

4.1 Simple Phenomena of Magnetism

Question Paper

Level	IGCSE
Subject	Physics (0625)
Exam Board	Cambridge International Examinations(CIE)
Topic	Electricity and Magnetism
Sub Topic	4.1 Simple Phenomena of Magnetism
Booklet	Question Paper

Time Allowed: 41 minutes

Score: /34

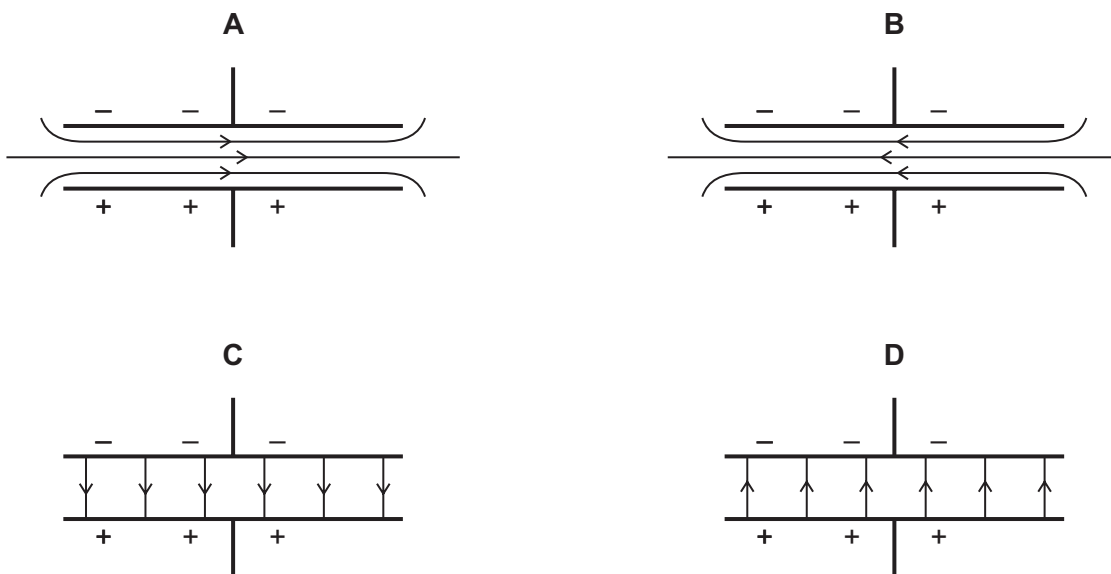
Percentage: /100

Grade Boundaries:

A*	A	B	C	D	E	U
>85%	75%	60%	45%	35%	25%	<25%

1 Each diagram shows two charged metal plates.

Which diagram shows the pattern and the direction of the electric field between the plates?



2 In which pair are both materials magnetic?

- A aluminium and copper
- B copper and iron
- C iron and steel
- D steel and aluminium

3 Which methods could be used to demagnetise a magnet?

method 1: place it in an east-west direction and hammer it

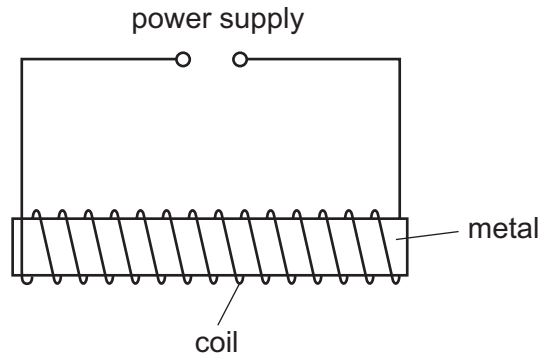
method 2: place it in an east-west direction and heat it until it is red hot

method 3: pull it slowly from a coil that is carrying an alternating current

method 4: put it slowly into a coil that is carrying a direct current

- A methods 1, 2 and 3
- B methods 2, 3 and 4
- C methods 1 and 2 only
- D methods 3 and 4 only

