

5: Electromagnetism – Topic questions

Paper 3

The questions in this document have been compiled from a number of past papers, as indicated in the table below.

Use these questions to formatively assess your learners' understanding of this topic.

Question	Year	Series	Paper number
11	2016	June	31
10	2016	March	32
9	2016	November	31

The mark scheme for each question is provided at the end of the document.

You can find the complete question papers and the complete mark schemes (with additional notes where available) on the School Support Hub at www.cambridgeinternational.org/support

11 (a) Put a ring around the names of the metals which are attracted to magnets.

aluminium copper iron mercury magnesium steel tin

[2]

(b) Fig. 11.1 and Fig. 11.2 show magnetic field patterns for bar magnets.

On each diagram, correctly label the poles. Write **N** or **S**.

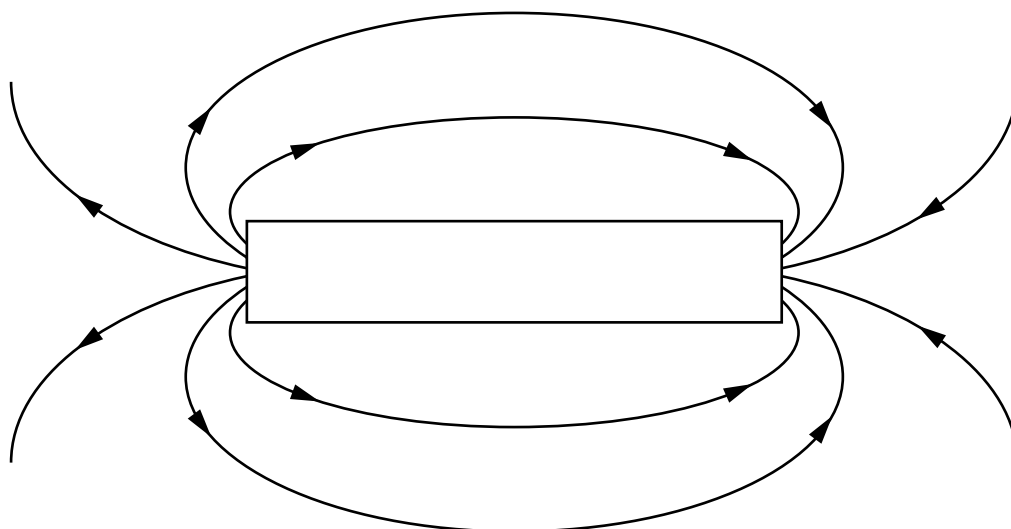


Fig. 11.1

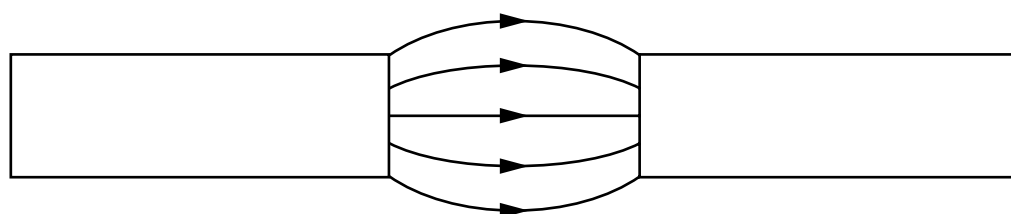


Fig. 11.2

[2]

(c) For each diagram in Fig. 11.3, describe the force acting, if any. Use the words *attraction*, *repulsion*, or *no force*.

