Class Notes – Lecture 21 (Ihas) 3 November 2009

Review end of Chapter 7

$\underbrace{F=ma}$ accelerations
real forces (always rep. interactions b/w objects)

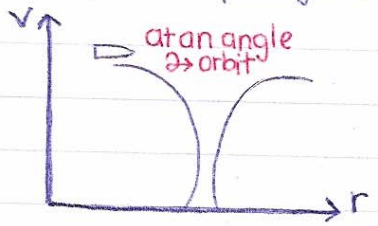
Newton's Law of Universal Gravitation

$\left.\begin{array}{l} \propto m_1 m_2 \\ \frac{1}{\propto} \sqrt{d} \end{array}\right\} F = G\frac{m_1 m_2}{r^2}$; $G = 6.673E{-}11 \frac{Nm^2}{kg^2}$

Cavendish experiment: amplify the effect of torque

CQ1: $g \sim \frac{1}{r^2}$, $\frac{g}{4} \sim \frac{1}{4r^2} = \frac{1}{(2r)^2}$; $r = 6000\,km$

$PE = -G\frac{M_E m}{r}$ for objects high above earth's surface



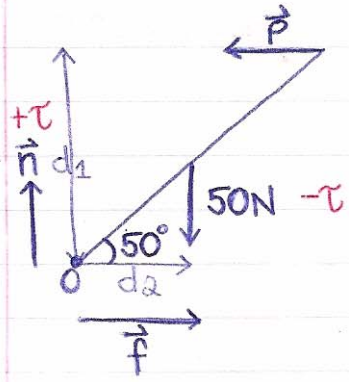
Escape speed: $v = \sqrt{2GM_e/R_e}$
Determines what gases can be trapped in the atmosphere
$v_{esc} \propto R_E$
No Kepler's Laws

Chapter 8

$\tau = rF\sin\theta = Fd$ $\quad d = r\sin\theta$
operates ⊥ to the lever arm $\quad$ operates ⊥ to the force

Equilibrium

$\Sigma \vec{F} = 0$
$\Sigma \tau = 0$



CQ2: weight = $-d_2 50 = \frac{L}{2}\cos 40^\circ \cdot 50$

wall = $+d_1 P = L \sin 40^\circ \cdot P$

$\Sigma = 0$; $P = \underbrace{30N}_{25 \cot 40^\circ}$