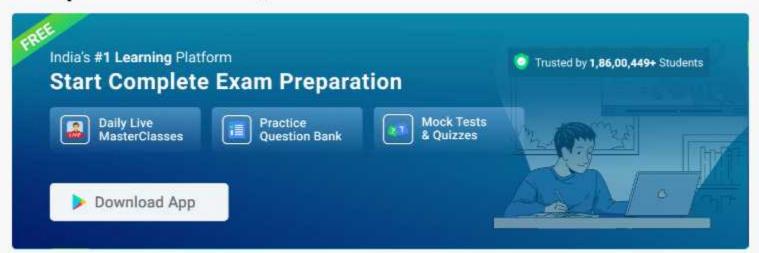
Multiples and Factors Questions





Answer (Detailed Solution Below)

Option 1: 10890



Multiples and Factors MCQ Question 1 Detailed Solution

Given:

3240

Concept:

If $k = a^x \times b^y$, then

a, and b must be prime number

Sum of all factors = $(a^0 + a^1 + a^2 + + a^x) (b^0 + b^1 + b^2 + + b^y)$

Solution:

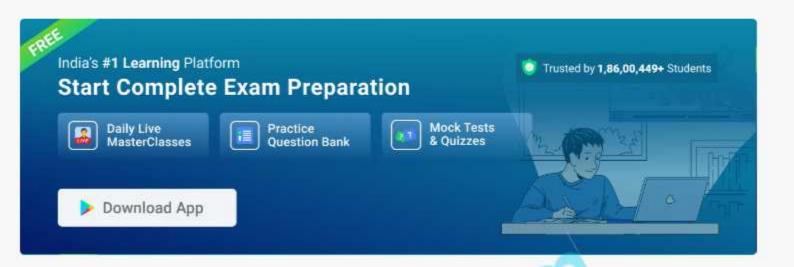
$$3240 = 2^3 \times 3^4 \times 5^1$$

Sum of factors =
$$(2^0 + 2^1 + 2^2 + 2^3)(3^0 + 3^1 + 3^2 + 3^3 + 3^4)(5^0 + 5^1)$$

$$\Rightarrow$$
 (1 + 2 + 4 + 8) (1 + 3 + 9 + 27 + 81) (1 + 5)

 $\Rightarrow 10890$

.. required sum is 10890



MCQ Question 2

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If a number is in the form of $8^{10} \times 9^7 \times 7^8$, find the total number of prime factors of the given number.

- 1. 52
- 2. 560
- 3. 3360
- 4. 25

Answer (Detailed Solution Below)

Option 1:52

Multiples and Factors MCQ Question 2 Detailed Solution

Given:

The number is $8^{10} \times 9^7 \times 7^8$

Concept used:

If a number of the form $x^a \times y^b \times z^c$ and so on, then total prime factors = a + b + c and so on

Where x, y, z, ... are prime numbers

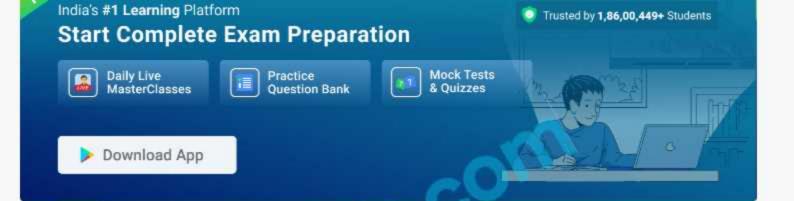
Calculation:

The number $8^{10} \times 9^7 \times 7^8$ can be written as $(2^3)^{10} \times (3^2)^7 \times 7^8$

The number can ve written as $2^{30} \times 3^{14} \times 7^{8}$

Total number of prime factors = 30 + 14 + 8

.. The total number of prime factors are 52



MCQ Question 3

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Find how many odd factors are there in the number 1240.

