Energy

kE = 1/2mv2

F = ∆p/∆t

∆GPE = mg∆h

W = Fd = ∆E

W = Fd

(%) efficiency = (useful energy output) (total energy input) × 100%

(%) efficiency = (useful power output) (total power input) × 100%

P = W / t

P = ∆E/ t

p = F / A

∆p = ρg∆h

T (in K) = θ (in °C) + 273

pV = constant

c = ∆E / m∆θ

Forces

∆p = ρg∆h (liquid pressure)

Pressure = force / area

W = m x g

kE = 1/2mv2

a = v-u / t

R.F = F.F - B.F

R.F or F = m x a

R.F or F = m x a = m x (v-u/t) = mv - mu /t = change in momentum/t

F = ∆ momentum or P/∆t

impulse = R.F or F x ∆t

impulse = change in momentum/ change in time

m1u1+ m2u2 = m1v1+ m2v2 (conservation of momentum)

m1u1 + m2u2 = (m1+m2) x V (when objects stick together)

Thermal physics

kE = 1/2mv2

F = ∆p/∆t

p is inversely proportional to V

W = Fd = ∆E

p1v1 = p2v2

c = ∆ E m∆θ

specific heat capacity = change in thermal energy/mass x change in temperature

P = ∆E/ t

p = F / A

∆p = ρg∆h

T (in K) = θ (in °C) + 273

pV = constant

c = ∆E / m∆θ

waves

where n is the refractive index, V is speed of light

n = sin(i)/sin(r)

n = 1/ sin(c)

n2/n1 = V1/V2 = sin(i)/sin(r)

n (in air) = 1

V (in air) = 3x 10^8

v = f λ

State the approximate range of frequencies audible to humans as 20Hz to 20000Hz

speed of sound in air is approximately 330–350m/ s

Define ultrasound as sound with a frequency higher than 20kHz

Electrical quantities

potential difference is the work done by a unit charge passing through a component, measured between two points in volts (V)

electromotive force (e.m.f.) is the electrical work done by a source in moving a unit charge around a complete circuit measured in volts (V)

kilowatt-hour (kWh) 1000 watts per one hour	1 kWh = 3.6 x 10^6 J

resistance, the opposition of a component to the flow of electric current through it measured in ohms (Ω)

charge is measured in coulombs, where one coloumb is he charge on 6.24 x 10^18 electrons

R1/R2 = V1/V2

R total = R1 x R2 = R1 + R2 or product/sum

resistance is directly proportional to length (b) resistance is inversely proportional to cross-sectional area	the p.d. across an arrangement of parallel resistances is the same as the p.d. across one branch in the arrangement of the parallel resistances
the sum of the currents entering a junction in a parallel circuit is equal to the sum of the currents that leave the junction	the total p.d. across the components in a series circuit is equal to the sum of the individual p.d.s across each component

Space Physics

v = 2π r/T	where r is the average radius of the orbit and T is the orbital period; recall and use this equation
one light-year is equal to 9.5 × 1015m	astronomical distances can be measured in light-years, where one light-year is the distance travelled in (the vacuum of) space by light in one year
the diameter of the Milky Way is approximately 100000 light-years	
H0 = v d	Define the Hubble constant H0 as the ratio of the speed at which the galaxy is moving away from the Earth to its distance from the Earth
d/v = 1/H0	represents an estimate for the age of the Universe
speed of light in a vacuum is 3 × 10^8	d = v/t

Electricity

I = Q / t
emf = W/Q
pd = W/Q
R = V/I
P = IV
E = IVt
R1/R2 = V1/V2
R total = R1 x R2 = R1 + R2 or product/sum

Motion

Density = Mass/ Volume
(constant) S = distance / time
a = v-u / t
D (while accelerating) = v+u x t
D = area under the graph
W = m x g
R.F/ F = m x a
R.F = F.F - B.F
Moment = force x perpendicular distance from the pivot
Pressure = force / area
(Liquid) pressure = Density x g x height
X = L new - L original
F = k/x , where k is the spring constant