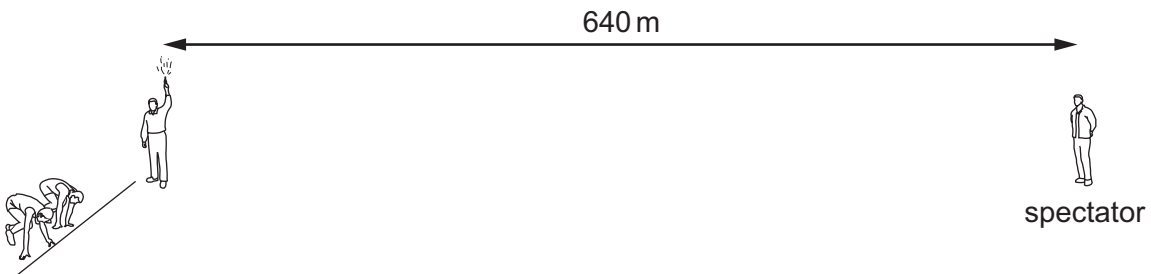
4 The diagram shows apparatus that can be used to make a magnet.



Which metal and which power supply are used to make a **permanent** magnet?

	metal	power supply
A	iron	6Va.c.
B	iron	6Vd.c.
C	steel	6Va.c.
D	steel	6Vd.c.

5 A man holding a starting pistol stands 640 m away from a spectator.



The spectator hears the sound of the starting pistol 2.0 s after seeing the flash from the pistol.

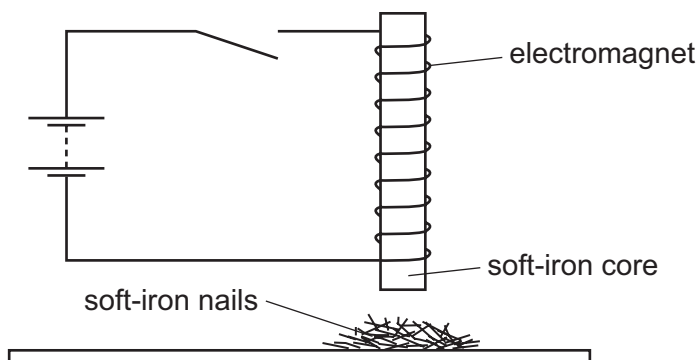
Using this information, what is the speed of sound in air?

- A** 160 m/s **B** 320 m/s **C** 640 m/s **D** 1280 m/s

6 Which group contains only non-ferrous metals?

- A aluminium, brass, iron
- B brass, copper, lead
- C copper, iron, steel
- D copper, lead, steel

7 An electromagnet with a soft-iron core is connected to a battery and an open switch. The soft-iron core is just above some small soft-iron nails.



The switch is now closed, left closed for a few seconds, and then opened.

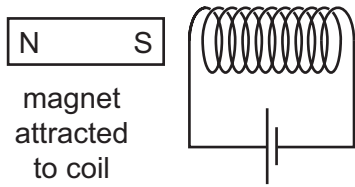
What do the soft-iron nails do as the switch is closed, and what do they do when the switch is then opened?

	as switch is closed	as switch is opened
A	nails jump up	nails fall down
B	nails jump up	nails stay up
C	nails stay down	nails jump up
D	nails stay down	nails stay down

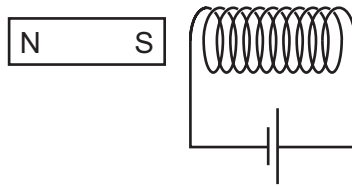
8 Which action will demagnetise a magnetised piece of steel?

- A Cool it in a freezer for several hours.
- B Hit it repeatedly with a hammer.
- C Put it in a coil carrying a direct current (d.c.).
- D Put it near an unmagnetised piece of iron.

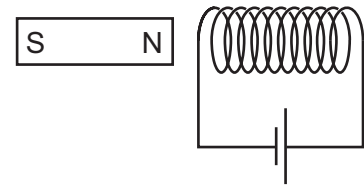
- 9 A student investigates the force on a bar magnet placed near a current-carrying coil. She carries out three different experiments.



experiment 1



experiment 2



experiment 3

In experiment 1, the magnet is attracted to the coil.

