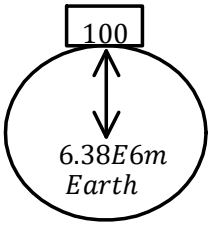
$F_g = \frac{Gm_1m_2}{r^2}$ $E_{p\infty} = -\frac{GMm}{r}$

P12 - 7.1 - Fg Ep Notes

F_g: *The Gravitational Force between any two Objects anywhere in the Universe.* (*Newton*)
E_p: *The Potential Energy a massive object has in relation to another due to gravity.* (*Joules*)

Distance from Earth



$g = \frac{GM}{r^2}$

$F_g = \frac{Gm_1m_2}{r^2}$

$F_g = \frac{6.67 \times 10^{-11}(5.98 \times 10^{24})(100)}{(6.38 \times 10^6)^2}$

$F_g = 979.9\ N$

$F_g = mg$
$F_g = 100 \times 9.8$
$F_g = 980\ N$

$E_p = -\frac{GMm}{r}$

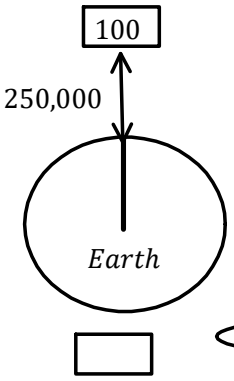
$E_p = -\frac{6.67 \times 10^{-11}(5.98 \times 10^{24})(100)}{6.38 \times 10^6}$

$E_p = -6.25 \times 10^9\ J$

$E_p = gmr$
$W = mgh$
Obviously:)!

$E_p = mgh$
$E_p = mg(0)$
$E_p = 0\ J$

$mgh = E_{pf} - E_{pi}\ ; r < 10000m$



$F_g = \frac{Gm_1m_2}{r^2}$

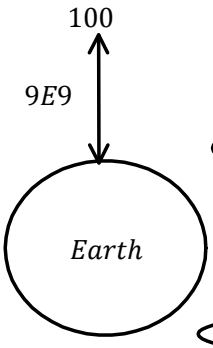
$F_g = \frac{6.67E-11(5.98E24)(100)}{(6.38E6+250000)^2}$

$F_g = 907.4\ N$

$E_p = -\frac{GMm}{r}$

$E_p = -\frac{6.67E-11(5.98E24)(100}{6.38E6+250000}$

$E_p = -6.01E9\ J$



$F_g = \frac{Gm_1m_2}{r^2}$

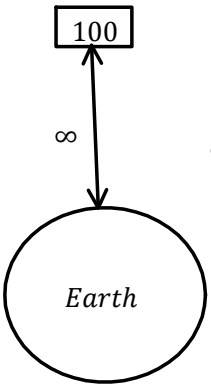
$F_g = \frac{6.67E-11(5.98E24)(100)}{(6.38E6+9E9)^2}$

$F_g = 4.92E-4\ N$

$E_p = -\frac{GMm}{r}$

$E_p = -\frac{6.67E-11(5.98E24)(100)}{6.38E6+9E9}$

$E_p = -2.58E6\ J$



$F_g = \frac{Gm_1m_2}{r^2}$

$F_g = \frac{6.67E-11(5.98E24)(100)}{(6.38E6+\infty)^2}$

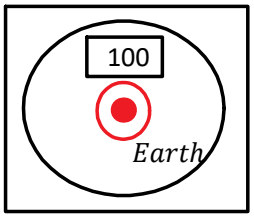
$F_g = 0\ N$

$E_{p\infty} = -\frac{GMm}{r}$

$E_{p\infty} = -\frac{6.67E-11(5.98E24)(100)}{6.38E6+\infty}$

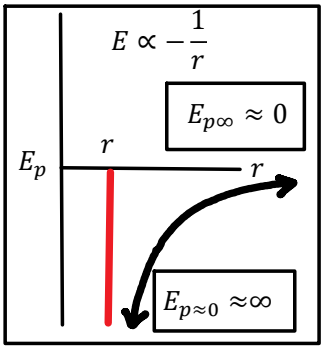
$E_{p\infty} = 0\ J$

E_p : Farther from Earth less negative!



Near Centre
$F_g \approx \infty N$
Surface
$F_g = 980N$
Far Away
$F_g \approx 0.0005N$
At Infinity
$F_g \approx 0N$

Weaker



Near Centre
$E_p \approx -\infty J$
Surface
$E_p \approx -6E9J$
Far Away
$E_p \approx -3E6J$
At Infinity
$E_p \approx 0J$