Cambridge International Examinations
Cambridge International General Certificate of Secondary Education

PHYSICS **0625/22**

Paper 2 Multiple Choice (Extended) **February/March 2016**

45 minutes

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

* 5 6 5 2 2 1 2 6 8 4 *

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.
Take the weight of 1.0 kg to be 10 N (acceleration of free fall = 10 m / s^2).

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 **17** printed pages and **3** blank pages.

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1 The diameter of a copper wire is thought to be approximately 0.3 mm.

Which instrument should be used to obtain a more accurate measurement of the diameter of the wire?

A measuring tape

B metre rule

C micrometer

D ruler

2 Which is a unit of acceleration?

A g/cm^3 **B** m/s **C** m/s^2 **D** N/m

3 An object is released from rest and falls to Earth. During its fall, the object is affected by air resistance. The air resistance eventually reaches a constant value.

Which description about successive stages of the motion of the object is correct?

A constant acceleration, then constant deceleration

B constant deceleration, then zero acceleration

C decreasing acceleration, then constant deceleration

D decreasing acceleration, then zero acceleration

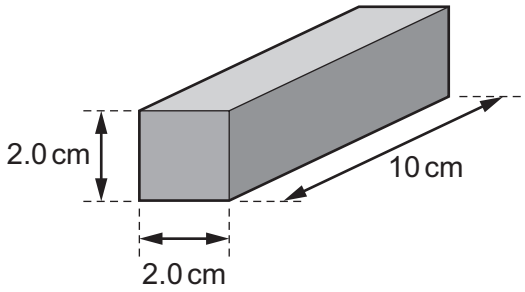
4 A concrete post is carried up a very high mountain. At the top of the mountain, the gravitational field is slightly weaker than at the bottom.

What is the effect of this weaker field on the mass and on the weight of the post at the top of the mountain?

	mass	weight
A	is less	is less
B	is less	is unchanged
C	is unchanged	is less
D	is unchanged	is unchanged

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5 The diagram shows a cuboid block made from a metal of density 2.5 g / cm^3.



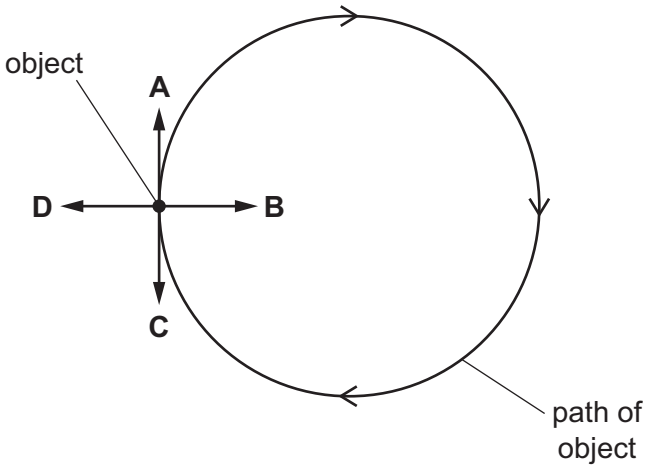
What is the mass of the block?

A 8.0 g **B** 16 g **C** 50 g **D** 100 g

6 The diagram shows an object moving at a constant speed in a circular path in the direction shown.

A force acts on the object to keep it in the circular path.

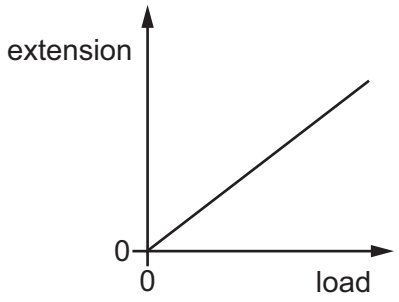
In which labelled direction does this force act, when the object is in the position shown?



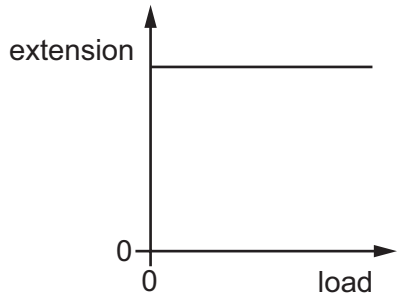
7 A spring obeys Hooke's law.