Which row shows what happens in the other two experiments?

	experiment 2	experiment 3
A	magnet attracted	magnet attracted
B	magnet attracted	magnet repelled
C	magnet repelled	magnet attracted
D	magnet repelled	magnet repelled

10 Which row states whether each metal is ferrous or non-ferrous?

	ferrous	non-ferrous
A	aluminium	copper
B	copper	iron
C	iron	steel
D	steel	aluminium

11 Which procedure may be used to demagnetise a steel bar?

- A** cooling it in a freezer for several hours
- B** earthing it with a copper wire for several seconds
- C** removing it slowly from a coil carrying an alternating current (a.c.)
- D** rubbing it in one direction with a woollen cloth

12 Which statement about a permanent bar magnet is correct?

- A** It is made from a soft magnetic material.
- B** It repels a non-magnetic material.
- C** Its field lines cross each other where the magnetic field is strong.
- D** Its N-pole repels the N-pole of another magnet.

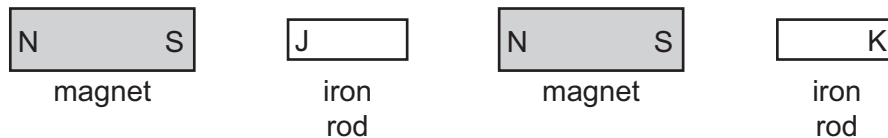
13 Which metal could be used for a permanent magnet and which metal could be used for the core of an electromagnet?

	permanent magnet	core of electromagnet
A	iron	copper
B	iron	steel
C	steel	copper
D	steel	iron

- 14 Which procedure may be used to demagnetise a steel bar?
- A cooling it in a freezer for several hours
 - B earthing it with a copper wire for several seconds
 - C removing it slowly from a coil carrying an alternating current (a.c.)
 - D rubbing it in one direction with a woollen cloth

- 15 Which metal is suitable to use to make a permanent magnet?
- A aluminium
 - B brass
 - C iron
 - D steel

- 16 The diagram shows two magnets and two iron rods placed in a line.

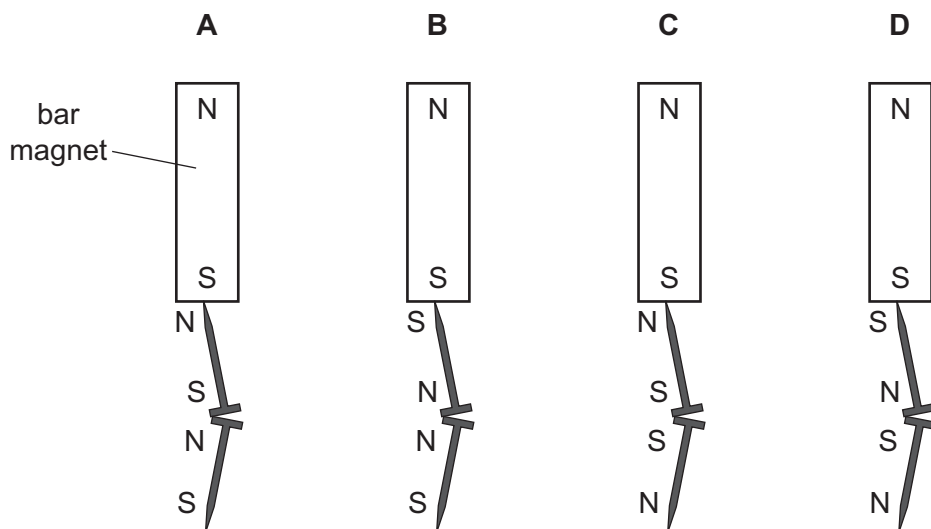


Which magnetic poles are induced at the ends J and K of the iron rods?

	pole induced at end J	pole induced at end K
A	N	N
B	N	S
C	S	N
D	S	S

17 Two iron nails hang from a bar magnet.

Which diagram shows the magnetic poles induced in the nails?

