Cambridge
O Level

Cambridge International Examinations
Cambridge Ordinary Level

PHYSICS **5054/11**

Paper 1 Multiple Choice **October/November 2014**

1 hour

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

3564398391

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.

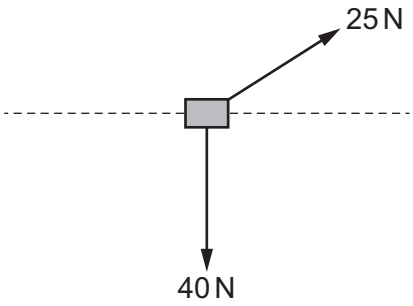
Read the instructions on the Answer Sheet very carefully.

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.

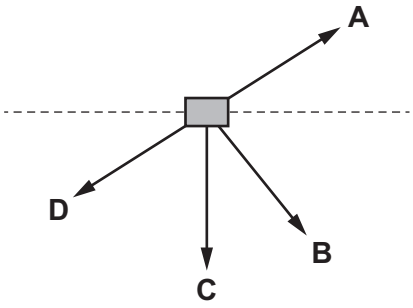
This document consists of **18** printed pages and **2** blank pages.

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1 Forces of 25 N and 40 N act on an object in the directions shown.



Which arrow shows the direction of the resultant force on the object?



2 Which device can be used to measure the thickness of a single sheet of paper?

A a metre rule

B a micrometer

C a plastic ruler

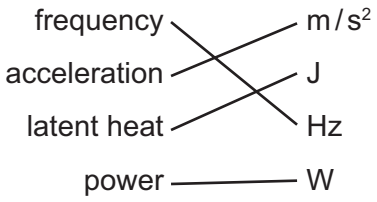
D a measuring tape

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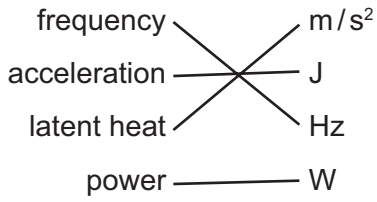
3 In a test, four students linked the quantities on the left with their units on the right.

Which student matched them all correctly?

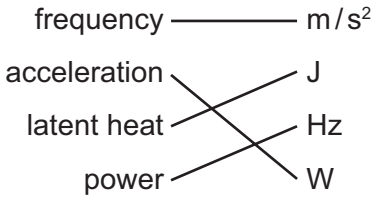
A



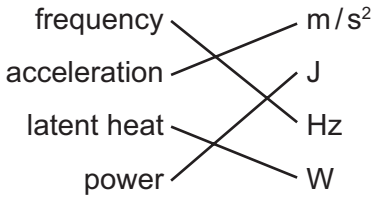
B



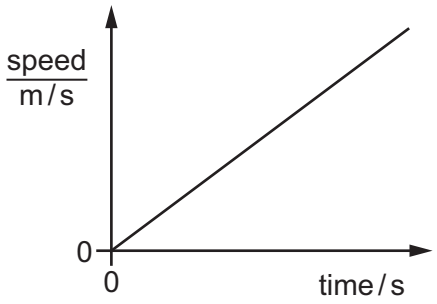
C



D

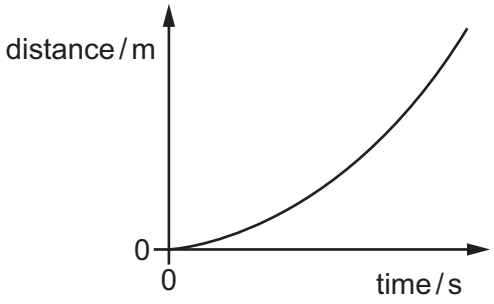


4 The speed-time graph represents a short journey.

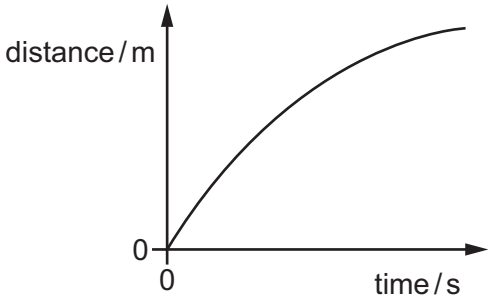


Which distance-time graph represents the same journey?

