|  |  |  |
| --- | --- | --- |
| W = m g |  | W = weight (N)  m = mass (kg)  g = gravitational field strength (N/kg) |
| m  g  W |  |

weight = mass x gravitational field strength

|  |  |  |
| --- | --- | --- |
| W = F s |  | W = work done (J)  F = force (N)  s = distance (m) |
| F  s  W |  |

Work done = force x distance (along the line of action of the force)

|  |  |  |
| --- | --- | --- |
| F = k e |  | F = force (N)  k = constant (N/m)  e = extension (m) |
| k  e  F |  |

Force applied to a spring = spring constant x extension

|  |  |  |
| --- | --- | --- |
| s = v t |  | s = distance travelled (m)  v = speed (m/s)  t = time (s) |
| v  t  s |  |

Distance travelled = speed x time

|  |  |  |
| --- | --- | --- |
| a =  ∆v  t |  | a = acceleration (m/s2)  ∆v = change in velocity (m/s)  t = time taken (s) |
| a  t  ∆v |  |

Acceleration = change in velocity

Time taken

|  |  |  |
| --- | --- | --- |
| F = m a |  | F = force (N)  m = mass (kg)  a = acceleration (m/s2) |
| m  a  F |  |

Resultant force = mass x acceleration

|  |  |  |
| --- | --- | --- |
| p = m v |  | p = momentum (kg m/s)  m = mass (kg)  v = velocity (m/s) |
| m  v  p |  |

Momentum = mass x velocity

|  |  |  |
| --- | --- | --- |
| Ek = ½ m v2 |  | Ek = kinetic energy (J)  m = mass (kg)  v2 = (speed) 2 (m/s) |
| Ek |  |

v2

m

½

Kinetic energy = 0.5 x mass x speed

|  |  |  |
| --- | --- | --- |
| Ep = m g h |  | Ep = gravitational potential energy (J)  m = mass (kg)  g = gravitational field strength (N/kg)  h = height (m) |
| h  g  m  Ep |  |

Gravitational potential energy = mass x gravitational field strength x height

|  |  |  |
| --- | --- | --- |
| P = |  | P = power (kWh)  E = energy transferred (kw)  t = time (h) |
| P  t  E |  |

Power = energy transferred

time

|  |  |  |
| --- | --- | --- |
| P = |  | P = power (W)  W = work done (J)  t = time (s) |
| P  t  E |  |

Power = work done

time

|  |  |  |
| --- | --- | --- |
|  |  | Efficiency (%)  Total output energy transfer (J)  Total input energy transfer (J) |
|  |  |

Efficiency = total output energy transfer

total input energy transfer

|  |  |  |
| --- | --- | --- |
|  |  | Efficiency (%)  Useful power output (J)  total power output (J) |
|  |  |

Efficiency = useful power output

total power output

|  |  |  |
| --- | --- | --- |
| v = f  [Image result for lamda](https://www.google.co.uk/url?sa=i&rct=j&q=&esrc=s&source=images&cd=&cad=rja&uact=8&ved=0ahUKEwjAtZ_RnLjUAhUE1RQKHbhqC_YQjRwIBw&url=https%3A%2F%2Fcommons.wikimedia.org%2Fwiki%2FFile%3AGreek_lc_lamda.svg&psig=AFQjCNGAY1eRlNQ3YGOZZ8iEzl21NBkcJA&ust=1497354042012023) | [Image result for lamda](https://www.google.co.uk/url?sa=i&rct=j&q=&esrc=s&source=images&cd=&cad=rja&uact=8&ved=0ahUKEwjAtZ_RnLjUAhUE1RQKHbhqC_YQjRwIBw&url=https%3A%2F%2Fcommons.wikimedia.org%2Fwiki%2FFile%3AGreek_lc_lamda.svg&psig=AFQjCNGAY1eRlNQ3YGOZZ8iEzl21NBkcJA&ust=1497354042012023) | v = wave speed (m/s)  f = frequency (hz)  = wavelength (m) |
| f  [Image result for lamda](https://www.google.co.uk/url?sa=i&rct=j&q=&esrc=s&source=images&cd=&cad=rja&uact=8&ved=0ahUKEwjAtZ_RnLjUAhUE1RQKHbhqC_YQjRwIBw&url=https%3A%2F%2Fcommons.wikimedia.org%2Fwiki%2FFile%3AGreek_lc_lamda.svg&psig=AFQjCNGAY1eRlNQ3YGOZZ8iEzl21NBkcJA&ust=1497354042012023)  v |  |

Wave speed = frequency x wavelength

|  |  |  |
| --- | --- | --- |
| Q = I t |  | Q = charge flow (C)  I = current (A)  t = time (s) |
| I  t  Q |  |

Charge flow = current x time

|  |  |  |
| --- | --- | --- |
| V = I R |  | V = potential difference (v)  I = current (A)  R = resistance (Ω) |
| I  R  V |  |

Potential difference = current x resistance

|  |  |  |
| --- | --- | --- |
| P = V I |  | P = power (W)  V = potential difference (V)  I = resistance (A) |
| V  I  P |  |

Power = potential difference x current

|  |  |  |
| --- | --- | --- |
| P = I2 R |  | P = power (W)  I2 = potential difference (V)  R = resistance (A) |
| m  g  W |  |

Power = (current)2 x resistance

|  |  |  |
| --- | --- | --- |
| E = P t |  | E = energy transferred (kWh)  P = power (W)  t = time (h) |
| P  t  E |  |

Energy transferred = power x time

|  |  |  |
| --- | --- | --- |
| E = Q V |  | E = energy transferred (J)  Q = charge flow (C)  V = potential difference (V) |
| m  g  W |  |

Energy transferred = charge flow x potential difference

|  |  |  |
| --- | --- | --- |
| p = |  | p = density (kg/m3)  m = mass (kg)  V = volume (m3) |
| m  g  W |  |

Density = mass

volume