Which graph is obtained by plotting the extension of the spring against the load applied?

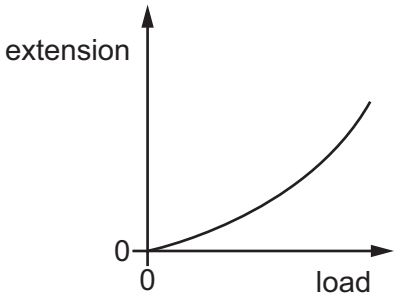
A



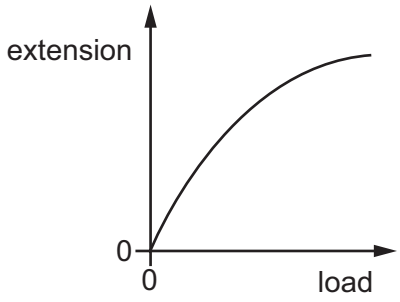
B



C



D



8 Which is the value of a vector quantity?

A 200 V

B 100 kg / m^3

C 20 m / s, east

D 50 J / (kg °C)

9 The table gives four energy sources and states whether the energy of the source is derived from the Sun.

Which row is correct?

	source of energy	derived from the Sun
A	geothermal	yes
B	oil	no
C	water held behind a dam	yes
D	wind	no

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10 A weight-lifter raises a 2000 N weight through a vertical height of 2.0 m in 0.80 s.

What useful power does he develop in doing this?

A 800 W **B** 3200 W **C** 4000 W **D** 5000 W

11 A wind turbine generates 54 kW of useful power from an input of 180 kW of wind power.

Which calculation gives the percentage efficiency of the turbine?

A $\frac{54000}{180000 \times 100}$ %

B $\frac{180000}{54000 \times 100}$ %

C $\frac{54000 \times 100}{180000}$ %

D $\frac{180000 \times 100}{54000}$ %

12 A force acts on an area to produce a pressure.

Which changes produce the same pressure?

A double the area and double the force

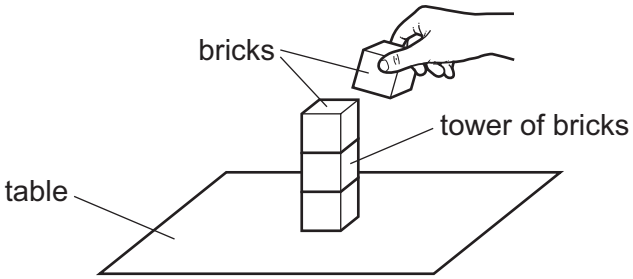
B double the area and halve the force

C double the area and make the force four times bigger

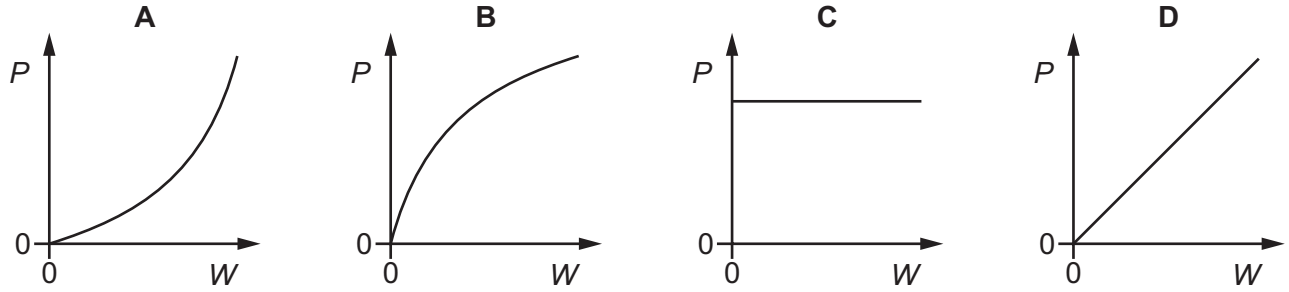
D halve the area and double the force

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13 Identical toy bricks are placed one on top of another to make a tower on a table.



Which graph shows the relationship between the pressure *P* that the tower exerts on the table and the weight *W* of the tower?



14 Gases can be compressed, but liquids cannot.

Which statement explains this difference?

A Each molecule in a gas is more compressible than each molecule in a liquid.