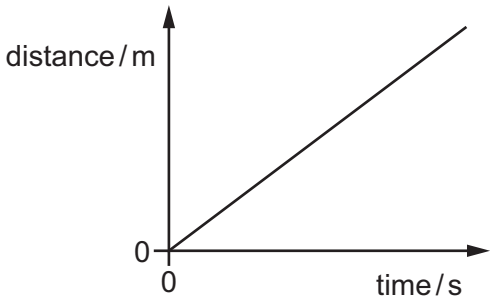
A



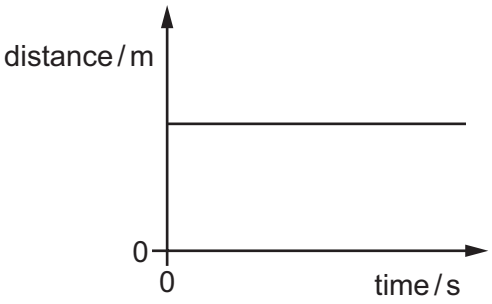
B



C



D

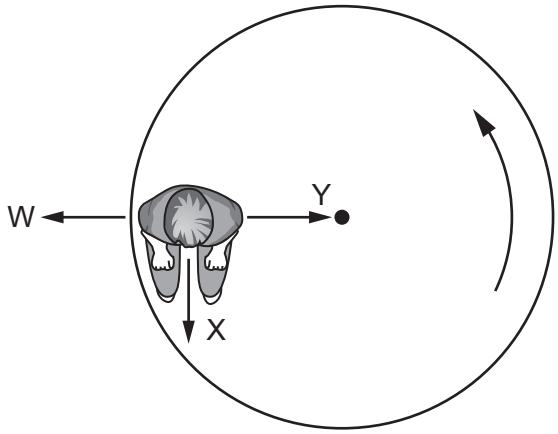


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5 A boy sits on a playground roundabout (carousel).

The roundabout carries the boy in a horizontal, anticlockwise circle at a constant speed.

The diagram shows the view of the roundabout from above.



What describes the resultant force on the boy?

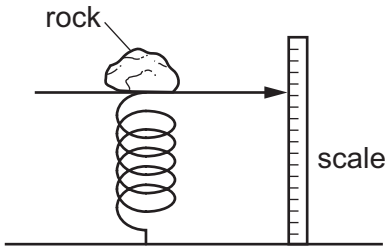
A The resultant force is zero.

B The resultant force is in direction W.

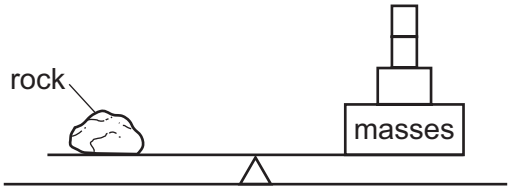
C The resultant force is in direction X.

D The resultant force is in direction Y.

6 A scientist places a rock on a spring balance. She then places the same rock on a beam balance.



spring balance



beam balance

At the North Pole, the gravitational field strength is greater than at the Equator.

She performs the experiment at the North Pole and at the Equator.

How do the readings at the North Pole compare with those at the Equator?

	scale reading on spring balance	masses needed on beam balance
A	different at North Pole	different at North Pole
B	different at North Pole	same at North Pole
C	same at North Pole	different at North Pole
D	same at North Pole	same at North Pole

7 What affects the stability of an object?

A only its base area and the location of its centre of mass

B only its weight and its base area

C only the location of its centre of mass

D only its weight

8 Which object behaves as an elastic solid as it deforms?

A a bullet as it hits a solid metal wall

B a car damaged in a collision

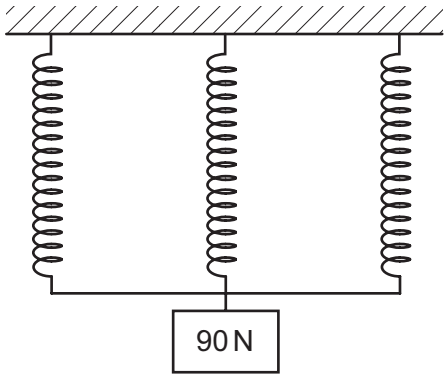
C a piece of metal cut by a saw

D a football as it is kicked

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9 A spring extends by 6.0 cm when a 15 N weight is suspended from its lower end.

