Oxford Cambridge and RSA

GCSE Physics A (Gateway)

J249/03 Physics A P1-P4 and P9 (Higher Tier)

Question Set 17

17 A student rubs a balloon against a scarf.

(a)* (1) Describe how the balloon becomes charged.

(2) Suggest how you could show that the balloon is charged.

What would you expect to see and why?

[6]

(1) when you rub the balloon against the scarf, all the electrons from the scarf move from the scarf to the balloon. The balloon now has a negative charge due to all the electrons that have moved across.

(2) you can show that the balloon has been charged by holding it up to a positively charged object. Opposites attract therefore our balloon should be attracted to this positively charged object showing that it is negatively charged

(b) Current is the rate of flow of electrical charge in a circuit.

A current of 40 mA transfers a charge of 3.6 C.

Calculate the time to transfer this charge.

Show your working.

$Q = It$

$3.6 = 40 \times 10^{-3} t$

$t = \frac{3.6}{40 \times 10^{-3}} = 90$

Answer = 90 seconds

[3]

Total Marks for Question Set 24: 9

Equations in physics

(final velocity)^2 – (initial velocity)^2 = 2 × acceleration × distance

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

thermal energy for a change in state = mass × specific latent heat

energy transferred in stretching = 0.5 × spring constant × (extension)^2

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

Higher tier only –

force on a conductor (at right angles to a magnetic field) carrying a current = magnetic flux density × current × length