Cambridge International Examinations
Cambridge International General Certificate of Secondary Education

PHYSICS **0625/11**

Paper 1 Multiple Choice **May/June 2015**

45 minutes

Additional Materials: Multiple Choice Answer Sheet
Soft clean eraser
Soft pencil (type B or HB recommended)

* 6 1 9 4 8 2 3 5 6 7 *

READ THESE INSTRUCTIONS FIRST

Write in soft pencil.
Do not use staples, paper clips, glue or correction fluid.
Write your name, Centre number and candidate number on the Answer Sheet in the spaces provided unless this has been done for you.
DO **NOT** WRITE IN ANY BARCODES.

There are **forty** questions on this paper. Answer **all** questions. For each question there are four possible answers **A**, **B**, **C** and **D**.
Choose the **one** you consider correct and record your choice in **soft pencil** on the separate Answer Sheet.

Read the instructions on the Answer Sheet very carefully.

Each correct answer will score one mark. A mark will not be deducted for a wrong answer.
Any rough working should be done in this booklet.
Electronic calculators may be used.

The syllabus is approved for use in England, Wales and Northern Ireland as a Cambridge International Level 1/Level 2 Certificate.

This document consists of **18** printed pages and **2** blank pages.

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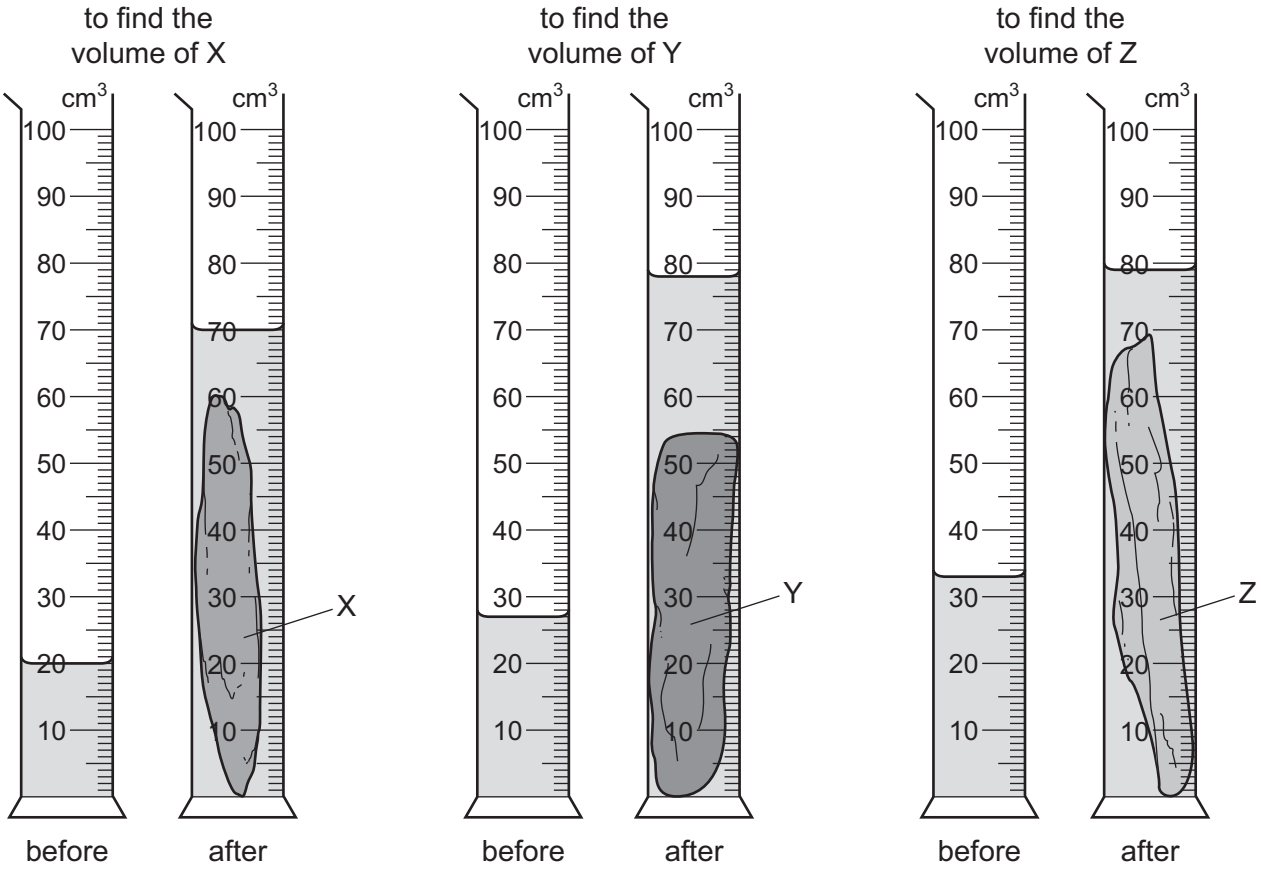
1 A geologist compares the volumes of three rocks, X, Y and Z. Three measuring cylinders contain different volumes of water. He places each rock into one of the measuring cylinders.

