**Mechanics Rules & Definitions**

Rules in italics are essential to know - there is a high likelihood of you needing these in the exam.

* Velocity is speed and the direction of motion.
* Acceleration is the rate of change of velocity. An object is accelerating when it is speeding up, slowing down or changing direction.
* Newton’s first law: *An object will remain at constant velocity unless there is an unbalanced outside force acting on it.*
* Newton’s second law: If there is an unbalanced force on the object it will accelerate. Ftotal=ma.
* Equilibrium: *An object is in equilibrium when the torques balance and the forces are balanced.*
* Circular motion: *An object will move in constant circular motion if the net force acting on it is towards the centre of the circle*. The net force is called the centripetal force.
* Conservation of momentum: *Total momentum is the same before and after a collision if there are no external forces acting.*
* Conservation of energy: Energy can change from one type to another and from one place to another, but the total amount of energy always stays the same.
* Projectile motion: The horizontal velocity is constant because there are no forces acting in the horizontal direction. In the vertical direction a projectile accelerates towards the ground at a constant rate.
* Impulse: The change in momentum in a collision is equal to the force acting times the time taken for the collision. If the time taken for the collision is increased, the force can be decreased.