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15. Practice with dimension and units

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Recitation due Aug 4, 2021 20:30 IST Completed

Practice

Gravity

1/1 point (graded)

The gravitational force between two planetary bodies satisfies the equation

$$F = G\frac{m_1 m_2}{r^2}$$

where m_1 and m_2 are the masses of each body, and r is the distance between their centers of mass. Find the dimension of the gravitational constant G in terms of the fundamental dimensions

- Length `L`,
- Time `T`,
- Mass `M`

(Recall that force has dimension ML/T^2.)

L^3/M/T^2 ✔ **Answer:** L^3/(M*T^2)

$\frac{L^3}{M \cdot T^2}$

? INPUT HELP

Submit You have used 1 of 10 attempts

Answers are displayed within the problem

Charge

1/1 point (graded)

The force exerted by one charge on another is given by Coulomb's Law:

$$F = k\frac{q_1 q_2}{r^2}$$

where q_1 and q_2 are the charges of each particle, and r is the distance between them. Find the dimension of the constant k in terms of the fundamental dimensions

- Length `L`,
- Time `T`,
- Mass `M`,
- Charge `C`

(Recall that force has dimension ML/T^2.)

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M*L^3/T^2/C^2 ✔ **Answer:** M*L^3/(C^2*T^2)

$\frac{M \cdot L^3}{T^2 \cdot C^2}$

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Submit You have used 2 of 15 attempts

Answers are displayed within the problem

Heat energy

2/2 points (graded)

The heat energy E measured in Joules that is absorbed or released by an object is determined by its mass m, its heat capacity c, and the the difference between the starting and ending temperatures ΔT.

The heat capacity c is a material property measured in units of Joules per gram per degree Celsius ($J/\left(g^\circ C\right)$).

Determine the numbers r, s so that the formula below has balanced dimension on both sides.

$$E = cm^r \Delta T^s$$

$r =$ 1 ✔ **Answer:** 1

$s =$ 1 ✔ **Answer:** 1

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Answers are displayed within the problem

15. Practice with dimension and units

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Suggestio on Charge Question 4
When the dimensions were presdnted in the previous section 5 were enumerater: length, mass, time, temperature and charge; but w...

Small Nit on Heat Energy 3
For the measurement of heat capacity, the degree symbol follows the symbol for grams rather than Celsius.

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