The diagrams show the measuring cylinders before and after the rocks are put in.



Which row shows the volumes of X, Y and Z in order, from largest to smallest?

	largest volume →		smallest volume
A	X	Z	Y
B	Y	X	Z
C	Y	Z	X
D	Z	Y	X

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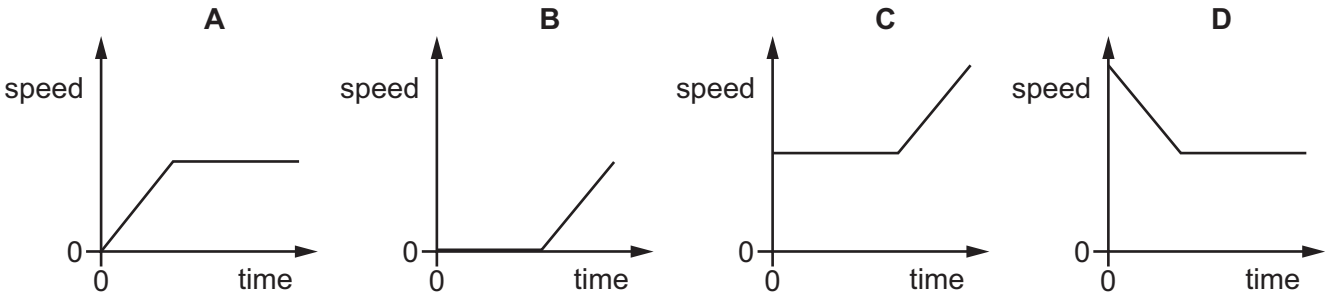
2 A car moves with constant speed and then constant acceleration.

Which graph is the speed-time graph for the car?



3 A car travels 100 km. The journey takes two hours. The highest speed of the car is 80 km / h, and the lowest speed is 40 km / h.

What is the average speed for the journey?

A 40 km / h **B** 50 km / h **C** 60 km / h **D** 120 km / h

4 Diagram 1 shows a piece of foam rubber that contains many pockets of air. Diagram 2 shows the same piece of foam rubber after it has been compressed so that its volume decreases.

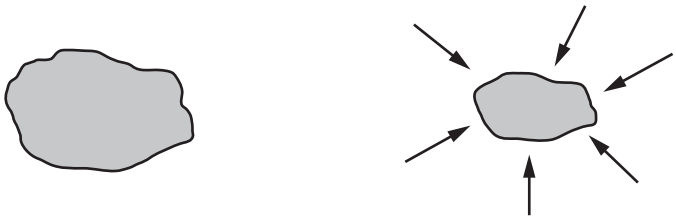


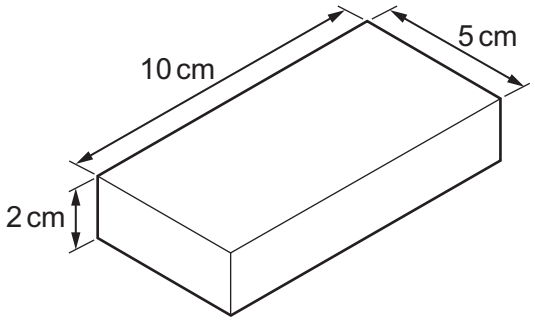
diagram 1
(before compression)

diagram 2
(after compression)

What happens to the mass and to the weight of the foam rubber when it is compressed?

	mass	weight
A	increases	increases
B	increases	no change
C	no change	increases
D	no change	no change

5 A metal block has the dimensions shown. Its mass is 1000 g.



What is the density of the metal?

A $\left(\frac{5 \times 10}{1000 \times 2}\right) \text{g/cm}^3$

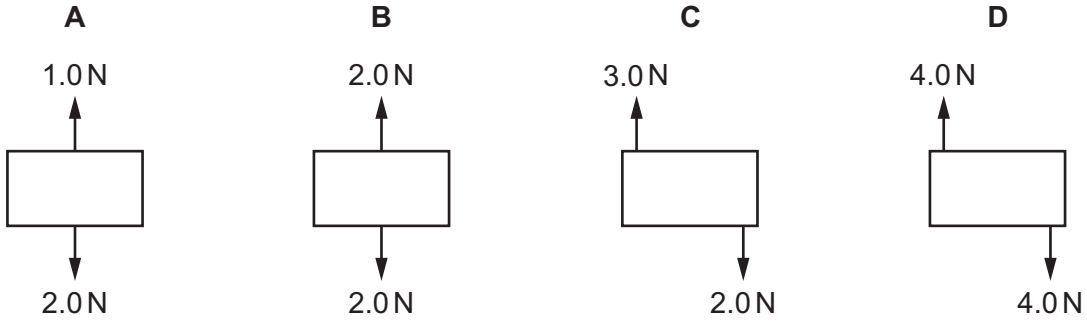
B $\left(\frac{2 \times 5 \times 10}{1000}\right) \text{g/cm}^3$

C $\left(\frac{1000 \times 2}{5 \times 10}\right) \text{g/cm}^3$

D $\left(\frac{1000}{2 \times 5 \times 10}\right) \text{g/cm}^3$

6 Four objects are each acted on by only two forces, as shown.

Which object is in equilibrium?



