Electromagnetic induction – 2019 Nov IGCSE

1. 0625/31/O/N/19/No.11

A student is experimenting with electromagnetic effects.

(a) Describe an experiment, using any standard laboratory equipment, to demonstrate electromagnetic induction. You may draw a diagram.

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.....

..... [3]

(b) Fig. 11.1 shows a transformer connected to an input voltage of 12 V a.c.

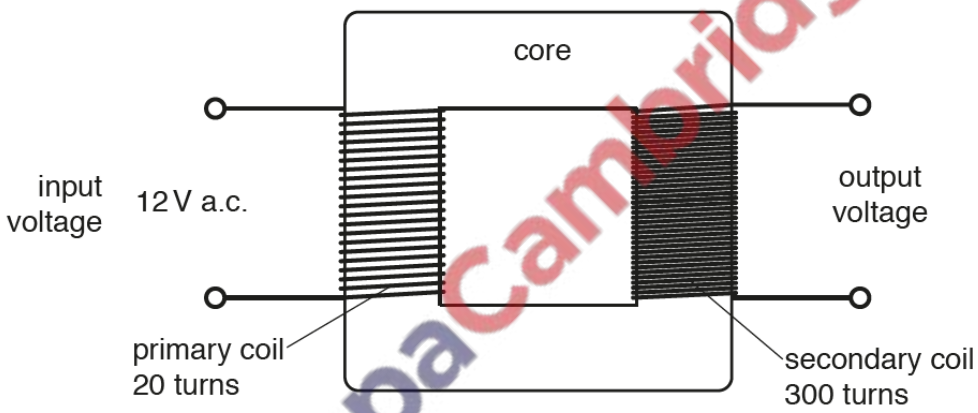

Fig. 11.1

(i) State the name of a suitable material for the core of the transformer.

..... [1]

(ii) Explain how the diagram in Fig. 11.1 shows a step-up transformer.

.....

..... [1]

(iii) Using the information in Fig. 11.1, calculate the output voltage of the transformer.

output voltage = ...V [3]

[Total: 8]

2. 0625/33/O/N/19/No.11

Fig. 11.1 shows a diagram of an electrical device. The diagram is **not** complete. The coil rotates in a magnetic field when connected to a d.c. power supply.

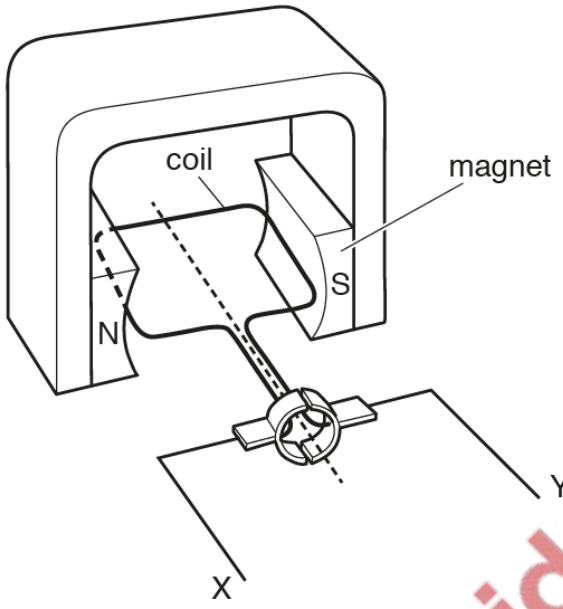

Fig. 11.1

(a) (i) Explain the meaning of the term *d.c.*

.....

..... [1]

(ii) Complete the diagram in Fig. 11.1 by drawing the symbols for two cells in series **and** a switch to make a circuit. [2]

(b) (i) State the name of the electrical device shown in Fig. 11.1.

..... [1]

(ii) State **two** changes to the electrical device that will make the coil in the device rotate faster.

1. .....

2. .....

[2]

[Total: 6]

3. 0625/42/O/N/19/No.7

(a) Fig. 7.1 shows a coil of wire wound on a thin plastic cylinder. The plastic has no effect on any magnetic field. The galvanometer is extremely sensitive.

