Magnetism – 2019 Nov IGCSE

1. 0625/31/O/N/19/No.9

A student is experimenting with magnets and electric charges.

(a) The student places a bar magnet on a piece of paper, as shown in Fig. 9.1.

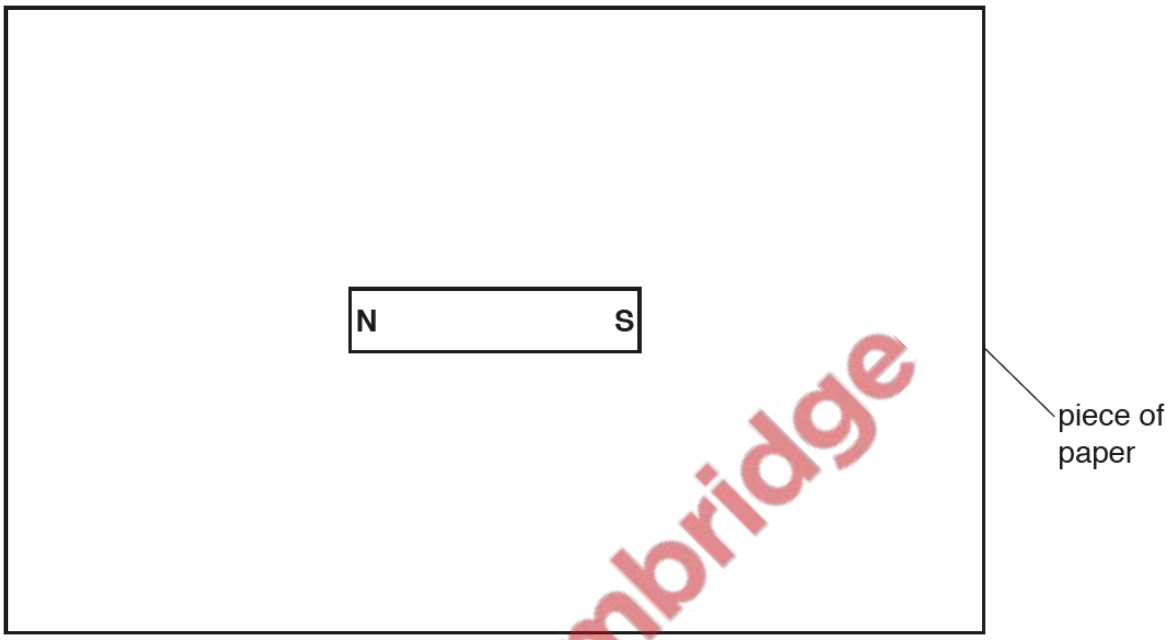

Fig. 9.1

Show the pattern of magnetic field lines around the bar magnet.

Draw **two** lines above the magnet and **two** lines below the magnet. Start and finish each line at a pole. Include **one** arrow to show the direction of the magnetic field. [3]

(b) The student rubs a plastic rod with a dry cloth. The plastic rod becomes positively charged.

Explain why the friction between the plastic and the cloth causes the plastic to become positively charged.

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..... [2]

(c) The student investigates the forces between two pairs of objects.

Fig. 9.2 and Fig. 9.3 show the pairs of objects.

State whether there is a force of attraction, a force of repulsion, or no force between the pairs of objects. Draw a **ring** around **one** phrase for each pair of objects.

1. two positively charged spheres

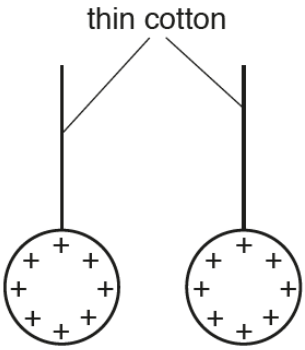

Fig. 9.2

force of attraction **force of repulsion** **no force**

2. a bar magnet and a bar of copper metal

Fig. 9.3

force of attraction **force of repulsion** **no force**

[2]

[Total: 7]

2. 0625/33/O/N/19/No.9

Two bar magnets are placed next to each other as shown in Fig. 9.1.

Fig. 9.1

Magnet A is slowly moved towards magnet B. This causes magnet B to move away from magnet A.

(a) (i) On Fig. 9.1, suggest the poles of each bar magnet.

Label N and S on each of the magnets. [1]

(ii) State the term used to describe the direction of the forces acting between magnet A and magnet B.

..... [1]

(iii) Magnet B is removed and replaced with a steel bar of the same size.

Describe what happens when magnet A is slowly moved towards the steel bar.

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..... [1]

(b) A student makes an electromagnet. He places an iron rod inside a coil of wire and connects the coil to a d.c. power supply, as shown in Fig. 9.2.

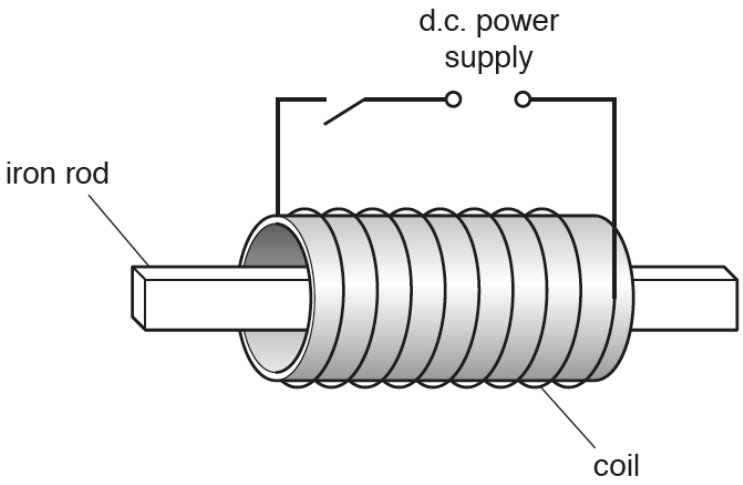

Fig. 9.2

(i) The switch is closed so there is a current in the coil. The S pole of a bar magnet is placed near to each end of the iron rod in turn.
Suggest what happens at each end of the iron rod and give a reason for your predictions.

Suggestions .....

.....

.....

reason .....

.....

[2]

(ii) The student removes the iron rod from the coil. The student places a steel rod inside the coil. He closes the switch and the steel rod becomes a magnet. He then opens the switch.

The student removes the steel rod and moves it close to the iron rod.

Describe and explain what happens as the two rods are moved close together.

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..... [2]

(iii) State **one** use for an electromagnet.

..... [1]

[Total: 8]