The Système International

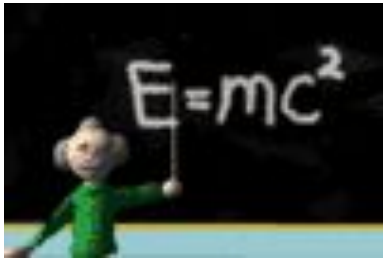
SI Units

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



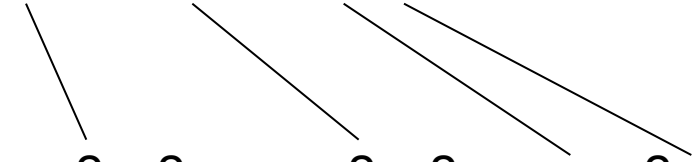
- $E_p = m\ g\ h$
- $J = kg\ Nkg^{-1}\ m$

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

- ∴ This equation is homogenous

Homogenous Equations

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



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

- $\underline{m^2}\,\underline{s^{-2}} = \underline{m^2}\,\underline{s^{-2}} + \underline{m^2}\,\underline{s^{-2}}$

- ∴ This equation is homogenous

Homogenous Equations

- $F = \frac{m\,v}{r}$
- $N = kg\ ms^{-1}\ m^{-1}$
- $kgms^{-2} = kgs^{-1}$
- ∴ This equation is not homogenous

Homogenous Equations

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

ms^{-1} = v on rhs

- ∴ The equation should read:

- $F = \frac{\underline{mv^2}}{r}$

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

- and $v = u + at^2$

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

$\underline{ms^{-1}} = \underline{ms^{-1}} + \underline{m}$ 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) $F = mv - mu$