Oxford Cambridge and RSA

GCSE Physics B (Twenty First Century Science)

J259/03 Depth in physics (Higher Tier)

Question Set 32

1 Jane is learning to drive.

(a) In a driving lesson, Jane's car is moving at 25 mph when she is asked to stop.

The car comes to a stop in a total time of 2.5 s.

Calculate the deceleration of the car as it stops.

Use the approximation: 1 mph ≈ 0.5 m/s

Deceleration = ... m/s^2 **[4]**

(b) In the driving test, Jane's car is moving at a speed of 16 m/s when she is asked to complete an emergency stop.

The car comes to a stop in a total time of 2.2 s.

Estimate the force acting on the car during the emergency stop.

Use your own estimate of the mass of the car to complete the calculation.

Force = ...N **[4]**

Total Marks for Question Set 32: 8

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

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