Three of these springs are used as shown to support a 90 N weight.



What is the extension of each spring?

A 2.0 cm **B** 12 cm **C** 36 cm **D** 110 cm

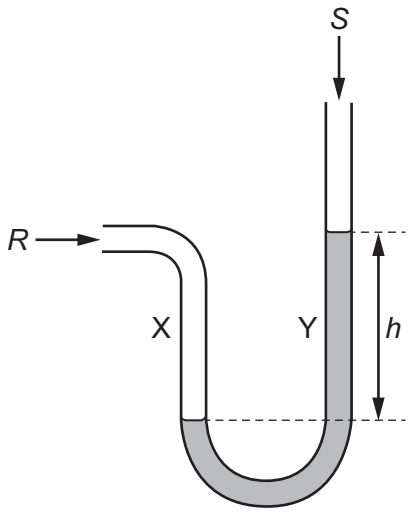
10 Objects of different weights are placed on a rigid, horizontal surface.

Which row shows the correct pressure acting on the surface?

	weight / N	area in contact / m^2	pressure / Pa
A	10	0.1	1
B	20	0.2	0.01
C	30	0.1	300
D	40	0.2	8

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11 The diagram shows a simple manometer that contains a liquid.



Side X is connected to a gas supply of pressure *R*.
Side Y is open to the atmosphere at pressure *S*.

Which pressure is the length *h* used to measure?

A *R*

B *S*

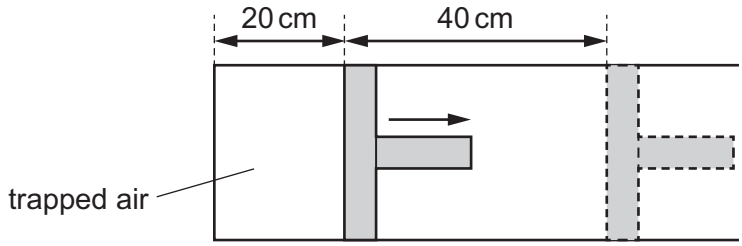
C $R - S$

D $R + S$

12 Air is trapped in a cylinder by a piston. The pressure of the air is *p* and the length of the air column is 20 cm.

The piston is moved outwards until the length of the air column has increased by 40 cm.

The temperature of the air remains constant.



What is the new air pressure?

A $\frac{p}{2}$ **B** $\frac{p}{3}$ **C** $2p$ **D** $3p$

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13 A student uses a newton meter to pull an object horizontally along rough ground. The student multiplies the newton meter reading by the distance moved by the object.

What does this calculation give?

A the efficiency of the process

B the kinetic energy of the object

C the power generated

D the work done on the object

14 A builder carrying six bricks climbs a ladder. Each brick weighs 25 N and the builder climbs a vertical distance of 4.0 m in 8.0 s.

What is the average power used to raise the bricks?

A 13 W **B** 75 W **C** 750 W **D** 4800 W

15 A copper rod is heated at one end.

Which statement describes how heat transfer occurs in the copper?

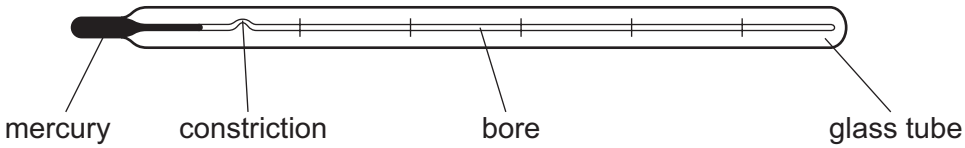
A Energetic copper molecules move from the cooler end to the hotter end.

B Energetic copper molecules move from the hotter end to the cooler end.

C Energetic free electrons move from the cooler end to the hotter end.

D Energetic free electrons move from the hotter end to the cooler end.

16 The diagram shows a clinical thermometer.



Which factor affects the sensitivity of the thermometer?

