OCR
Oxford Cambridge and RSA

GCSE Physics B (Twenty First Century Science)

J259/04 Depth in physics (Higher Tier)

Question Set 16

Multiple Choice Questions

1 Eve is investigating the force on a current-carrying wire when it is placed in a magnetic field, as shown in **Fig. 7.1**.

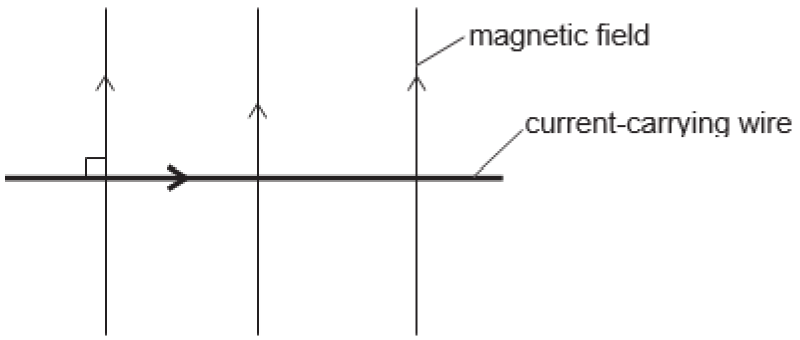

Fig. 7.1

The direction of the current in the wire is from left to right.

The magnetic field of the magnet is in the plane of the paper and perpendicular to the current- carrying wire.

The current-carrying wire moves.

(a) **(i)** Use Fleming's left-hand rule to predict the **direction** in which the **wire** moves.

Tick (✓) **one** box.

Up along the plane of the paper. ☐

Down along the plane of the paper. ☐

Out of plane of paper. ☐

Into the plane of paper. ☐

[1]

(ii) Describe how you used Fleming's left-hand rule to find the direction in which the wire moves. **[1]**

(b) Explain **why** the current-carrying wire moves.

Use ideas about magnetic fields in your answer. **[2]**

(c) The current in the wire is 2.0 A. The magnetic flux density is 0.060 T.

Calculate the force acting on the 4.5 cm length of the wire.

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

(d) Explain what happens to the size of the force in **(c)** when the current in the wire is doubled. **[2]**

Total Marks for Question Set 16: 10

Resource Materials

Question Set No: 16

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 × acceleration × 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 ×

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