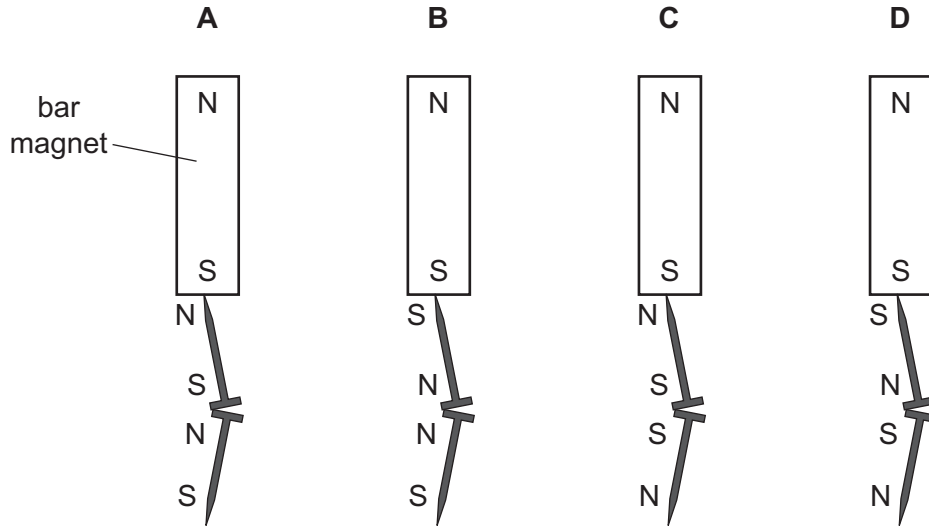


18 Which row correctly shows whether copper and steel are ferrous or non-ferrous?

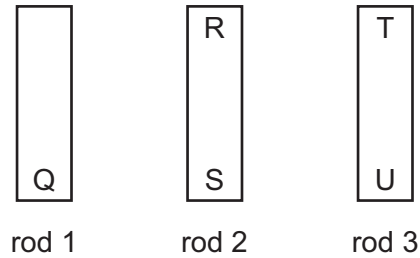
	copper	steel
A	ferrous	ferrous
B	ferrous	non-ferrous
C	non-ferrous	ferrous
D	non-ferrous	non-ferrous

19 Two iron nails hang from a bar magnet.

Which diagram shows the magnetic poles induced in the nails?



20 The ends of three metal rods are tested by holding end Q of rod 1 close to the others in turn.



The results are as follows.

End Q: attracts end R,
attracts end S,
attracts end T,
repels end U.

Which of the metal rods is a magnet?

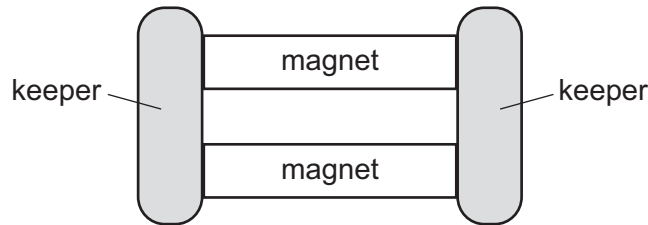
- A rod 1 only
- B rod 1 and rod 2
- C rod 1 and rod 3
- D rod 3 only

21 A permanent magnet is made from metal and an electromagnet uses a metal core.

Which metal is suitable for each of these purposes?

	permanent magnet	core of electromagnet
A	iron	iron
B	iron	steel
C	steel	iron
D	steel	steel

- 22 The diagram shows two bar magnets, stored with metal keepers across the ends. The keepers help to keep the magnets magnetised.

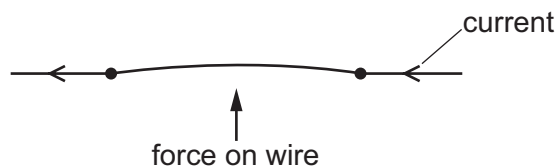


The material used for the keepers becomes strongly magnetised when placed in contact with the magnets, but does not remain magnetised when taken away from the magnets.

What is a suitable metal to use for the magnets and what is a suitable metal to use for the keepers?

	metal for magnets	metal for keepers
A	iron	iron
B	iron	steel
C	steel	iron
D	steel	steel

- 23 The diagram shows a thin copper wire in a magnetic field. The current in the wire is from right to left. This causes an upward force on the wire.

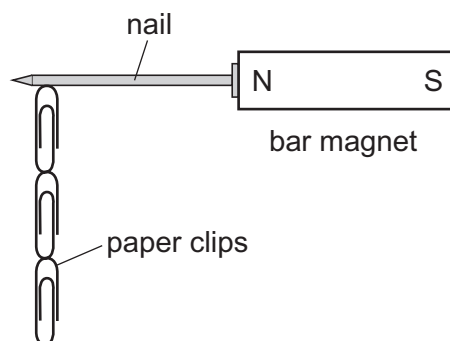


The direction of the current and the direction of the magnetic field are both reversed.

In which direction does the force act on the wire, after these changes are made?

