A Car Was Travelling At A Speed Of 90km/h. What Was Its Speed In M/s?

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Understanding how to convert speed from kilometers per hour (km/h) to meters per second (m/s) is essential for various applications in physics, engineering, and everyday life. Whether you're a student studying motion, a vehicle enthusiast, or someone working in transportation logistics, knowing how to perform this conversion accurately can help you interpret data correctly and make informed decisions. In this article, we will explore the process of converting a speed of 90 km/h into meters per second, explain the significance of these units, and provide practical insights into how this conversion is used in real-world scenarios.

Understanding the Basics: What Are Kilometers Per Hour and Meters Per Second?

Kilometers Per Hour (km/h)

Kilometers per hour is a common unit of speed used worldwide, especially in road signs and vehicle speedometers. It indicates how many kilometers a vehicle travels in one hour. It is a measure of velocity often used for measuring speeds over longer distances.

Meters Per Second (m/s)

Meters per second is a standard SI (International System of Units) unit for velocity. It measures how many meters an object travels in one second. This unit is widely used in physics for analyzing motion, calculating acceleration, and understanding the dynamics of moving objects.

Converting Speed from km/h to m/s: The Formula and Explanation

The process of converting from km/h to m/s is straightforward once you understand the relationship between the units involved.

The Conversion Formula

To convert a speed from km/h to m/s, use the following formula:

$$ \text{Speed in m/s} = \text{Speed in km/h} \times \frac{1000\, \text{meters}}{1\, \text{kilometer}} \times \frac{1\, \text{hour}}{3600\, \text{seconds}} $$

Simplifying this, we get:

$$ \text{Speed in m/s} = \text{Speed in km/h} \times \frac{1000}{3600} $$

which reduces to:

$$ \text{Speed in m/s} = \text{Speed in km/h} \times \frac{1}{3.6} $$

Step-by-Step Conversion Process

1. Take the given speed in km/h.
2. Divide the value by 3.6.
3. The result is the speed in meters per second.

Calculating the Speed of a Car Traveling at 90 km/h in Meters Per Second

Given that the car's speed is 90 km/h, let's perform the conversion:

$$ \text{Speed in m/s} = 90 \div 3.6 = 25\, \text{m/s} $$

Therefore, a car traveling at 90 km/h is moving at 25 meters per second.

Practical Applications of Speed Conversion in Real Life

Understanding and converting speed units is critical across various fields. Here are some key applications:

1. Traffic Safety and Regulations

Speed limits are often posted in km/h, but understanding how these translate to meters per second helps in analyzing vehicle behavior and safety measures.

2. Physics and Motion Analysis

In physics, calculations involving velocity, acceleration, and force often require SI units, making the

conversion from km/h to m/s essential.

3. Engineering and Design

Designers of transportation systems and vehicle engineers need to understand how different units relate to optimize performance and safety.

4. Sports and Athletics

Speed measurements in athletics, such as sprinting or cycling, are often expressed in m/s, necessitating conversion from common speed units.

Additional Tips for Accurate Conversion

- Always double-check your calculations, especially when dealing with large or small numbers.
- Use calculator functions or conversion tools for quick and error-free conversions.
- Remember that unit conversions are fundamental in scientific research, engineering projects, and daily activities involving motion.

Summary of Key Points

- A car traveling at 90 km/h moves at 25 m/s after conversion.
- The conversion factor between km/h and m/s is 1 km/h = 1/3.6 m/s.
- Converting units helps in better understanding and analyzing motion in practical and scientific contexts.

Conclusion: Why Understanding Speed Conversions Matters

Converting speed from km/h to m/s is a fundamental skill that bridges everyday experiences and scientific understanding. Whether analyzing vehicle speeds, designing transportation systems, or studying physics, knowing how to accurately perform this conversion enhances comprehension and decision-making. Remember, the key is the simple but powerful conversion factor of 3.6, which allows you to switch seamlessly between these units. So, the next time you see a speed limit or a vehicle’s speed, you'll confidently know how to interpret it in different units, making your understanding of motion more versatile and precise.

Meta Description:
Learn how to convert a car's speed from 90 km/h to meters per second with our comprehensive guide. Understand the conversion formula, practical applications, and why this knowledge is essential in science and everyday life.

Frequently Asked Questions

How do you convert a speed from km/h to m/s?

To convert km/h to m/s, multiply the speed in km/h by (1000/3600), which simplifies to dividing by 3.6.

What is the speed of a car traveling at 90 km/h in meters per second?

The speed is 25 m/s (since 90 ÷ 3.6 = 25).

Why is it important to convert speed units in physics problems?

Converting units ensures consistency and accuracy in calculations, especially when combining different measurements or applying formulas that require SI units.

What is the formula to convert km/h to m/s?

Speed in m/s = Speed in km/h ÷ 3.6.

If a car travels at 90 km/h, how long does it take to cover 1 km in meters per second?

First, convert 90 km/h to 25 m/s; then, time to cover 1 km (1000 meters) is 1000 ÷ 25 = 40 seconds.

Is 90 km/h considered a high speed on urban roads?

Yes, 90 km/h is generally considered a high speed for urban areas, where speed limits are often lower, typically around 50-60 km/h.

How can understanding speed conversions help in real-world driving scenarios?