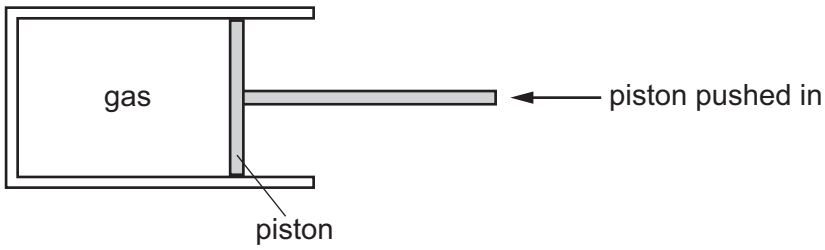
B Molecules in a gas are further apart than molecules in a liquid.

C Molecules in a gas attract each other more strongly than molecules in a liquid.

D Molecules in a gas move more slowly than molecules in a liquid.

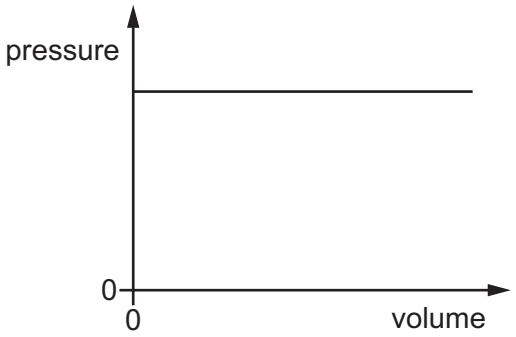
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15 The diagram shows a quantity of gas trapped in a cylinder. The piston is pushed in slowly and the gas is compressed. The temperature of the gas does not change.

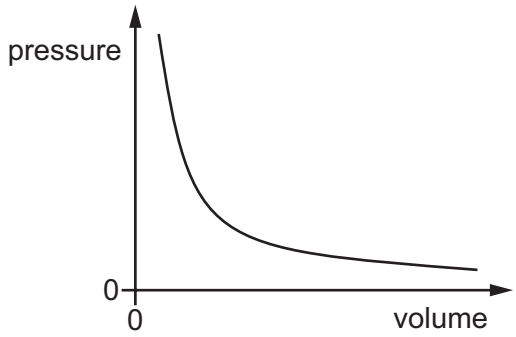


Which graph shows the relationship between the pressure and the volume of the gas?

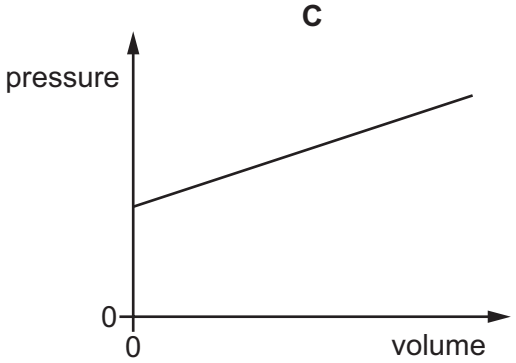
A



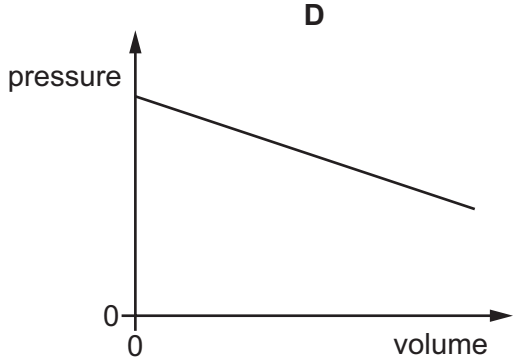
B



C



D



16 Which quantity gives the *thermal capacity* of a solid object?

A the energy lost by radiation from the object in 1.0 s

B the energy needed to melt the object

C the energy needed to raise the temperature of the object by 1.0 °C

D the total amount of thermal energy in the object

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17 To mark a temperature scale on a thermometer, standard temperatures known as fixed points are needed.

Which of these is a fixed point on the Celsius scale?

A room temperature

B the temperature inside a freezer

C the temperature of pure melting ice

D the temperature of pure warm water

18 In an experiment, a liquid is heated at a constant rate.

The temperature of the liquid increases and eventually becomes constant.

Which statement about the experiment is correct?