A the constriction

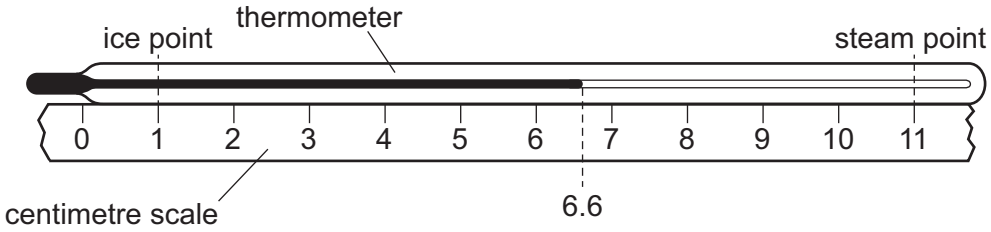
B the diameter of the bore

C the length of the glass tube

D the thickness of the glass tube

17 A centimetre scale is fixed next to an unmarked mercury-in-glass thermometer.

The ice point and the steam point are marked.



What is the temperature shown on the thermometer?

A 44 °C **B** 56 °C **C** 60 °C **D** 66 °C

18 Water is poured into four dishes. In two of the dishes the water has a small surface area and in the other two it has a large surface area. The water in two of the dishes is cool and the water in the other two is warm.

From which dish does the water evaporate the quickest?

	surface area	temperature
A	large	cool
B	large	warm
C	small	cool
D	small	warm

19 A wave of frequency 13 000 Hz travels 1300 m in 4.0 s.

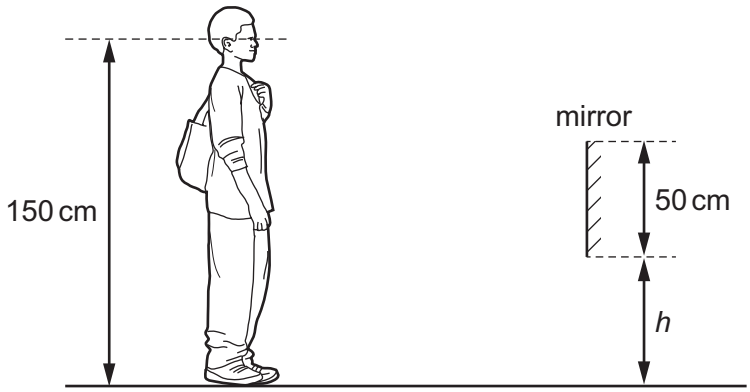
What is the wavelength of the wave?

A 0.025 m **B** 0.40 m **C** 2.5 m **D** 40 m

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20 A shoe shop puts a mirror on the wall so that customers can look at their shoes.

The length of the mirror is 50 cm. A customer has eyes 150 cm above ground level.

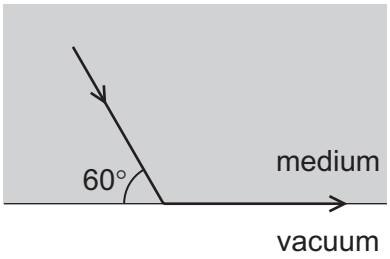


The bottom of the mirror is at height *h* above the ground.

What is the smallest value of *h* that allows the customer to see an image of his shoes in the mirror?

A 0 **B** 25 cm **C** 50 cm **D** 75 cm

21 The diagram shows light travelling through a medium. The light reaches the boundary with a vacuum as shown. The light emerges travelling along the surface.

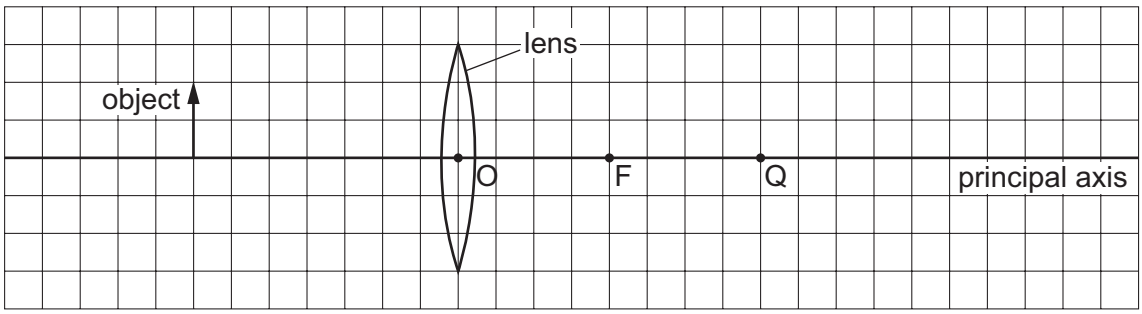


What is the refractive index of the medium?