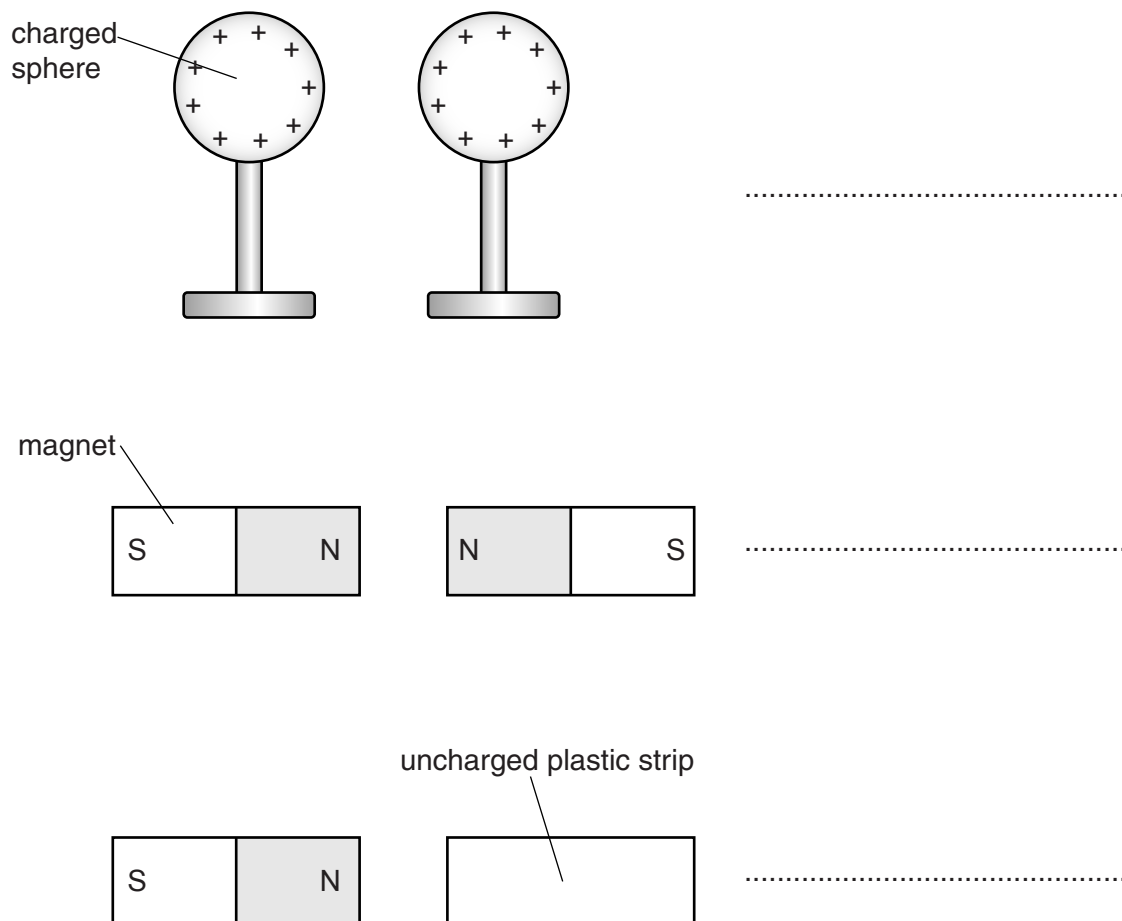


Fig. 11.3

[3]

[Total: 7]

10 A student uses a bar magnet to distinguish between an unlabelled magnet and an iron bar.

(a) Describe how the student identifies which is the magnet and which is the iron bar.

.....

.....

.....

.....[2]

(b) The student suspends the iron bar near to a coil, as shown in Fig. 10.1. The iron bar is free to move.

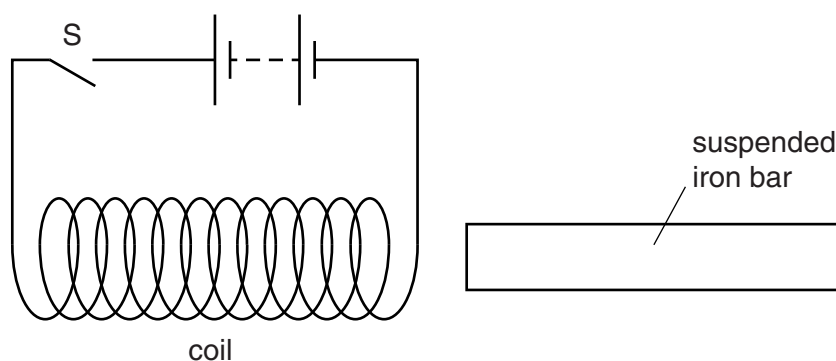


Fig. 10.1

Describe and explain what happens when the switch S is closed.

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.....

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.....

.....

.....[3]

(c) Fig. 10.2 shows a wire passing through a piece of card.

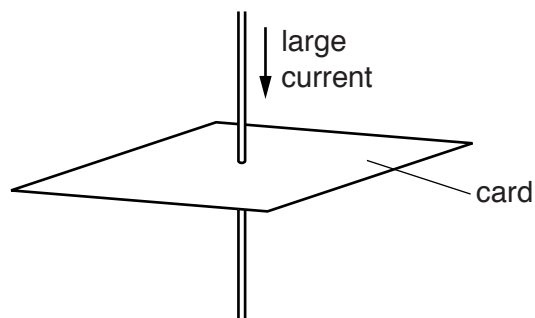


Fig. 10.2

There is a current in the wire in the direction of the arrow.

