The Système International
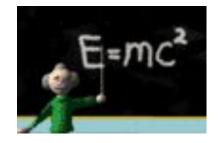
SI Units

GEL2006

Base Quantity		Base Unit	
Name	Symbol	Name	Symbol
Time	t	second	s
Length	l	metre	m
Mass	m	kilogram	kg
Temperature	T , θ	kelvin	K
Electric Current	I	ampere	A
Amount of Substance	n	mole	mol
Luminous Intensity	(not in A Level)	candela	cd

Physical Quantity	Defined as :	Unit	Special Name
velocity		m/s	meter per second
acceleration			
density			
momentum			
force			
pressure			
work (energy)			
power			
electrical charge			
potential difference			
resistance			

Homogenous Equations

- $E_p = m\ g\ h$

- $J = kg\ Nkg^{-1}\ m$

- $Nm = kg\ kgms^{-2}kg^{-1}\ m$

- $kgms^{-2}\ m = kgm^2s^{-2}$

- $\underline{kgm^2s^{-2}} = \underline{kgm^2s^{-2}}$

- $\therefore$ This equation is homogenous

Homogenous Equations

- $v^2 = u^2 + 2ax$

- $m^2s^{-2} = m^2s^{-2} + ms^{-2} \; m$

- $m^2s^{-2} = m^2s^{-2} + m^2s^{-2}$

- $\therefore$ This equation is homogenous

Homogenous Equations

- F = $\dfrac{m\,v}{r}$

- N = kg ms^{-1} m^{-1}

- kgms^{-2} = kgs^{-1}

- ∴ This equation is not homogenous

Homogenous Equations

- What is missing? $kgms^{-2} = kgs^{-1}$

    $ms^{-1} = v$ on rhs

- $\therefore$ The equation should read:

- $F = \dfrac{mv^2}{r}$

Homogenous Equations

- Try these:
- $E_k = \frac{1}{2} m v^2$ $J = kg\ m^2s^{-2}$

$N\ m = kg\ m^2s^{-2}$

$\underline{kg\ m^2s^{-2}} = \underline{kg\ m^2s^{-2}}$ OK

$ms^{-1} = ms^{-1} + ms^{-2}\ s^2$

- and $v = u + at^2$ $\underline{ms^{-1}} = \underline{ms^{-1}} + \underline{m}$ Not OK

s^{-1} is missing, so equation should read:

$V = u + at$

Show that these equations are homogenous

a) $x = ut + \frac{1}{2}at^2$

b) $T = 2\pi\sqrt{l/g}$

c) $v = f\lambda$

d) $I = nAve$

e) $W = \frac{1}{2}CV^2$

What is missing here?

f) $F = mv - mu$