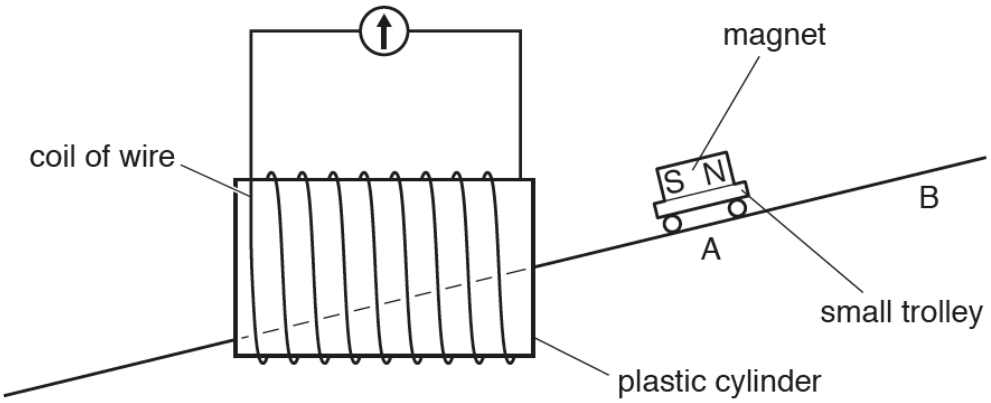

Fig. 7.1

A magnet is fixed to a small trolley that runs without friction on a track through the cylinder and coil.

(i) The trolley is released from point A so it runs through the coil from right to left.

State and explain what is observed on the galvanometer.

.....

.....

..... [2]

(ii) The trolley is now released from point B so it runs through the coil from right to left again.

State what is observed on the galvanometer and explain why it is different to your answer in **(a)(i)**.

.....

.....

..... [2]

(b) Fig. 7.2 shows an extension lead used to supply power to a 3 kW electric heater on a cool evening.

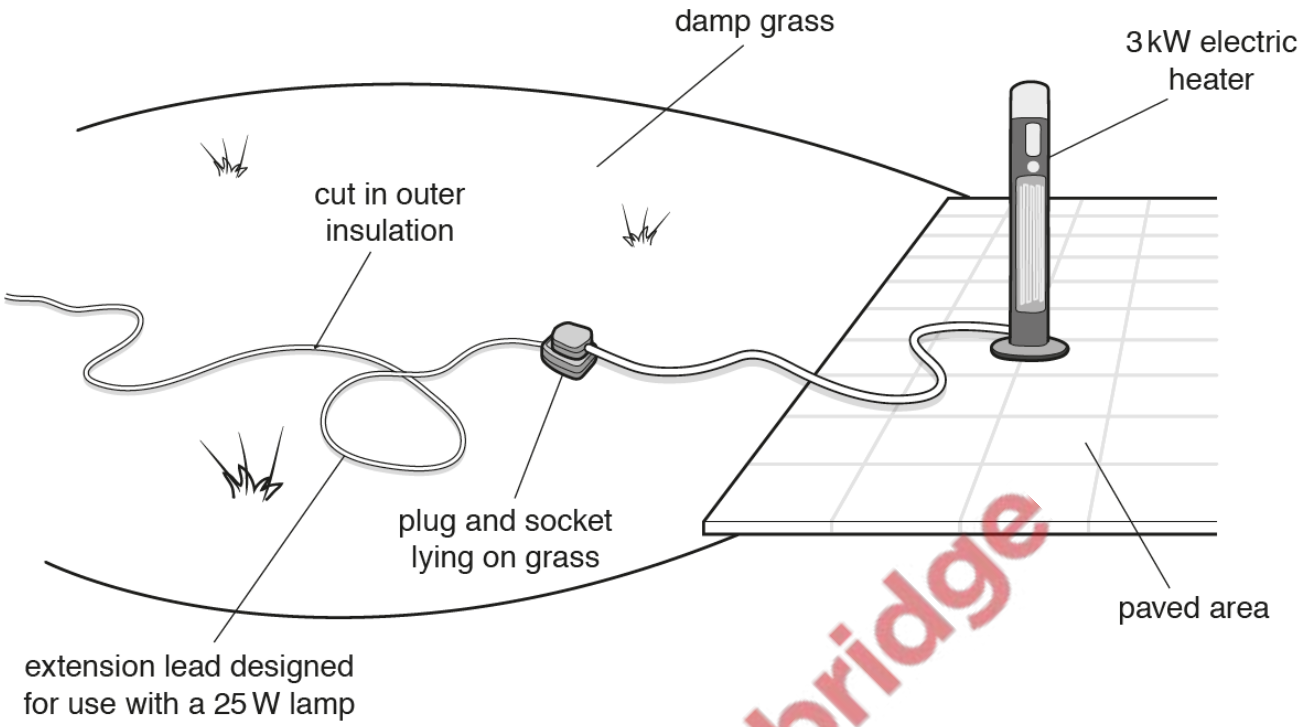

Fig. 7.2

State and explain three dangers with this arrangement.

danger 1 .....