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7 A student measures the length of a spring. She then hangs different weights from the spring. She measures the length of the spring for each different weight.

The table shows her results.

weight / N	length / mm
0	520
1.0	524
2.0	528
3.0	533
4.0	537
5.0	540

What is the extension of the spring when the weight hung from it is 3.0 N?

A 4 mm **B** 5 mm **C** 12 mm **D** 13 mm

8 Which energy resource is used to generate electricity without using any moving parts?

A geothermal

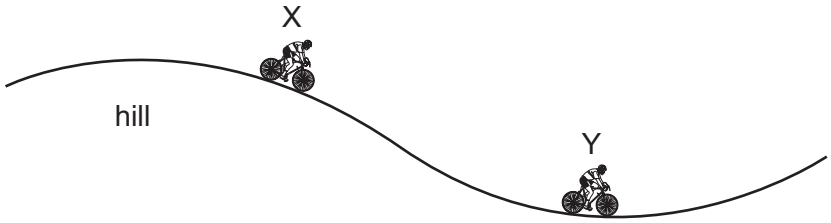
B hydroelectric

C nuclear

D solar

9 A cyclist travels down a hill from rest at point X, without pedalling.

The cyclist applies his brakes and the cycle stops at point Y.



Which energy changes have taken place between X and Y?

A gravitational potential → kinetic → thermal (heat)

B gravitational potential → thermal (heat) → kinetic

C kinetic → gravitational potential → thermal (heat)

D kinetic → thermal (heat) → gravitational potential

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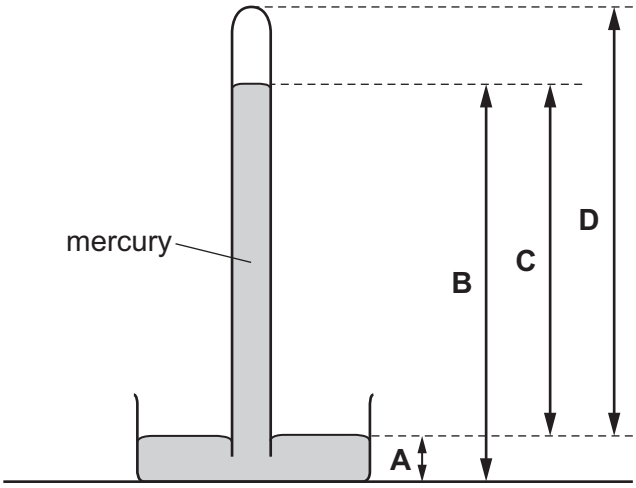
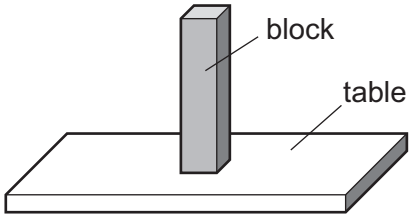
10 The diagram shows a simple mercury barometer.

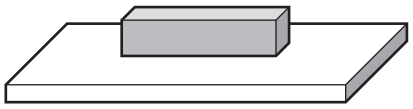
Which height is used as a measurement of atmospheric pressure?



11 A block with flat, rectangular sides rests on a table.



The block is now turned so that it rests with its largest side on the table.



How has this change affected the force and the pressure exerted by the block on the table?

	force	pressure
A	decreased	decreased
B	decreased	unchanged
C	unchanged	decreased
D	unchanged	unchanged

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12 Two states of matter are described as follows.

In state 1, the molecules are very far apart. They move about very quickly at random in straight lines until they hit something.