A Boiling occurs at all temperatures but only on the liquid surface.

B Boiling occurs throughout the liquid but only at the constant temperature.

C Evaporation occurs throughout the liquid and at all temperatures.

D Evaporation occurs only at the constant temperature and only on the liquid surface.

19 One end of a copper rod is heated.

What is one method by which thermal energy is transferred in the copper rod?

A Free electrons transfer energy from the cooler end to the hotter end.

B Free electrons transfer energy from the hotter end to the cooler end.

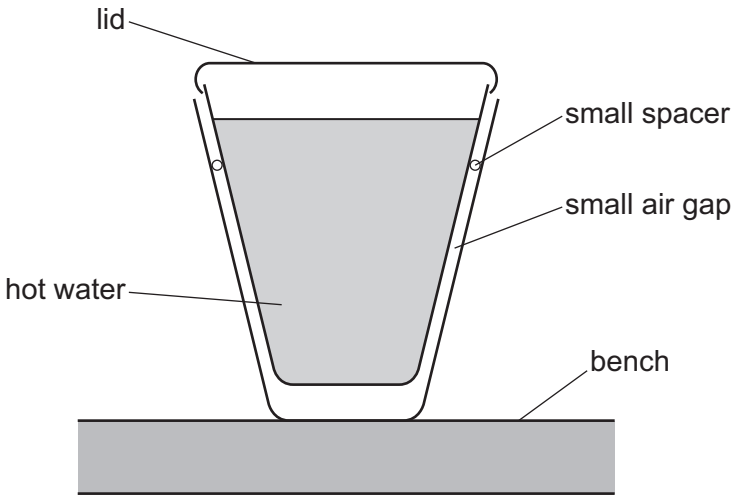
C Molecules of copper move from the cooler end to the hotter end.

D Molecules of copper move from the hotter end to the cooler end.

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20 Two plastic cups are placed one inside the other. A small spacer keeps the two cups separated.

Hot water is poured into the inner cup and a lid is put on top, as shown.



Which statement is correct?

A The bench is heated by convection from the bottom of the outer cup.

B The lid reduces the energy lost by convection.

C There is no thermal conduction through the sides of either cup.

D Thermal radiation is prevented by the small air gap.

