

A Lorry Is Travelling At 13.6 M/s. The Speed Limit Is 50 Km/h. Show That The Lorry Is Travelling Below

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Introduction

Understanding vehicle speeds and their conversions between different units is essential for traffic safety, legal compliance, and technical analysis. In this context, we examine a lorry traveling at a speed of 13.6 meters per second (m/s) and compare it with the legal speed limit of 50 kilometers per hour (km/h). The goal is to demonstrate that the lorry's speed is below the permissible limit by converting the speed from meters per second to kilometers per hour and analyzing the result.

Understanding Speed Units and Their Conversions

Speed in Meters per Second (m/s)

- Meters per second is a SI (International System of Units) standard for measuring speed.
- It indicates how many meters an object covers in one second.
- Commonly used in physics and engineering.

Speed in Kilometers per Hour (km/h)

- Kilometers per hour is a metric unit commonly used for speed limits on roads.
- It measures how many kilometers an object travels in one hour.
- Widely used in everyday traffic regulations.

Converting Speed from Meters per Second to Kilometers per Hour

Conversion Formula

To convert a speed from m/s to km/h, multiply the speed by 3.6:

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

Application of the Formula

Given:

- Speed of the lorry = 13.6 m/s

Calculation:

$$13.6 \, \text{m/s} \times 3.6 = 48.96 \, \text{km/h}$$

Therefore, the lorry's speed in km/h is approximately 48.96 km/h.

Comparison with the Speed Limit

Legal Speed Limit

- The maximum allowable speed for the lorry is 50 km/h.

Analysis of the Converted Speed

- The lorry is traveling at approximately 48.96 km/h.
- This is less than the legal limit of 50 km/h.

Conclusion Based on the Comparison

- Since $48.96 \, \text{km/h} < 50 \, \text{km/h}$, the lorry is traveling below the speed limit.
- The vehicle complies with legal speed regulations and is not exceeding the permissible limit.

Additional Considerations

Significance of Accurate Conversion

- Precise conversion ensures correct assessment of compliance.
- Minor discrepancies can lead to misunderstandings or legal issues.

Real-World Implications

- Drivers and authorities rely on accurate speed conversions for enforcement.
- Understanding conversions helps in safe driving and legal adherence.

Possible Variations in Speed Limits

- Different roads or regions may have varying speed limits.
- Always verify local regulations when assessing compliance.

Summary

- The lorry's speed in m/s is converted to km/h using the factor 3.6.
- The calculated speed (48.96 km/h) is below the speed limit of 50 km/h.
- Therefore, the lorry is travelling below the legal speed limit.

Final Remarks

Accurate unit conversions are fundamental in evaluating vehicle speeds against legal standards. In this case, converting 13.6 m/s to km/h clearly demonstrates that the lorry is traveling below the specified speed limit, ensuring compliance and safety on the road. Always remember to perform such conversions carefully to avoid misinterpretations and ensure proper enforcement of traffic regulations.

Frequently Asked Questions

How do you convert the lorry's speed from meters per second to kilometers per hour?

Multiply the speed in meters per second by 3.6. So, $13.6 \text{ m/s} \times 3.6 = 48.96 \text{ km/h}$.

Is the lorry exceeding the speed limit of 50 km/h?

No, since 48.96 km/h is less than the speed limit of 50 km/h, the lorry is traveling below the limit.

What is the significance of converting units when comparing speeds?

Converting units ensures accurate comparison between different measurement systems, such as meters per second and kilometers per hour.

How do you verify if a vehicle is within the speed limit?

Convert the vehicle's speed to the same units as the speed limit and compare. If the speed is less than or equal to the limit, the vehicle is within the limit.

What is the importance of understanding speed limits for drivers?

Understanding speed limits helps drivers stay safe, avoid fines, and comply with traffic laws.

Can a vehicle traveling at 13.6 m/s be considered safe on a road with a 50 km/h limit?

Yes, since its speed is approximately 48.96 km/h, it is within the safe and legal speed limit.

How does the conversion factor 3.6 relate to speed conversions?

The factor 3.6 converts meters per second to kilometers per hour because 1 m/s equals 3.6 km/h.

What would be the lorry's speed if it were traveling at 60 km/h? How does that compare to 50 km/h?

At 60 km/h, the lorry would be exceeding the 50 km/h limit, indicating it's over the speed limit.