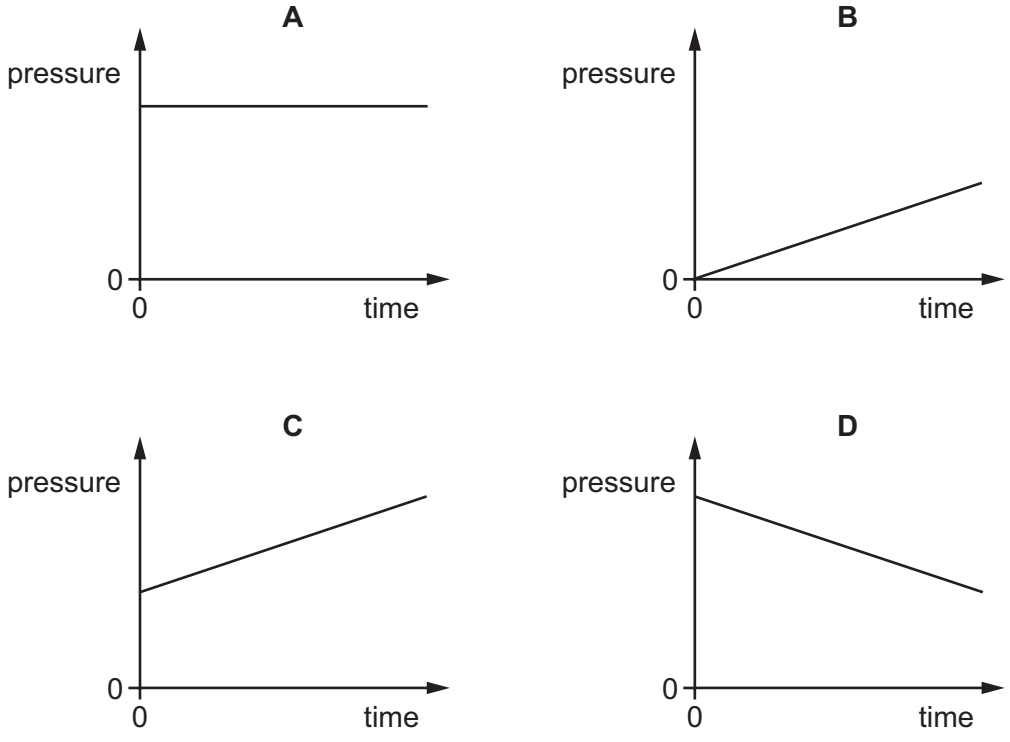
In state 2, the molecules are quite closely packed together. They move about at random. They do not have fixed positions.

What is state 1 and what is state 2?

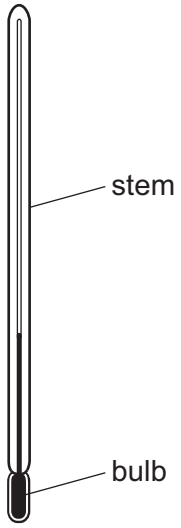
	state 1	state 2
A	gas	liquid
B	gas	solid
C	liquid	gas
D	solid	liquid

13 The pressure of a fixed mass of gas in a cylinder is measured. The temperature of the gas in the cylinder is then slowly increased. The volume of the cylinder does not change.

Which graph shows the pressure of the gas during this process?



14 The thermometer in the diagram has no scale.



Where must the bulb be placed so that 0 °C can be marked on the stem?

A in a freezer

B in pure boiling water

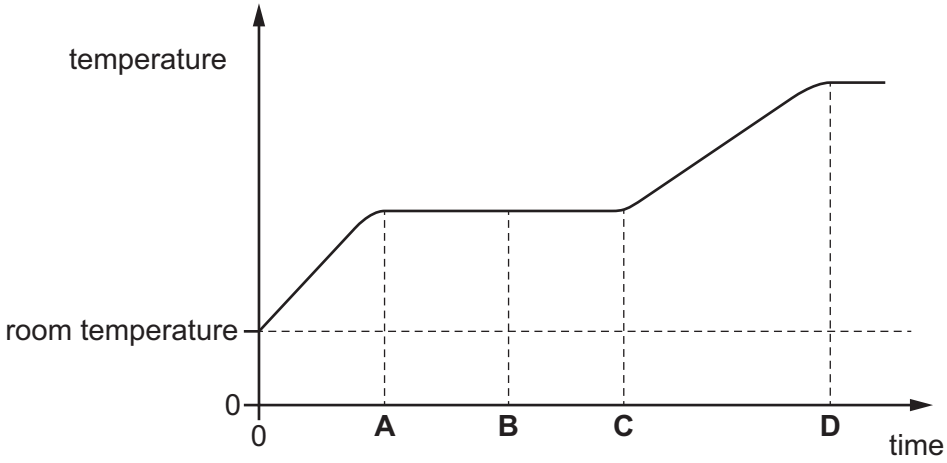
C in pure cold water

D in pure melting ice

15 A solid is heated from room temperature.

The graph shows how its temperature changes with time as it is heated constantly.

At which time has it just become **completely** liquid?



16 Thermal energy travels through space from the Sun to the Earth. Space is a vacuum.

How is thermal energy transferred from the Sun to the Earth?

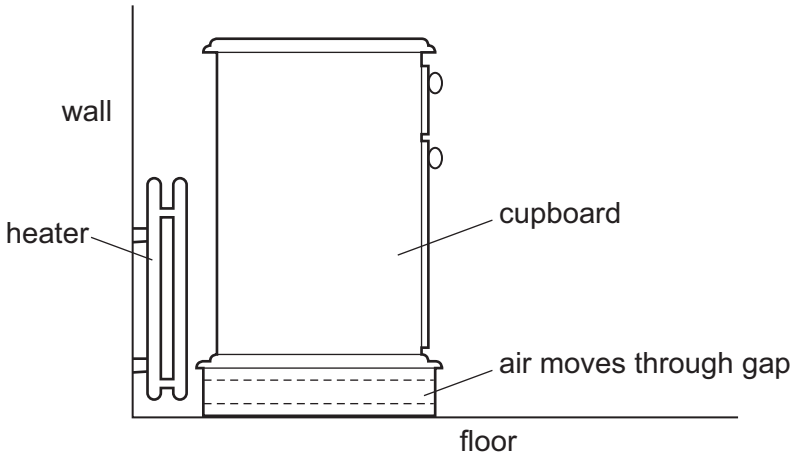
A by conduction only

B by convection only

C by radiation only

D by convection and radiation

17 A cupboard is placed in front of a heater. Air can move through a gap under the cupboard.



Which row describes the temperature, and the direction of movement, of the air in the gap?