A $\frac{\sin 60°}{\sin 30°}$ **B** $\frac{\sin 60°}{\sin 90°}$ **C** $\frac{\sin 90°}{\sin 30°}$ **D** $\frac{\sin 90°}{\sin 60°}$

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22 The diagram shows an object on the principal axis of a converging (convex) lens. A principal focus of the lens is at F.



Where is the image formed by the lens?

A between O and F

B between F and Q

C at Q

D to the right of Q

23 A digital camera uses a lens to produce a diminished (reduced in size) image on a light sensor.

Which row shows the correct type of lens and the nature of the image?

	type of lens	nature of image
A	converging	inverted
B	converging	upright
C	diverging	inverted
D	diverging	upright

24 Which application uses microwaves?

A detecting small cracks in metals

B gaining a sun-tan

C lighting a fluorescent tube

D satellite television

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25 A star explodes in outer space.

Which waves from the exploding star do **not** reach the Earth?

A infra-red

B light

C radio

D sound

26 A metal bar PQ hangs from a thin thread and always comes to rest with end P pointing north. Another bar XY of the same metal settles in no definite direction.

What happens if the two bars are brought near one another?

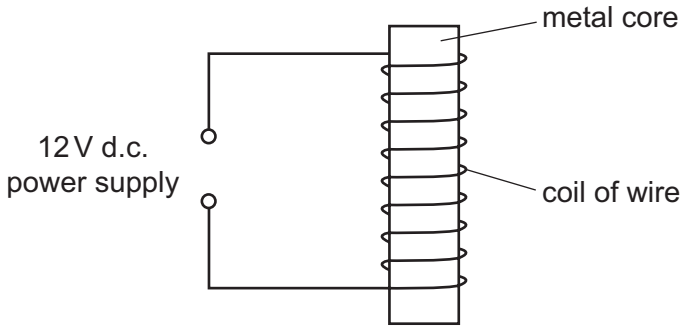
A End P and end Q both attract end X.

B End P attracts end X but repels end Y.

C End P neither attracts nor repels end X.

D End P repels end X but attracts end Y.

27 The diagram shows a 12 V d.c. power supply connected across a coil with a metal core.



The core becomes a magnet when the current is switched on. It remains a magnet after the current is switched off.

From which metal is the core made?

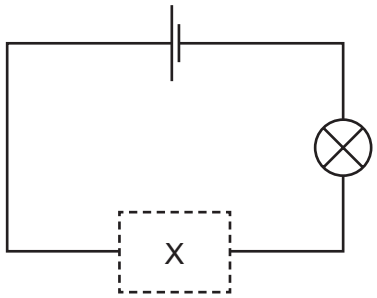
A aluminium

B copper

C soft iron

D steel

28 With component X placed in the circuit below, the brightness of the lamp can be gradually reduced until it goes out.



What is component X?

A a reed relay

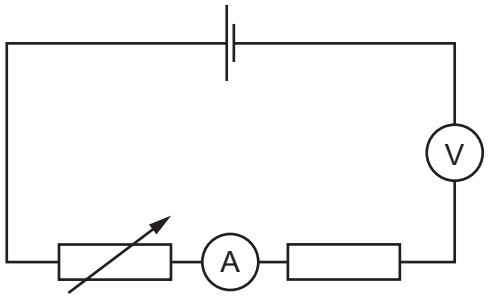
B a switch

C a transformer

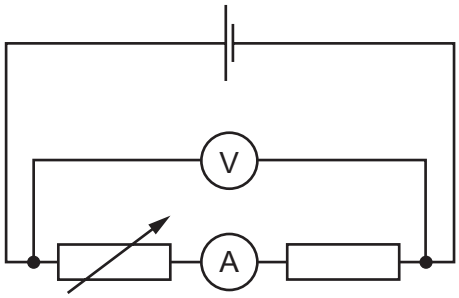
D a variable resistor

29 Which circuit is connected correctly to measure the current in a fixed resistor and the potential difference (p.d.) across the same resistor?

