G481 - Mechanics

Definition List

SPEED	Rate of change of distance. (ms^{-1})

AVERAGE SPEED	$\frac{\text{Total distance travelled}}{\text{time taken}}$	(ms^{-1})

DISPLACEMENT	Distance moved in a stated direction. (m)

VELOCITY	Rate of change of displacement. (ms^{-1})

SCALAR QUANTITY	A quantity with magnitude (size) but not direction.

VECTOR QUANTITY	A quantity with magnitude (size) and direction.

ACCELERATION	Rate of change of velocity. (ms^{-2})

THINKING DISTANCE	Distance travelled from when the driver sees a problem and the brakes are applied.

BRAKING DISTANCE	Distance travelled from when the driver starts braking to when the car stops.

STOPPING DISTANCE	Distance travelled from when the driver sees a problem to when the car stops (thinking distance + stopping distance).

DENSITY	Mass per unit volume. ($kg\ m^{-3}$) (symbol = ρ rho)

NEWTON	One Newton is the force that causes a mass of one kilogram to have an acceleration of one metre per second squared. (N)

WEIGHT The weight of an object is the gravitational force acting on the object. (N)

CENTRE OF GRAVITY A point where the entire weight of an object appears to act.

DRAG The resistive force experienced by an object moving through a fluid.

TERMINAL VELOCITY At terminal velocity drag = weight. (ms^{-1})

EQUILIBRIUM At equilibrium net: resultant force = 0 and net moment = 0.

MOMENT OF A FORCE The force multiplied by the perpendicular distance from a specified point. (Nm)

PRINCIPLE OF MOMENTS If an object is balanced, then the sum of the clockwise moments about a pivot is equal to the sum of the anticlockwise moments about the same pivot.

COUPLE A couple is a pair of equal and parallel but opposite forces, which tends to produce rotation only.

TORQUE OF A COUPLE The force multiplied by the perpendicular distance between the forces. (Nm)

PRESSURE Force per unit area. (Pa)

WORK DONE The force multiplied by distance moved in the direction of the force. (J)

JOULE The work done by a force of one newton acting over a distance of one metre.

POTENTIAL ENERGY The stored energy associated with a force due to the position of a body (J).

GRAVITATIONAL POTENTIAL ENERGY	The stored energy associated with the weight of a body at a given vertical height (J).

KINETIC ENERGY	The energy of a body due to the motion of the body (J).

WORK-ENERGY PRINCIPLE	The total work done by all the forces acting on a body (i.e. the resultant force) is equal to the increase in kinetic energy of the body.

CONSERVATION OF ENERGY	Energy cannot be created or destroyed, it can only be transformed into other forms.

POWER	Rate of work done with respect to time (W or J/s).

WATT	One Joule per second.

HOOKE'S LAW	Extension of material is proportional to force applied to material.

TENSILE STRESS	The force per unit cross-sectional area of a material.

TENSILE STRAIN	The extension per unit length of a material.

YOUNG'S MODULUS	Tensile stress per unit tensile strain.

ULTIMATE TENSILE STRENGTH	The maximum stress a material can withstand.