21 Which is a unit of wavelength?

A hertz

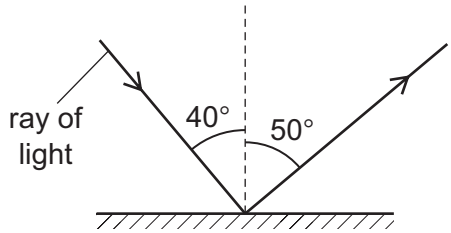
B metre

C metre per second

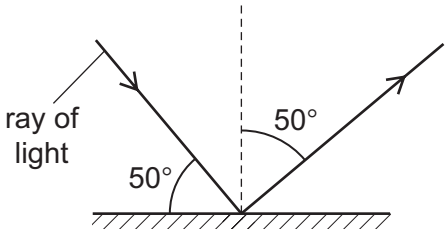
D second

22 Which diagram correctly shows a ray of light reflected by a plane mirror?

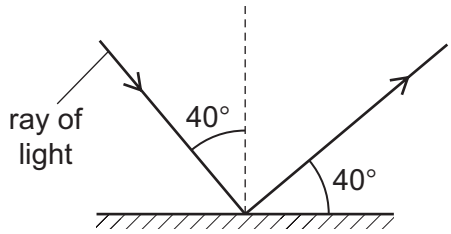
A



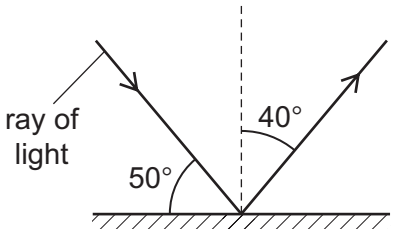
B



C



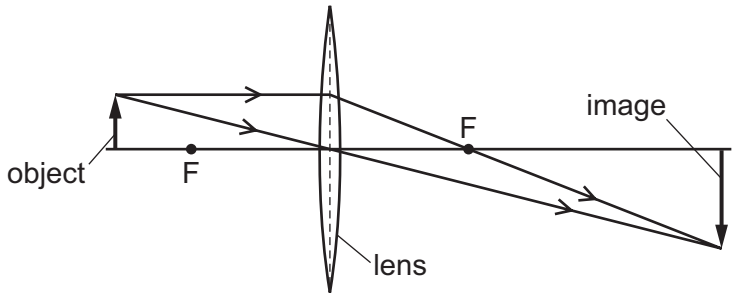
D



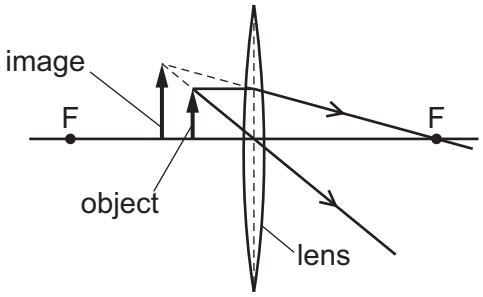
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23 Which diagram shows how a converging lens is used as a magnifying glass?

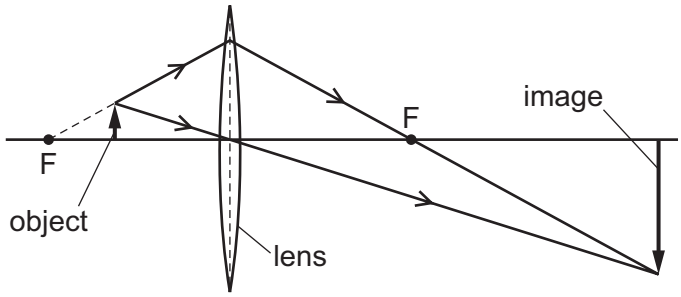
A



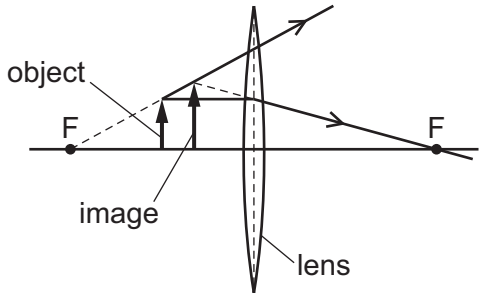
B



C



D



24 A sound wave travels from a point X to a point Y.



Which diagram represents the movement of the air molecules, due to the sound wave, in the region between X and Y?

A



B



C



D



25 The speed of sound in air is 340 m / s.

Which row gives typical values for the speed of sound in a liquid and in a solid?

	speed of sound in a liquid / (m / s)	speed of sound in a solid / (m / s)
A	250	180
B	250	5000
C	1500	180
D	1500	5000

26 In which pair are both materials magnetic?

A aluminium and copper

B copper and iron

C iron and steel

D steel and aluminium

27 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

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28 Which produces an electromotive force (e.m.f.)?

A a battery

B a filament lamp

C a resistor

D a spring balance

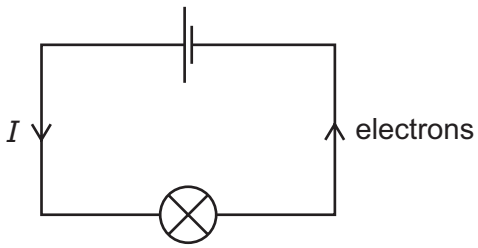
29 The table describes four different resistance wires. They are all made from the same metal.

Which wire has the smallest resistance?

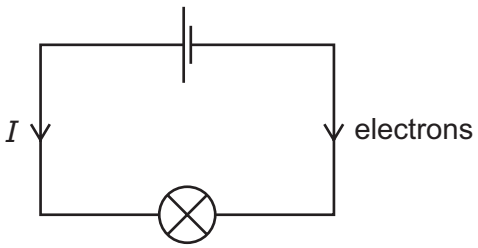
	length of wire / m	diameter of wire / mm
A	2.0	1.0
B	2.0	1.5
C	3.0	1.0
D	3.0	1.5

