}$

for eg:- 18

TNF of $18 = 2^1 \times 3^2$

$= 12 \times 3$

$= 6$

$(18)^{\frac{6}{2}3}$

$= 18^3$

For perfect squares

$36 = 2^2 \times 3^2$

TNF $= 3 \times 3 = 9$

POF :- $36^{\frac{9}{2}}$

But in exams the options will be given as 8×36^4

To simplify this

$36^{\frac{9}{2}} \rightarrow 36^{4\frac{1}{2}} \rightarrow 36^{4+\frac{1}{2}}$

$36^4 \cdot 36^{\frac{1}{2}}$

$36^4 \times \sqrt{36}$

we get root here as anything to the power $\frac{1}{2}$ is root

$36^4 \times 6$

Q) if 'a' is a prime no. greater than 3, (a^2-1) is divisible by which of the following

a) 6
b) 24
c) 3
d) all of these ✓

let a = 5 then $25-1 = 24$ (divisible by all)
" " = 7 " " $49-1 = 48$ (" " ")
" " = 11 " " $121-1 = 120$ (" " ")

∴ then answer is (A)

Q) if m & n are integers div by 5, which of the following is not 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 the above

let m = 30 n = 10

a) $30 - 10 = 20$ div by 5
b) $900 - 100 = 800$ div by 25
c) $30+10$ = div by 10

but if

m = 30 & n = 5

then $30 + 5 = 35$ (not div by 10)

∴ answer (c)

Q. What is the least natural number by which $(3^9)(5^{13})$ must be divided so that the resulting quotient is
a) perfect square
b) perfect cube

$$\frac{3^9 \times 5^{13}}{?} = \text{Quotient}$$

a) $3^1 \times 5^1 \rightarrow 3^8 \times 5^{12}$ (Perfect square)
b) $5^1 \rightarrow 3^9 \times 5^{12}$ (Perfect cube)

Factors
4 - 1, 2, 4 → There are 3 factors
12 - 1, 2, 3, 4, 6, 12 → There are 6 factors

But it will be difficult to find the number of factors for a bigger no. as it is time consuming.

So, to find it.

① Do the Prime factorization

2	12
2	6
3	3
	1

$12 = 2^2 \times 3^1$

② Now add 1 to both the powers & multiply the value with each other

$(2+1)\ (1+1)$
$= (3) \times (2)$
$= 6$ (ans)

Note: No. of prime factors of 12 are 2 i.e. $(2^2 \times 3^1)$