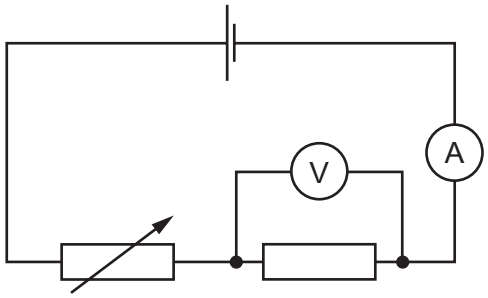
A



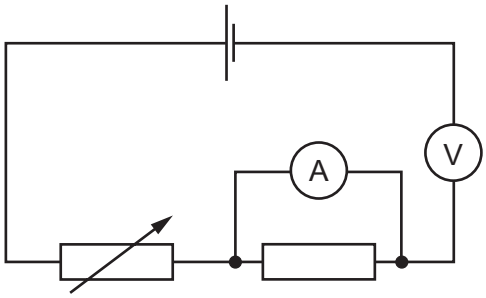
B



C



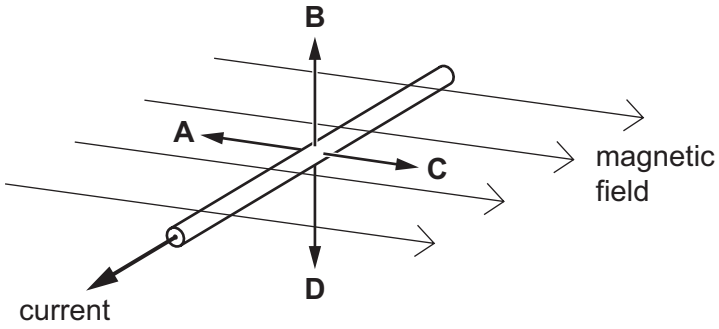
D



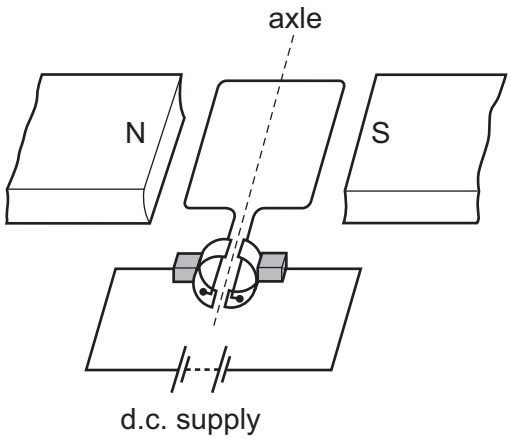
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30 The diagram shows a current-carrying wire in a horizontal magnetic field.

Which arrow shows the direction of the force experienced by the wire?



31 The diagram shows a d.c. motor with its coil horizontal.



Why is a split-ring commutator used?

A to change the current direction in the coil as the coil passes the horizontal position

B to change the current direction in the coil as the coil passes the vertical position

C to change the current direction in the d.c. supply as the coil passes the horizontal position

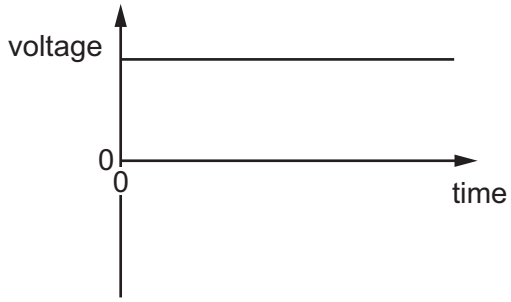
D to change the current direction in the d.c. supply as the coil passes the vertical position

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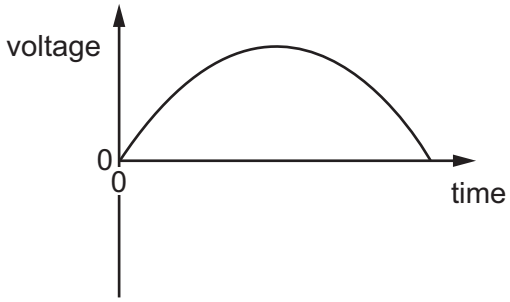
[Turn over

