OCR Mechanics 2 Module Revision Sheet

The M2 exam is 1 hour 30 minutes long. You are allowed a graphics calculator.

Before you go into the exam make sure you are fully aware of the contents of the formula booklet you receive. Also be sure not to panic; it is not uncommon to get stuck on a question (I've been there!). Just continue with what you can do and return at the end to the question(s) you have found hard. If you have time check all your work, especially the first question you attempted. . . always an area prone to error.

$\mathscr{J}.\mathscr{M}.\mathscr{S}.$

Moments

- Blah

Projectiles

- Blah

Circular Motion

- ω is the angular speed of a particle; it is the rate of change of the angle at the centre of the circle $\omega \equiv \frac{d\theta}{dt}$. It is the arc length formula differentiated wrt time.

$$S = r\theta$$
$$\frac{d}{dt}(S) = \frac{d}{dt}(r\theta)$$
$$\frac{d}{dt}(S) = r\frac{d}{dt}(\theta) \text{ because } r \text{ is constant}$$
$$v = r\omega.$$

  Note that the formula $S = r\theta$ is only valid for radians, so ω is measured in *radians* per second.[1]

- The acceleration of a particle travelling in a circle is

$$a = \frac{v^2}{r} = r\omega^2.$$

  The acceleration is towards the centre of the circle. [Make sure you can derive $a = \frac{v^2}{r}$ if you are going for Oxbridge.] Since $F = ma$ we also have

$$F = \frac{mv^2}{r} = mr\omega^2.$$

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[1]Also worth noting $T = \frac{2\pi}{\omega}$ and $T = \frac{1}{f}$.