Contents

1 Useful Physics Formulae

1.1 Energy

1.1.1 Conservation of energy

Explanation: The final total energy of a system (the sum of all kinetic (K_f) and potential (U_f) energy terms) will be exactly the same as the initial total energy plus the work (W) done on the system by an external force.

$$\Sigma U_i + \Sigma K_i + W = \Sigma U_f + \Sigma K_f$$

1.1.2 Work done by a force

Explanation: If a force acts on an object while the object is moving, then the work done on the object is just the product of the force F, the total distance traveled d, and the cosine of the angle between the displacement and the force (θ). This is true even if the motion was not in a straight line; d is just the total change in position.

$$W = Fdcos(\theta)$$

1.1.3 Relationship between work and potential energy

Explanation: The work done by a conservative force is simply the change in **potential energy**, albeit with a negative sign in front (since the energy *lost* by the potential is *gained* by the system, or vice versa).

$$W = -\Delta U = -(U_f - U_i)$$