It helps drivers understand travel times, comply with speed limits in different units, and ensure safety by accurately interpreting speed measurements.

Additional Resources

A Car Was Travelling At A Speed Of 90 km/h. What Was Its Speed In m/s?

When considering the conversion of speed units, understanding how to accurately switch from kilometers per hour (km/h) to meters per second (m/s) is a fundamental skill in physics and everyday life. The question, "A car was travelling at a speed of 90 km/h. What was its speed in m/s?" might seem straightforward, but it opens the door to exploring unit conversions, the significance of different measurement systems, and their practical applications. This article delves into the details of converting speeds, the importance of different units, and how such conversions are used in various contexts—from traffic safety to engineering.

Understanding the Units of Speed: km/h and m/s

Before diving into the conversion process, it’s essential to understand what km/h and m/s represent and why these units are used.

What is km/h?

Kilometers per hour (km/h) is a measure of speed commonly used in countries that follow the metric system, especially for road speed limits and vehicle speeds. It indicates how many kilometers a vehicle travels in one hour.

Features of km/h:
- Widely used in transportation and traffic regulations.
- Suitable for measuring moderate to high speeds over longer distances.
- Easy to relate to distances traveled over time in road contexts.

What is m/s?

Meters per second (m/s) is a SI (International System of Units) standard for expressing speed, often used in physics and engineering. It indicates how many meters a body travels in one second.

Features of m/s:
- Precise and suitable for scientific calculations.
- Used in physics to analyze motion, velocity, and acceleration.
- Less common in everyday driving contexts but critical in technical fields.

Why Convert km/h to m/s?

Understanding how to convert between these units is important for various reasons:

- Scientific calculations: Physics problems often require m/s because SI units are standard.
- Engineering applications: Designing vehicle safety features or analyzing motion data typically uses m/s.
- Educational purposes: Learning unit conversions enhances understanding of measurement systems.
- Practical scenarios: Sometimes, speed limits are given in km/h, but calculating stopping distances or kinetic energy involves m/s.

Conversion Method: How to Convert 90 km/h to m/s

The process of converting km/h to m/s involves understanding the relationship between kilometers, meters, hours, and seconds.

Conversion Factors

- 1 kilometer = 1000 meters
- 1 hour = 3600 seconds

Using these, the conversion is straightforward:

Speed in m/s = (Speed in km/h) × (1000 meters / 1 kilometer) ÷ (3600 seconds / 1 hour)

Simplifying:

Speed in m/s = (Speed in km/h) × (1000 / 3600)

which reduces to:

Speed in m/s = (Speed in km/h) × (1 / 3.6)

Therefore:

Speed in m/s = 90 / 3.6 = 25 m/s

So, a car traveling at 90 km/h is moving at 25 meters per second.

Practical Application of the Conversion

Knowing the speed in m/s can be useful in various real-life situations:

- Calculating kinetic energy: $KE = \frac{1}{2} m v^2$
- Determining stopping distances based on vehicle speed

- Physics experiments involving motion
- Engineering simulations

Example:
If a car weighs 1500 kg and travels at 25 m/s, its kinetic energy is:

$$ KE = \frac{1}{2} \times 1500 \times 25^2 = 750 \times 625 = 468,750 \text{ Joules} $$

This calculation is essential in safety assessments and crash analysis.

Additional Insights into Speed Conversion

While the basic conversion is simple mathematically, understanding its implications enhances practical knowledge.

Conversion Factors in Context

- The factor 3.6 is derived from the ratio of 3600 seconds in an hour to 1000 meters in a kilometer.
- The conversion is linear, meaning any speed in km/h can be converted to m/s by dividing by 3.6.

Conversion Table for Common Speeds

Speed (km/h)	Speed (m/s)
30 km/h	8.33 m/s
50 km/h	13.89 m/s
90 km/h	25 m/s
120 km/h	33.33 m/s

This table can be useful for quick reference or estimation.

Pros and Cons of Different Units

Understanding the advantages and disadvantages of km/h and m/s helps in choosing the appropriate unit for specific applications.

Pros of km/h:
- Intuitive for everyday driving and travel planning.
- Consistent with legal speed limits.
- Easy to relate to distances over time.

Cons of km/h:
- Less precise for scientific calculations.
- Larger numbers can be less convenient in physics formulas.

Pros of m/s:
- Standard SI unit, enabling precise scientific analysis.
- Facilitates calculations involving acceleration, force, energy.
- Useful in physics and engineering contexts.

Cons of m/s:
- Less intuitive for everyday use.
- Less common in traffic regulations, which prefer km/h.

Conclusion: The Significance of Unit Conversion in Real Life

Converting 90 km/h to m/s, resulting in 25 m/s, exemplifies the importance of understanding measurement systems and their conversions. Although the process appears straightforward—dividing by 3.6—the implications extend beyond mere numbers. Whether it's analyzing a vehicle's kinetic energy, designing safety features, or understanding physics principles, mastering unit conversions is essential. Recognizing when and why to use specific units enhances clarity and precision in both everyday and technical scenarios.

In summary, a car traveling at 90 km/h is moving at 25 m/s. This conversion not only aids in scientific calculations but also deepens our appreciation of the measurement systems that underpin our understanding of motion in the physical world. By grasping these concepts, we can better interpret data, adhere to safety standards, and apply physics principles effectively in various fields.

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