1. 2

3. 5

4. 16

Answer (Detailed Solution Below)

Option 2:4

351100014. Multiples and Factors MCQ Question 3 Detailed Solution

Given:

number 1240

Formula used:

Odd factors of $p^a \times q^b = (a + 1)(b + 1)$,

Where p and q should be odd prime numbers

Calculation:

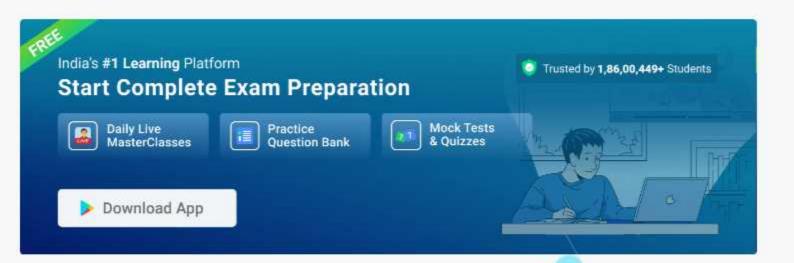
Factor of $1240 = 2^3 \times 5^1 \times (31)^1$

- \Rightarrow Odd number are $5^1 \times (31)^1$
- ⇒ Odd factors of pa × qb

 \Rightarrow (a +1)(b + 1)

$$\Rightarrow (1+1)(1+1) = 4$$

: 1240 has 4 odd factors



MCQ Question 4 The sum of all the factors of 100 is 1. 115 2. 216 3. 217 4. 223

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Answer (Detailed Solution Below)

Option 3:217

Multiples and Factors MCQ Question 4 Detailed Solution

Given:

Number = 100

Formula Used:

The sum of all the factors of $a^m \times b^n$ is $(a^0 + a^1 + ... + a^m) \times (b^0 + b^1 + ... + b^n)$

Calculation:

F : (400 0° F°

ractors or 100 = 2- x 3-

Sum of factors = $(2^0 + 2^1 + 2^2) \times (5^0 + 5^1 + 5^2)$

 \Rightarrow (1 + 2 + 4) × (1 + 5 + 25)

 \Rightarrow 7 × 31

⇒ 217

.. The sum of all factors of 100 is 217.



MCQ Question 5 Find total number of odd factors of 360. 1. 6 2. 9 3. 4 4. 7

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Answer (Detailed Solution Below)

Option 1:6

Multiples and Factors MCQ Question 5 Detailed Solution

Given:

Number = 360

Concept Used:

$$x = a^m \times b^n$$

where a, b → Odd numbers

Odd factors = $(m + 1) \times (n + 1)$

Calculations:

Prime factors of 360 = $2^3 \times 3^2 \times 5^1$

Odd factors = $(1 + 2) \times (1 + 1) = 6$

.. The total number of odd factors of 360 is 6



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MCQ Question 6 Find the sum of the factors of 10800 1. 38440 2. 38000 3. 39000 4. 36440

Answer (Detailed Solution Below)

Option 1:38440

Sum of all factors = $(a^0 + a^1 + a^2 + + a^x)$ $(b^0 + b^1 + b^2 + + b^y)$ Solution: $10800 = 2 \times 2 \times 2 \times 2 \times 3 \times 3 \times 3 \times 5$ $\Rightarrow 10800 = 2^4 ...$

$$\Rightarrow$$
 10800 = $2^4 \times 3^3 \times 5^2$

Sum of all factors = $(2^0 + 2^1 + 2^2 + 2^3 + 2^4)(3^0 + 3^1 + 3^2 + 3^3)(5^0 + 5^1 + 5^2)$

$$\Rightarrow$$
 (1 + 2 + 4 + 8 + 16) (1 + 3 + 9 + 27) (1 + 5 + 25)

- \Rightarrow 31 × 40 × 31
- $\Rightarrow 38440$
- .. required sum is 38440



MCQ Question 7

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Find the total number of factors of the number 480.

- 1. 12
- 2. 24
- 4. 36

Answer (Detailed Solution Below)

Option 2:24

Multiples and Factors MCQ Question 7 Detailed Solution

Given:

The number is 480.

Formula Used:

If Prime Factorisation of a number $N = a^p \times b^q \times c^r \times ...$

ok.com Then, Total number of factors of N = $(p + 1) \times (q + 1) \times (r + 1) \times ...$

Calculation:

Here.