32 Which graph shows the voltage output of an a.c. generator when the coil makes **one** complete revolution?

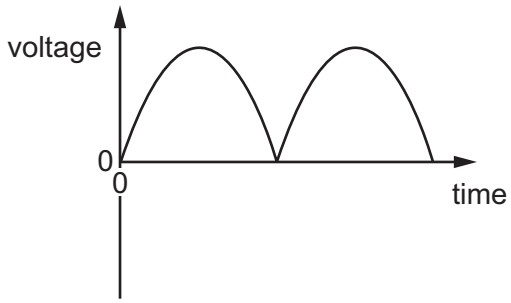
A



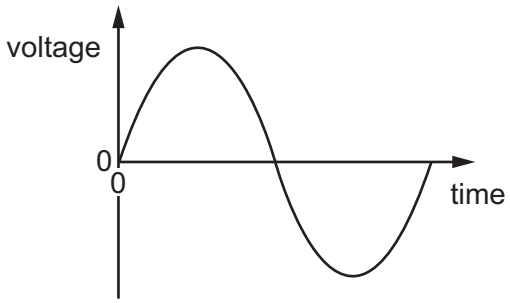
B



C



D



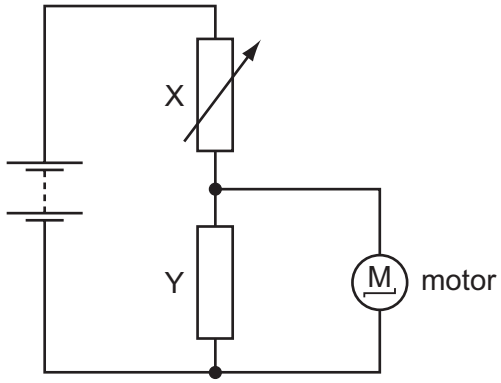
33 An electric current flows through a thin metal filament in a vacuum. The filament emits particles.

Which particle is emitted and what is its charge?

	particle	charge
A	electron	negative
B	proton	negative
C	electron	positive
D	proton	positive

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34 In the circuit shown, resistors X and Y act as a potential divider to control the speed of a motor.



What is the reason for the potential divider?

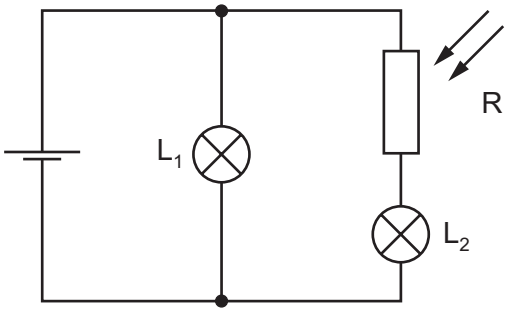
A to vary the direction of the current in X

B to vary the e.m.f. of the battery

C to vary the potential difference across the motor

D to vary the resistance of the motor

35 In the circuit shown, R is a light-dependent resistor. Its resistance decreases when the intensity of the light shining on it increases.



The light intensity on R increases.

What happens to the brightness of the two lamps L_1 and L_2?

	L_1	L_2
A	decreases	decreases
B	decreases	increases
C	stays the same	decreases
D	stays the same	increases

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36 Why is a reed relay used in a switching circuit?

A to switch on a small current using a large current

B to switch on a small voltage using a large voltage

C to switch on a large current using a small current

D to switch on a large voltage using a large current

37 Three types of radiation emitted by unstable nuclei are electrons, helium nuclei and electromagnetic radiation.

What are these types of radiation?

	electrons	helium nuclei	electromagnetic radiation
A	alpha	beta	gamma
B	alpha	gamma	beta
C	beta	alpha	gamma
D	beta	gamma	alpha

38 The energy emitted by the Sun is released when the nuclei of an element fuse together.

Which nuclei, when fusing together, release most of the energy in the Sun?

A carbon

B helium

C hydrogen

D uranium

39 A sample of wood contains 9.0×10^{16} nuclei of carbon-14. The nuclei undergo radioactive decay with a half-life of 5600 years.

How many carbon-14 nuclei remain in this sample after 16 800 years?

A 1.1×10^{2} **B** 1.1×10^{16} **C** 3.0×10^{16} **D** 4.5×10^{16}

40 How many nucleons are in one neutral atom of the krypton isotope $^{84}_{36}\text{Kr}$?

A 36 **B** 48 **C** 84 **D** 120

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