	air temperature	air direction
A	cool	away from the heater
B	cool	towards the heater
C	warm	away from the heater
D	warm	towards the heater

18 What is the number of wavefronts per second that pass a fixed point?

A the amplitude of the wave

B the frequency of the wave

C the speed of the wave

D the wavelength of the wave

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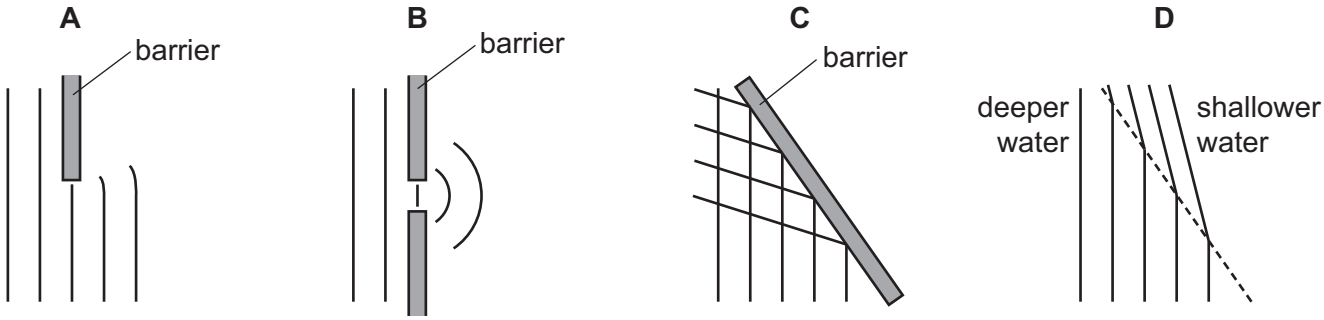
19 The diagrams represent water waves in a tank.

Which diagram represents a wave that changes speed?



20 The diagram shows the electromagnetic spectrum, in order of increasing wavelength.

Three types of radiation, P, Q and R, are missing from the spectrum diagram.

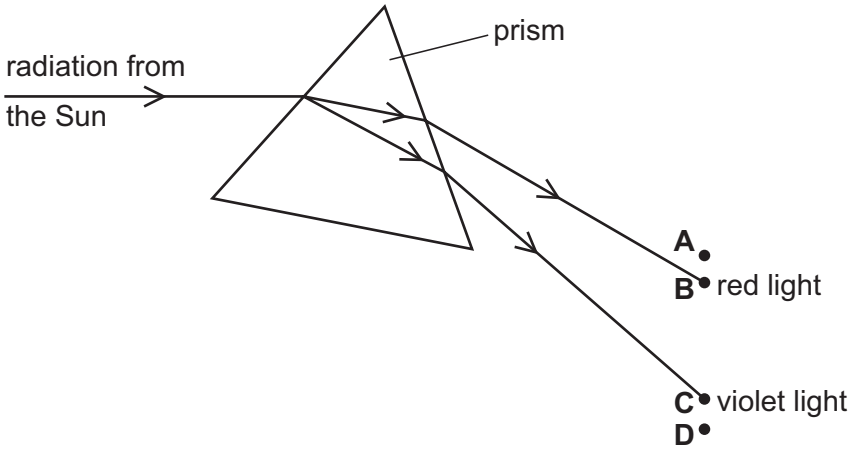
γ-rays	X-rays	P	visible light	Q	microwaves	R

Which types of electromagnetic radiation are represented by P, by Q and by R?

	P	Q	R
A	infra-red	radio waves	ultraviolet
B	infra-red	ultraviolet	radio waves
C	ultraviolet	infra-red	radio waves
D	ultraviolet	radio waves	infra-red

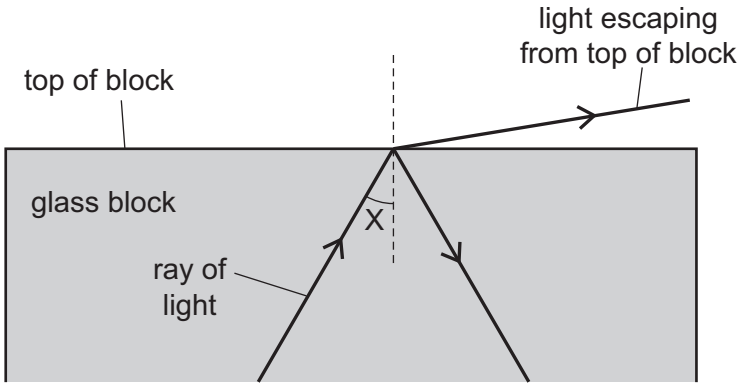
21 Radiation from the Sun is dispersed by a prism. The prism does not absorb any of the radiation. Four identical thermometers are placed, one at each of the labelled positions.