30 Which circuit shows the directions of the conventional current I and the flow of electrons?

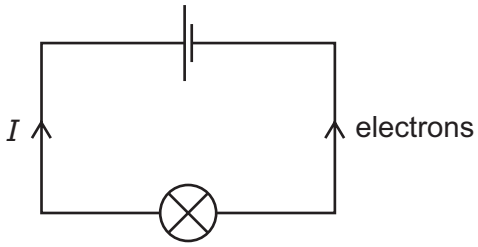
A



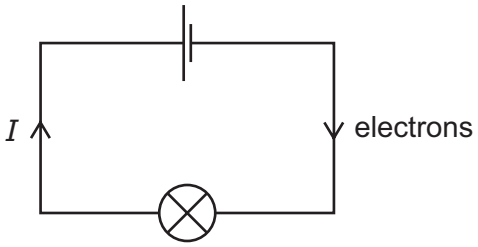
B



C

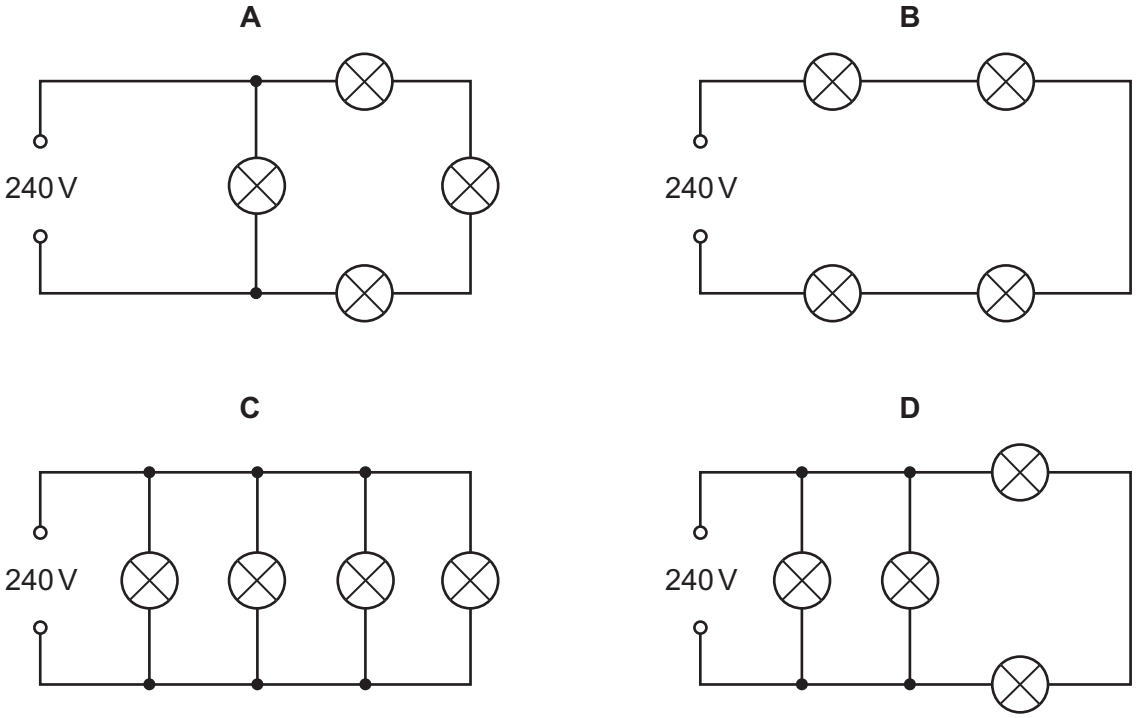


D



31 Four lamps are each labelled 240 V.

In which circuit do all four lamps have normal brightness?



32 A battery charger plugs into a 230 V a.c. supply. The charger is used to charge a 6.0 V d.c. battery.

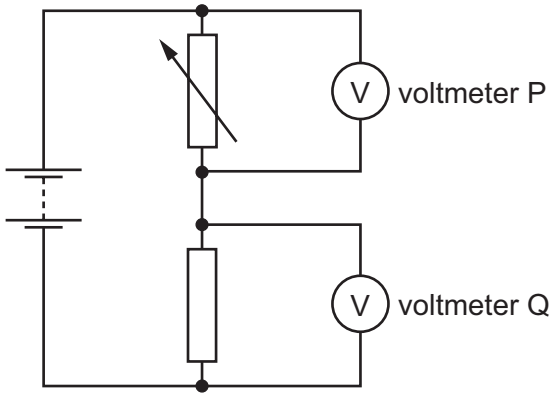
The charger contains diodes and a transformer.