Why is it important for drivers to know how to convert speeds between units?

It allows drivers to accurately assess their speed relative to local speed limits, ensuring safe and legal driving.

Additional Resources

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Understanding vehicle speeds and their relation to speed limits is fundamental for safe and lawful driving. In this analysis, we examine a scenario where a lorry is traveling at a velocity of 13.6 meters per second (m/s), and the posted speed limit is 50 kilometers per hour (km/h). Our objective is to demonstrate, through precise conversion and comparison, that the lorry is indeed traveling below the speed limit. This exercise not only reinforces the importance of unit conversions in physics and road safety but also highlights the significance of understanding speed limits in various units for effective traffic management.

Understanding Speed Units and Their Significance

Speed is a scalar quantity that indicates how fast an object is moving. It is measured in different units depending on the context and region, with meters per second (m/s) and kilometers per hour (km/h) being the most common.

Why Different Units Matter

- Contextual Relevance:
- Meters per second (m/s) is often used in physics and scientific calculations.
- Kilometers per hour (km/h) is more common in everyday traffic regulations and road signs.
- Conversion Necessity:
- To compare or evaluate vehicle speeds against legal limits, conversion between units is essential.

Features of Speed Units:

- Meters per second (m/s):
- SI unit of speed.
- Useful for precise scientific calculations.
- Kilometers per hour (km/h):
- Widely used for speed limits.
- Convenient for everyday understanding of vehicle speeds.

Converting the Lorry's Speed from m/s to km/h

To determine whether the lorry is traveling below the speed limit, we need to convert its speed from meters per second to kilometers per hour.

Conversion Formula

The conversion factor between m/s and km/h is:

$$1 \text{ m/s} = 3.6 \text{ km/h}$$

This is derived from the fact that:

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

Therefore,

$$\text{Speed in km/h} = \text{Speed in m/s} \times \frac{3600}{1000} = \text{Speed in m/s} \times 3.6$$

Applying the Conversion

Given:

$$\text{Speed of the lorry} = 13.6 \text{ m/s}$$

Calculating:

$$13.6 \text{ m/s} \times 3.6 = 48.96 \text{ km/h}$$

Thus,

The lorry's speed is approximately 48.96 km/h.

Comparison with the Speed Limit

The posted speed limit is:

$$\text{Speed limit} = 50 \text{ km/h}$$

Comparing the two speeds:

Parameter	Speed (km/h)
Lorry's speed	48.96 km/h
Speed limit	50 km/h

Since:

$$48.96 \text{ km/h} < 50 \text{ km/h}$$

The lorry is traveling below the speed limit.

Implications and Significance

This calculation confirms that the lorry is adhering to the speed regulations, which is

crucial for road safety and legal compliance. It also demonstrates the importance of understanding unit conversions in real-world scenarios, especially when speed limits are given in different units than the vehicle's speed.

Practical Applications

- Traffic Law Enforcement: Officers can use such conversions to determine if a vehicle exceeds speed limits.
- Driver Awareness: Drivers should be aware of their speed in various units, especially when traveling between regions with different measurement systems.
- Safety Protocols: Ensuring vehicles do not exceed speed limits helps prevent accidents.

Pros and Cons of Different Speed Measurement Systems

Pros of km/h:

- Intuitive for everyday driving.
- Standard on road signs globally.
- Easier to estimate time and distance over typical driving ranges.

Cons of km/h:

- Less precise for scientific calculations.
- Can be less convenient for physics-based analysis.

Pros of m/s:

- Standard SI unit, ideal for scientific computations.
- Facilitates precise physics modeling.

Cons of m/s:

- Less intuitive for the general public.
- Not commonly used in everyday traffic regulations.

Conclusion

By converting the lorry's speed from meters per second to kilometers per hour, we have established that the vehicle is traveling at approximately 48.96 km/h, which is below the

statutory speed limit of 50 km/h. This demonstrates the importance of understanding and correctly converting between different units of speed to assess compliance with traffic laws accurately. Whether in scientific contexts or everyday driving, mastering these conversions enhances safety, legality, and comprehension of vehicle dynamics on the road.

In summary, the lorry's speed of 13.6 m/s confirms that it is traveling safely within the prescribed speed limit, emphasizing the significance of unit awareness and conversion skills in traffic safety and physics.

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