In which position does the thermometer show the greatest rise in temperature?



22 A scientist tries to direct a ray of light in a glass block so that no light escapes from the top of the block.

However, some light does escape.



The scientist changes angle X and stops the light escaping from the top.

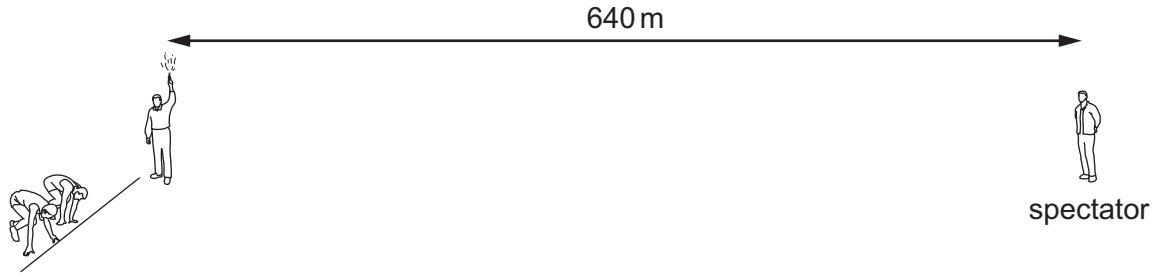
Which row in the table describes the change to angle X and the name of the effect produced?

	change to angle X	name of effect produced
A	decrease	total internal reflection
B	decrease	total internal refraction
C	increase	total internal reflection
D	increase	total internal refraction

23 Which row states two properties of sound waves?

	can travel through	type of wave
A	a vacuum	longitudinal
B	a vacuum	transverse
C	water	longitudinal
D	water	transverse

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



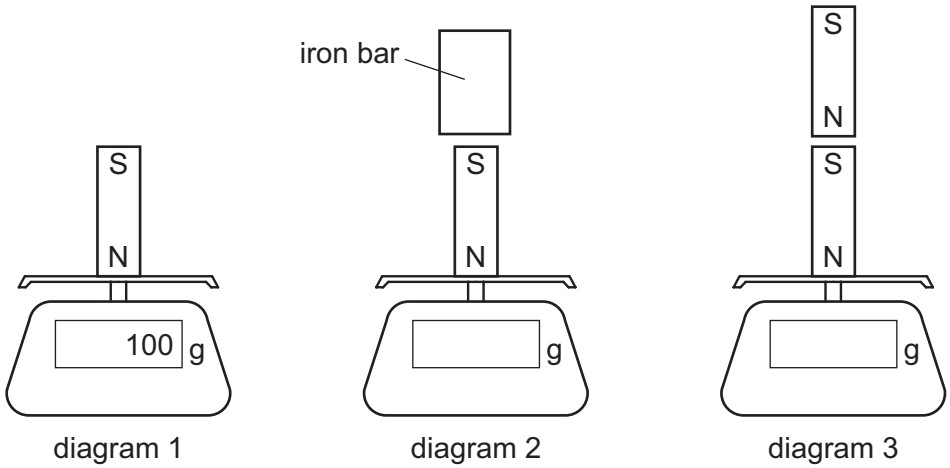
The spectator hears the sound of the starting pistol 2.0 s after seeing the flash from the pistol.

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

25 A magnet is placed on a balance. The balance reading changes when an iron bar or another magnet is held close to the first magnet.

The arrangements are shown in the diagrams.



Which row gives the balance reading in diagram 2 and in diagram 3?

	balance reading in diagram 2 / g	balance reading in diagram 3 / g
A	less than 100	less than 100
B	less than 100	more than 100
C	more than 100	less than 100
D	more than 100	more than 100

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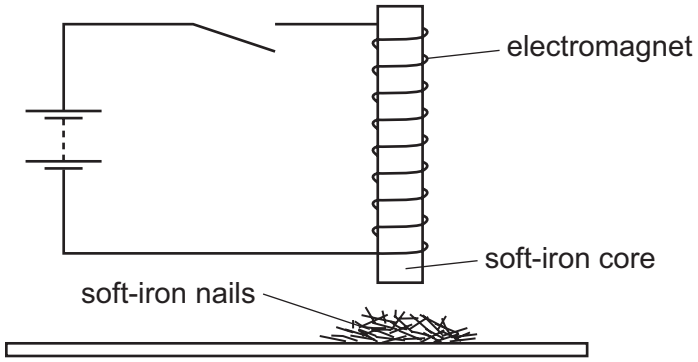
26 An electromagnet with a soft-iron core is connected to a battery and an open switch. The soft-iron core is just above some small soft-iron nails.



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

27 The diagram shows a piece of metal resistance wire.

Which wire, made of the same metal, has a smaller resistance?