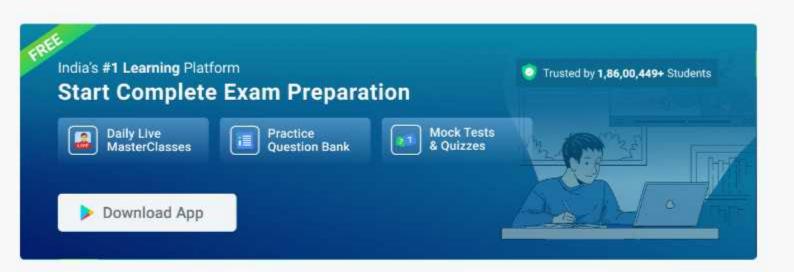
Prime Factorisation of $480 = 2^5 \times 3^{10} \times 5^{10}$

So, Total number of factors = $(5+1) \times (1+1) \times (1+1)$

 $\Rightarrow 6 \times 2 \times 2$

⇒ 24

.. The total number of factors of 480 is 24.



MCQ Question 8

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How many factors of 8820 are perfect squares?

- 2. 5
- 3. 6
- 4. 7

Answer (Detailed Solution Below)

Option 1:8

Multiples and Factors MCQ Question 8 Detailed Solution

We can write the prime factorization of 8820 as-

$$\Rightarrow$$
 8820 = $2^2 \times 3^2 \times 7^2 \times 5$

Now, this is clear that 1, 4, 9, 49 are four factors that are a perfect square.

But we can make more perfect square factors by the combination of 4, 9, and 49.

 \Rightarrow there are 4 more possible combinations i.e. $4 \times 9 = 36 (6^2)$,

$$9 \times 49 = 441 (21^2)$$

$$49 \times 4 = 196 (14^2)$$

and one more combination is 4 × 9 × 49 = 1764 whose square root is 42

.. There are 8 perfect square factors of 8820.

Alternate Method

For a factor to be a square it needs to have an even number of powers of each of the prime factors

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$$8820 = 2^2 \times 3^2 \times 7^2 \times 5$$

Let
$$8820 = 2^a \times 3^b \times 7^c \times 5^d$$

Now a can take values 0 and 2 i.e 2 values

b can take values 0 and 2 i.e 2 values

c can take values 0 and 2 i.e 2 values

d can take value 0 i.e 1 value

Hence total number of perfect squares = 2 × 2 × 2 × 1 = 8

why do we need to multiply here?

All the square factors occur when we take combinations of exponents from the four sets sets $\{0,2,\},\{0,2\}$ and $\{0\}$, hence the rule of multiplication is applied here for counting



MCQ Question 9 Which of the following numbers will have an even number of factors? 1. 1600 2. 52900 3. 30000 Answer (Detailed Solution Below) Option 3: 30000

Multiples and Factors MCQ Question 9 Detailed Solution

Concept used:

We know when a number is a perfect square if it has an odd number of factors.

For example, 25 is a perfect square then it has an odd number of factors that is 1,5,25.

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No of factors = 3 (odd value)

Calculation:

As we know,

1600, 52900 and 36100 are perfect square.

So, these have an odd number of factors.

30000 is not a perfect square so it has an even number of factors.

$$\Rightarrow$$
 1600 = 5² × 2⁶

Total no of factors = $(2 + 1) \times (6 + 1) = 21$ (odd value)

$$\Rightarrow$$
 52900 = 23² × 2² × 5²)

Total no of factors = $(2 + 1) \times (2 + 1) \times (2 + 1) = 27$ (odd value)

$$\Rightarrow$$
 30000 = 5⁴ × 2⁴ × 3

Total no of factors = $(4 + 1) \times (4 + 1) \times (1 + 1) = 50$ (even value)

$$\Rightarrow$$
 36100 = 19² × 2² × 5²

Total no of factors = $(2 + 1) \times (2 + 1) \times (2 + 1) = 27$ (odd value)

.. The correct answer is 30000.



MCQ Question 10

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The expression $2x^3 + x^2 - 2x - 1$ is divisible by

- 1. 2x + 3
- 2. 2x + 1
- 3. 2x-3
- 4. 2x 1

Answer (Detailed Solution Below)

Option 2:2x + 1

Multiples and Factors MCQ Question 10 Detailed Solution

$$2x^3 + x^2 - 2x - 1$$

$$\Rightarrow$$
 $x^2(2x + 1) - (2x + 1)$

$$\Rightarrow$$
 (2x + 1) (x² - 1)

 \therefore The expression $2x^3 + x^2 - 2x - 1$ is divisible by (2x + 1)