Oxford Cambridge and RSA

June 2022 only

GCSE (9–1) Physics B (Twenty First Century Science)

J259 01/02/03/04

Data Sheet

946837793 2

INSTRUCTIONS
- Do **not** send this Data Sheet for marking. Keep it in the centre or recycle it.

INFORMATION
- This Data Sheet is for the June 2022 examination series only.
- This Data Sheet has **4** pages.

Equations in physics

Key:

HT = Higher Tier only

P1 Radiation and waves

wave speed = frequency × wavelength

P2 Sustainable energy

energy transferred = power × time

$$\text{efficiency} = \frac{\text{useful energy transferred}}{\text{total energy transferred}}$$

P3 Electric circuits

charge = current × time

potential difference = current × resistance

$$\text{potential difference} = \frac{\text{work done (energy transferred)}}{\text{charge}}$$

$$\text{power} = \frac{\text{energy}}{\text{time}}$$

energy transferred (work done) = charge flow × potential difference

power = potential difference × current

power = $(\text{current})^2$ × resistance

HT force = magnetic flux density × current × length of conductor

potential difference across primary coil × current in primary coil =
potential difference across secondary coil × current in secondary coil

HT $$\frac{\text{potential difference across primary coil}}{\text{potential difference across secondary coil}} = \frac{\text{number of turns in primary coil}}{\text{number of turns in secondary coil}}$$

P4 Explaining motion

weight = mass × gravitational field strength, g

$$\text{average speed} = \frac{\text{distance}}{\text{time}}$$

$$\text{acceleration} = \frac{\text{change in speed}}{\text{time taken}}$$

$(\text{final speed})^2 - (\text{initial speed})^2 = 2 \times \text{acceleration} \times \text{distance}$

HT momentum = mass × velocity

HT change in momentum = resultant force × time for which it acts

moment of a force = force × distance (normal to direction of the force)

force = mass × acceleration

work done = force × distance (along the line of action of the force)

kinetic energy = $0.5 \times \text{mass} \times (\text{speed})^2$

(in a gravity field) gravitational potential energy = mass × gravitational field strength, g × height

$$\text{power} = \frac{\text{energy transferred}}{\text{time}}$$

P6 Matter – models and explanations

$$\text{density} = \frac{\text{mass}}{\text{volume}}$$

change in internal energy = mass × specific heat capacity × change in temperature

energy to cause a change of state = mass × specific latent heat

force exerted by a spring = extension × spring constant

energy stored in a stretched spring = $\frac{1}{2} \times \text{spring constant} \times (\text{extension})^2$

$$\text{pressure} = \frac{\text{force normal to a surface}}{\text{area of that surface}}$$

for gases: pressure × volume = constant
(for a given mass of gas and at a constant temperature)

HT pressure due to a column of liquid = height of column × density of liquid × g