A a wire of the same length with a larger diameter

B a wire of the same length with a smaller diameter

C a wire of greater length with the same diameter

D a wire of greater length with a smaller diameter

28 What is the unit of electromotive force (e.m.f.)?

A ampere

B joule

C volt

D watt

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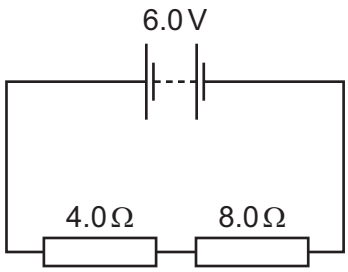
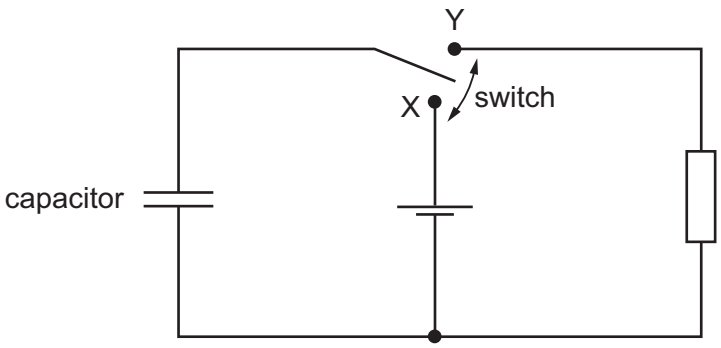
29 The circuit diagram shows a 4.0 Ω resistor and an 8.0 Ω resistor connected to a 6.0 V battery.



What is the current in the battery?

A 0.50 A **B** 0.75 A **C** 1.5 A **D** 2.0 A

30 The diagram shows a circuit which includes an uncharged capacitor and a switch.



The switch can be moved between position X and position Y.

What happens to the capacitor when the switch is moved to position X, and what happens when the switch is then moved to position Y?

	switch at X	switch at Y
A	capacitor charges	capacitor charges
B	capacitor charges	capacitor discharges
C	capacitor discharges	capacitor charges
D	capacitor discharges	capacitor discharges

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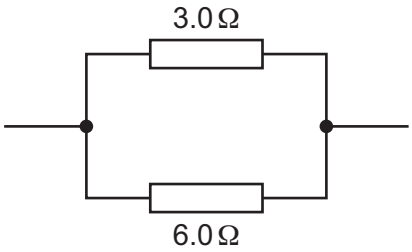
31 The diagram shows a 3.0 Ω resistor and a 6.0 Ω resistor connected in parallel.



What is the total resistance of this arrangement?

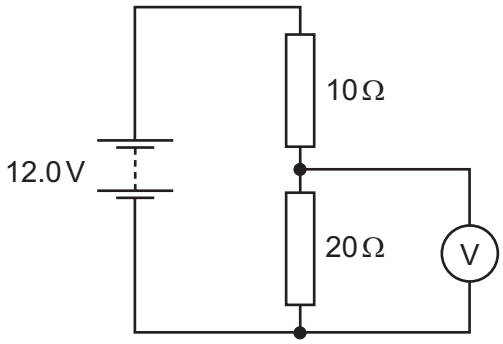
A less than 3.0 Ω

B 3.0 Ω

C 4.5 Ω

D more than 6.0 Ω

32 The diagram shows a 10 Ω resistor and a 20 Ω resistor connected in a potential divider circuit.

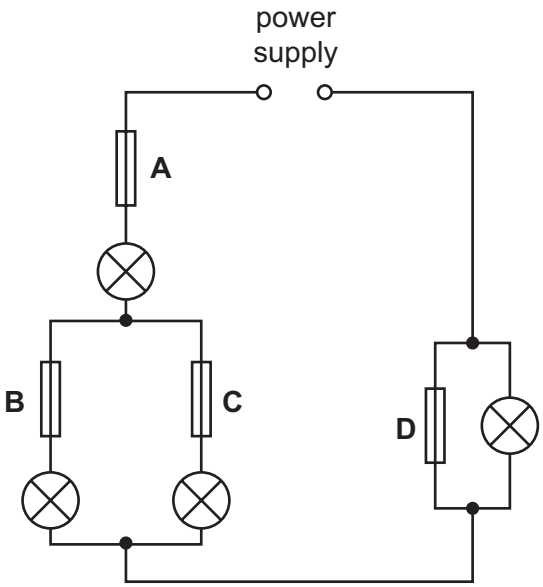


What is the reading on the voltmeter?

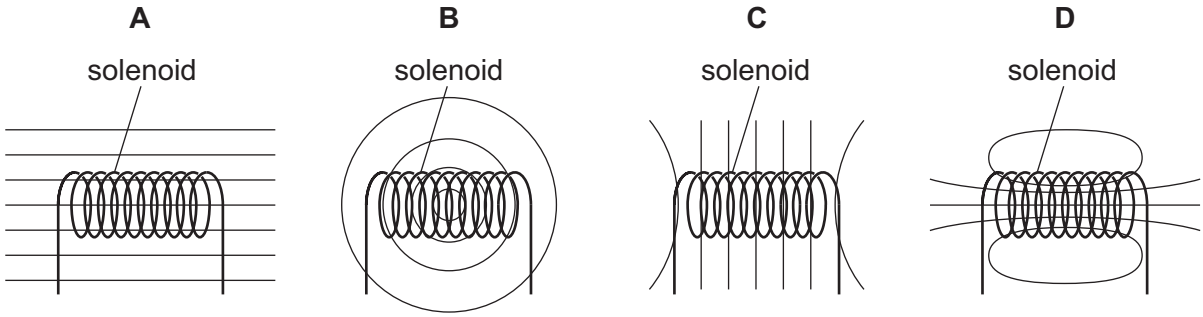
A 4.0 V **B** 6.0 V **C** 8.0 V **D** 12.0 V

33 In the circuit shown, only one of the fuses has blown, but none of the lamps is lit.

Which fuse has blown?