On Fig. 10.3, draw the pattern of the magnetic field lines due to the current in the wire. Include the direction of the field. [3]

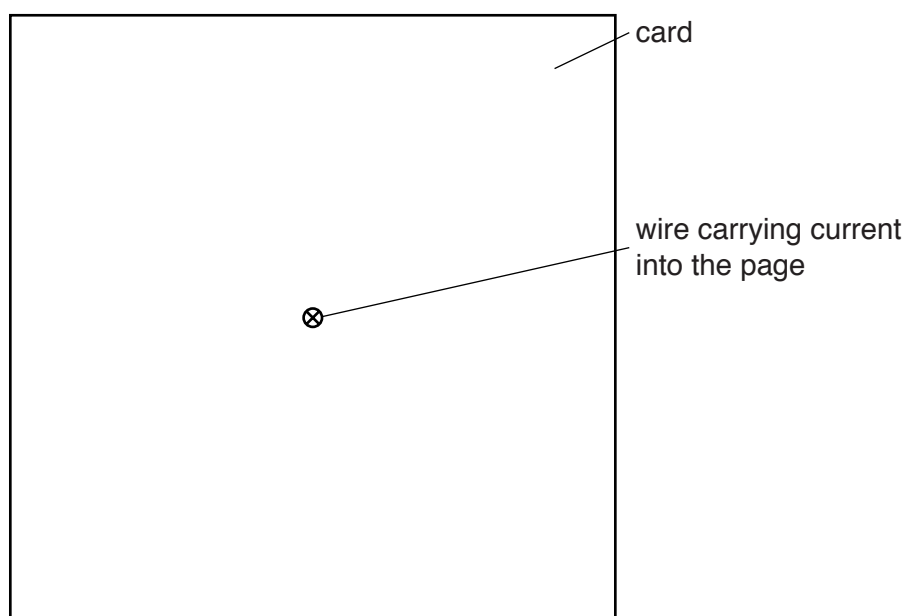


Fig. 10.3

[Total: 8]

9 The charger for a mobile phone contains a transformer. Fig. 9.1 shows a simple transformer.

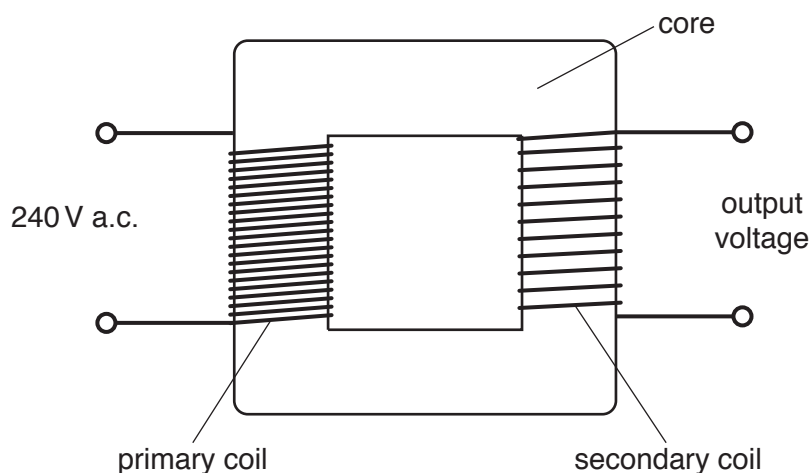


Fig. 9.1

(a) State the name of the material used in the core.

.....[1]

(b) (i) The transformer has 36 000 turns on the primary coil and 900 turns on the secondary coil. The input voltage is 240 V.
Calculate the output voltage.

output voltage = V [3]

(ii) State whether this transformer is *step-up* or *step-down*. Give a reason for your answer.

.....
.....[1]

(c) Transformers can produce high voltages for transmitting electricity from power stations to towns.

Describe the advantages of transmitting electricity at a high voltage.

.....
.....
.....[2]

[Total: 7]

Question	Answer	Mark
11 (a)	iron, steel	B2
11 (b)	N and S correctly labelled on Fig. 11.1	B1
	N and S correctly labelled on Fig. 11.2	B1
11 (c) (i)	repulsion	B1
11 (c) (ii)	repulsion	B1
11 (c) (iii)	<u>No force</u>	B1
Total: 7		
10 (a)	(bar) magnet is brought close to both ends (of one of unknown bars)	B1
	either If both ends attract it is an iron bar	B1
	or If one end repels it is a magnet	
10 (b)	iron bar moves toward coil	B1
	any two from:	
	• current in coil	B2
	• coil becomes an electromagnet	
	• soft iron attracted to coil	
	• iron bar becomes (an induced) magnet (with opposite pole nearest coil)	
10 (c)	at least one circle centred on wire (by eye)	M1
	two or more circles centred on wire (by eye)	B1
	arrow showing clockwise direction on at least one circle	B1
Total: 8		
9 (a)	(laminated) iron	B1
9 (a) (ii)	$(V_p / V_s) = (N_p / N_s)$ in any form	C1
	$240 / V_s = 36\,000 / 900$ or $V_s = 240 / 40$	C1
	6.0 (V)	A1
9 (b) (ii)	step-down (transformer because) there are fewer turns on secondary (compared to primary coil) OR the output voltage is smaller than the input voltage	B1
9 (c)	Any 2 from:	
	• less energy or power wasted or less heating or more efficient	
	• accept lower current	
	• can use thinner (transmission) wires or cables	
	• fewer power stations needed	
	• (so) lower cost for cable and supporting pylons	
	• transmit (electricity over) longer distances (without drop in power)	B2
Total: 7		

Notes about the mark scheme are available separately.