Oxford Cambridge and RSA

GCSE Physics A (Gateway)

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

Question Set 21

21 (a) (i) Name the rule which can be used to predict the direction of the force perpendicular to a current-carrying conductor in a magnetic field.

Fleming's left hand rule

[1]

A student places four wires of different lengths (**A**, **B**, **C** and **D**) perpendicular to different magnetic fields with different currents flowing.

Look at the table of the results.

Wire	Magnetic flux density (T)	Current (A)	Length (m)
A	0.10	2.5	0.50
B	0.15	2.0	0.75
C	0.20	4.5	0.25
D	0.25	5.0	1.00

Use the results to show that wire **D** experiences the highest force.

Show your working. $F = BIL$

A: $0.10 \times 2.5 \times 0.5 = 0.125$

B: $0.15 \times 2 \times 0.75 = 0.225$

C: $0.2 \times 4.5 \times 0.25 = 0.225$

D: $0.25 \times 5.0 \times 1 = 1.25$

∴ D experiences the highest force

[2]

(b) (i) The student decides to build a model transformer.

The transformer is a step-up transformer which doubles the input voltage.

Describe how she could build this step-up transformer in a science laboratory.

Turn the wire around one side of the iron core, these are the primary coils. On the other side of the iron core wrap another wire twice the number of times as the primary coil, this is the secondary coil. The student then has to connect the primary coil to an a.c power supply.

[4]

(ii) Suggest **one** risk associated with this experiment and how it can be reduced.

high voltages can be produced that are dangerous. this can be reduced by insulating the wire.

[2]

(c) Describe how a microphone works.

A microphone converts changes in pressure in sound waves to variations in current in circuits.

[2]

Total Marks for Question Set 21: 11