34 Which diagram shows the pattern of the magnetic field produced by a current-carrying solenoid?



35 What is an advantage of transmitting electricity at a high voltage?

A It is faster.

B It is safer.

C Less energy is wasted.

D Less equipment is needed.

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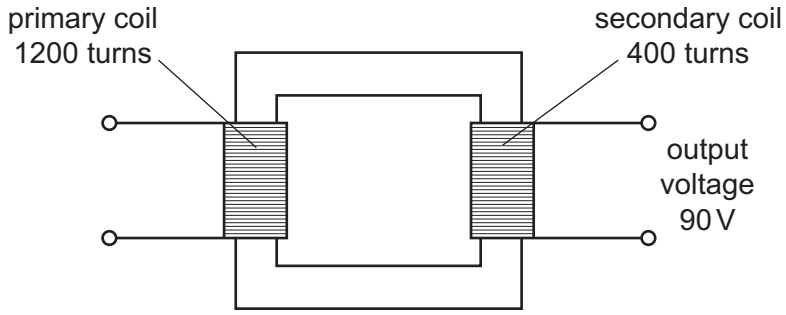
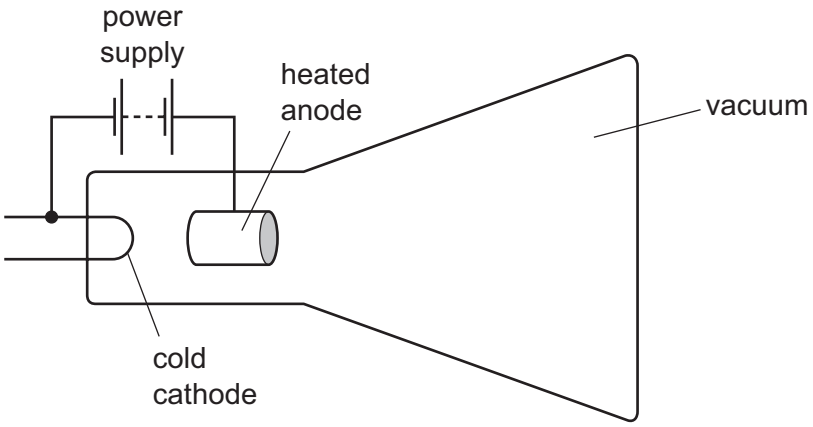
36 A transformer has 1200 turns on its primary coil and 400 turns on its secondary coil. An output voltage of 90 V is induced across the secondary coil.



What is the input voltage of the transformer?

A 30 V **B** 90 V **C** 270 V **D** 1200 V

37 The diagram shows a design for a cathode-ray tube. A tube with this design does not work.



Which change should be made so that the tube works properly to produce cathode rays?

A Heat the cathode instead of the anode.

B Reverse the connections of the power supply.

C Use air in the tube instead of a vacuum.

D Use an a.c. power supply instead of a d.c. power supply.

38 Which row gives the properties of the radiation from radioactive materials?

	most penetrating radiation	most highly ionising radiation
A	α	β
B	β	γ
C	γ	α
D	γ	γ

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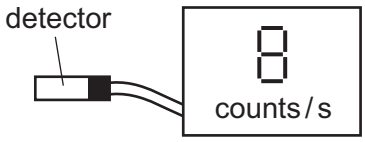
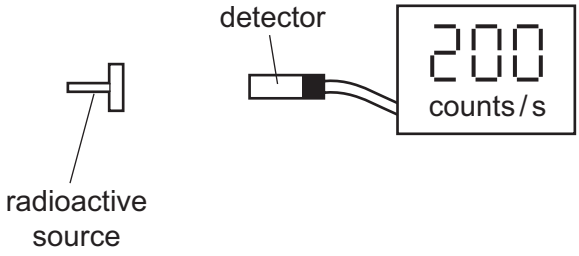
39 In a laboratory, a detector of ionising radiation records an average background count rate of 8 counts per second.



A radioactive source is now placed close to the detector. The count rate on the detector rises to 200 counts per second.



What is the count rate due to radiation from the radioactive source?

A 25 counts / s

B 192 counts / s

C 200 counts / s

D 208 counts / s

40 $^{14}_{6}C$ is a nuclide of carbon.

What is the composition of one nucleus of this nuclide?

	neutrons	protons
A	6	8
B	6	14
C	8	6
D	14	6

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