Oxford Cambridge and RSA

GCSE Physics B (Twenty First Century Science)

J259/03 Depth in physics (Higher Tier)

Question Set 4

1 **(a)** The maximum speed of a racing car is 320 km / hour.

Calculate this speed in metres per second.

Maximum speed = ... m / s **[2]**

(b) **(i)** A different racing car is moving with a speed of 80 m / s.

Before turning a corner, it slows down to a speed of 20 m / s.

While slowing down, it has a constant acceleration of $-40\,m/s^2$.

Calculate the distance that it travels as it slows down.

Distance travelled = ... m **[3]**

(ii) The car moves at a constant speed around the corner.

Explain why its velocity is changing as it moves around the corner.

[2]

Total Marks for Question Set 4: 7

Resource Materials

Equations in Physics

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

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

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

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

energy stored in a stretched spring = ½ × spring constant × $(\text{extension})^2$

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

Higher tier only –

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

force = magnetic flux density × current × length of conductor

potential difference across primary coil ÷ potential difference across secondary coil = number of turns in primary coil ÷ number of turns in secondary coil

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