.....

.....

danger 2 .....

.....

.....

danger 3 .....

.....

.....

[4]

[Total: 8]

(a) A magnet and a coil are attached separately to a door and a door frame as shown in Fig. 10.1.

The purpose of the arrangement is to activate a circuit connected to an LED indicator when the door is opening or closing. This will provide a visual indication that the door is being used.

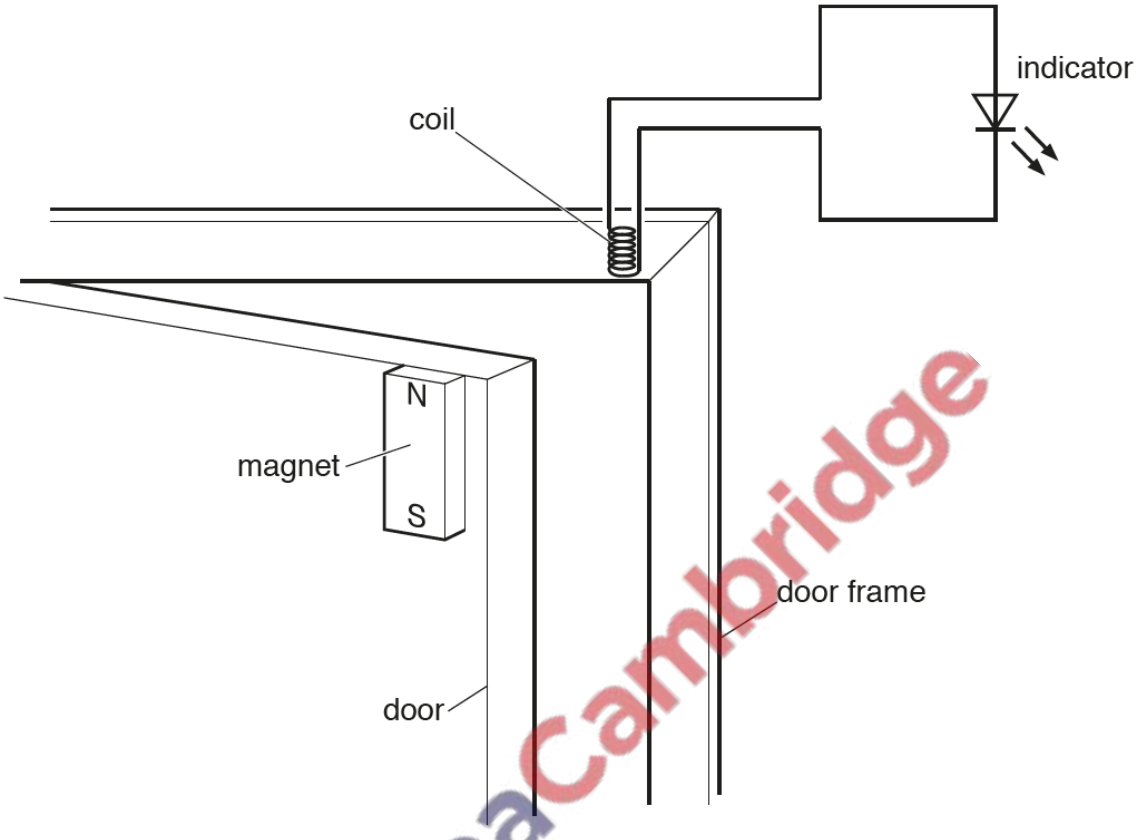

Fig. 10.1

Initially, the door is closed and then it is opened.

(i) Explain why the indicator comes on and then goes off when the door is opened.

.....

.....

..... [2]

(ii) The door shuts. The indicator comes on more brightly but for a shorter time than it did in **(i)**. Suggest and explain why this happens.

.....

.....

..... [2]

(b) A circuit breaker is recommended for use with an electric lawnmower.

State **two** reasons for this recommendation.

reason 1.....

.....

reason 2.....

.....

[2]

[Total: 6]