What is the purpose of these components?

	diodes	transformer
A	rectify the a.c.	steps down the voltage
B	rectify the a.c.	steps up the voltage
C	step down the voltage	rectifies the a.c.
D	step up the voltage	rectifies the a.c.

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33 The diagram shows a potential divider connected to two voltmeters P and Q.



The resistance of the variable resistor is decreased.

Which row shows what happens to the reading on each voltmeter?

	reading on voltmeter P	reading on voltmeter Q
A	decreases	decreases
B	decreases	increases
C	increases	decreases
D	increases	increases

34 After some building work in a house, a bare (uninsulated) live wire is left protruding from a wall.

What is the greatest hazard?

A a fire

B a fuse blows

C an electric shock

D no current flows

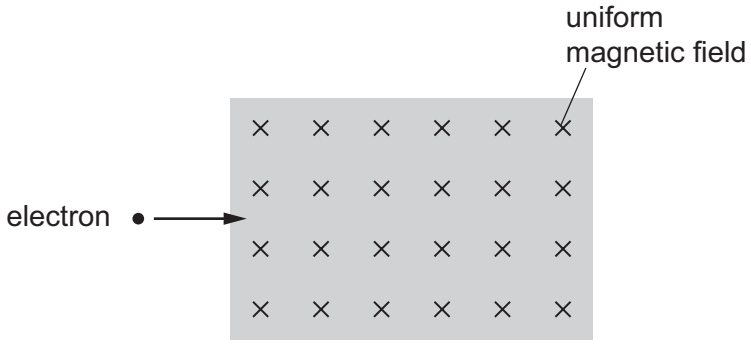
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[Turn over

35 An electron moves into a uniform magnetic field.

The arrow shows the initial direction of motion of the electron.

The direction of the magnetic field is into the plane of the page (away from you).



In which direction does a force act on the electron when it enters the magnetic field?

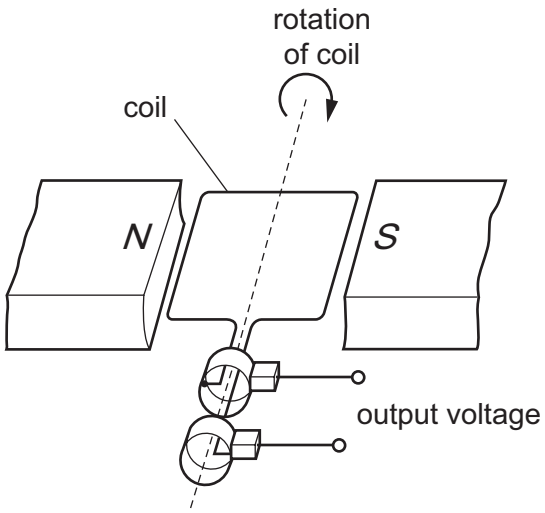
A into the page

B out of the page

C towards the bottom of the page

D towards the top of the page

36 The diagram shows an a.c. generator.



As the coil passes through the position shown, the output voltage is +10 V.

When does the output voltage become –10 V?

A when the coil has turned through 90°

B when the coil has turned through 180°

C when the coil has turned through 270°

D when the coil has turned through 360°

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37 The scattering of α-particles by a thin metal foil supports the nuclear model of an atom.

Why are α-particles used rather than neutrons?

A because they always travel more slowly

B because they are heavier

C because they are larger in diameter

D because they have a positive charge

38 A nucleus of a radioactive substance $^{218}_{84}Po$ undergoes an α-decay followed by a β-decay.

What are the nucleon (mass) number and proton (atomic) number of the nuclide formed after both decays have happened?

	nucleon number	proton number
A	214	85
B	216	85
C	214	83
D	216	83

39 A scientist carries out an experiment using a sealed source which emits β-particles. The range of the β-particles in the air is about 30 cm.

Which precaution is the most effective to protect the scientist from the radiation?

A handling the source with long tongs

B keeping the temperature of the source low

C opening all windows in the laboratory

D washing his hands before leaving the laboratory

40 Which row describes the nature of α-particles and of γ-rays?

	α-particles	γ-rays
A	helium nuclei	electromagnetic radiation
B	helium nuclei	electrons
C	protons	electromagnetic radiation
D	protons	electrons

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