- A** downwards
- B** into the page
- C** out of the page
- D** upwards

24 Four nails, **A**, **B**, **C** and **D**, are tested to find which makes the strongest permanent magnet.



One of the nails is placed against a bar magnet and the number of paper clips which the nail can support is recorded. The bar magnet is then removed and the number of paper clips remaining attached to the nail is recorded. Each nail is tested in turn.

Which nail becomes the strongest permanent magnet?

nail	number of paper clips attached to the nail	
	bar magnet present	bar magnet removed
A	2	0
B	2	1
C	4	3
D	5	2

25 Which symbols are used for the units of current and of resistance?

	unit of current	unit of resistance
A	A	W
B	A	Ω
C	C	W
D	C	Ω

- 26 In which pair are both metals ferrous?
- A** aluminium and copper
 - B** aluminium and steel
 - C** copper and iron
 - D** iron and steel
- 27 How can a permanent magnet be demagnetised?
- A** cool the magnet for a long time
 - B** hit the magnet repeatedly with a hammer
 - C** leave the magnet in a coil which is connected to a battery
 - D** shine bright light onto the magnet
- 28 Which statement describes a property of a magnet?
- A** It attracts ferrous materials.
 - B** It could have only one pole (north or south).
 - C** It points in a random direction when suspended.
 - D** It repels non-ferrous materials.
- 29 Which procedure may be used to demagnetise a steel bar?
- A** cooling it in a freezer
 - B** earthing it with a copper wire
 - C** placing it in a solenoid carrying a large direct current (d.c.)
 - D** striking it repeatedly with a hammer

- 30 The diagram shows a magnet being brought near to an unmagnetised iron bar. This causes the iron bar to become magnetised.



Which magnetic pole is induced at X and how is the iron bar affected?

	pole induced	effect on iron bar
A	north	attracted
B	north	repelled
C	south	attracted
D	south	repelled

- 31 A student wishes to make a permanent magnet. She has an iron rod and a steel rod.

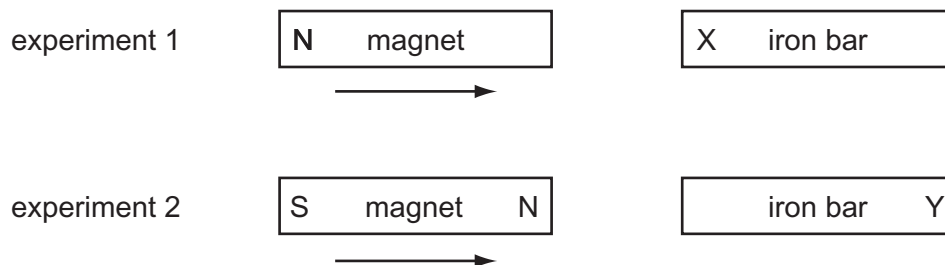
Which rod should she use to make the permanent magnet, and is this rod a hard magnetic material or a soft magnetic material?

	rod	type of magnetic material
A	iron	hard
B	iron	soft
C	steel	hard
D	steel	soft

- 32 Which test could be used to find which end of a magnet is the north pole?

- A** putting it near a compass needle
- B** putting it near a ferrous metal
- C** putting it near a non-ferrous metal
- D** putting it near a steel spoon

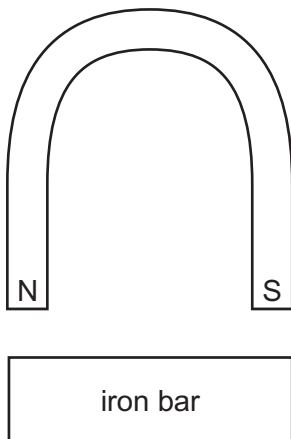
- 33 In two separate experiments, a magnet is brought near to an unmagnetised iron bar. This causes the bar to become magnetised.



Which magnetic poles are induced at X and at Y?

	pole induced at X	pole induced at Y
A	N	N
B	N	S
C	S	N
D	S	S

34 A horseshoe magnet is brought near to an unmagnetised iron bar.



Which row in the table shows the magnetic poles induced in the iron bar and the direction of the forces between the bar and the magnet?

	magnetic poles induced in iron bar	force between iron bar and magnet
A	N S	attraction
B	N S	repulsion
C	S N	attraction
D	S N	repulsion