Cambridge
O Level

Cambridge International Examinations
Cambridge Ordinary Level

PHYSICS **5054/12**

Paper 1 Multiple Choice **May/June 2018**

1 hour

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

* 7 0 5 4 8 5 7 8 1 5 *

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.

IB18 06_5054_12/2RP
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1 Which is a vector quantity?

A a mass of 2.0 kg

B a temperature of –10 °C

C a weight of 15 N

D an average speed of 20 m / s

2 Forces of 4.0 N and 2.0 N act at a point.

Which scale diagram shows the forces that have a resultant of 4.0 N?

A



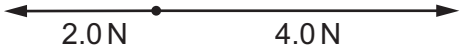
B



C



D



3 What is the name and value of the unit of power written as mW?

	name	value
A	megawatt	10^{-3} W
B	megawatt	10^{6} W
C	milliwatt	10^{-3} W
D	milliwatt	10^{6} W

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4 Micrometers, metre rules, tapes and calipers are used for measuring lengths.

Which row identifies the most suitable device for accurately measuring the stated length?

	length	measuring device
A	0.15 mm	micrometer
B	0.50 mm	metre rule
C	0.15 m	tape
D	0.50 m	calipers

5 The planets in the Solar System orbit the Sun.

Which statement is correct?

A There is a force on each planet away from the Sun.

B There is a force on each planet in the direction in which it travels.

C There is a force on each planet opposite to the direction in which it travels.

D There is a force on each planet towards the Sun.

6 Which forces act on a skydiver who is falling at terminal velocity?

A air resistance and weight

B air resistance only

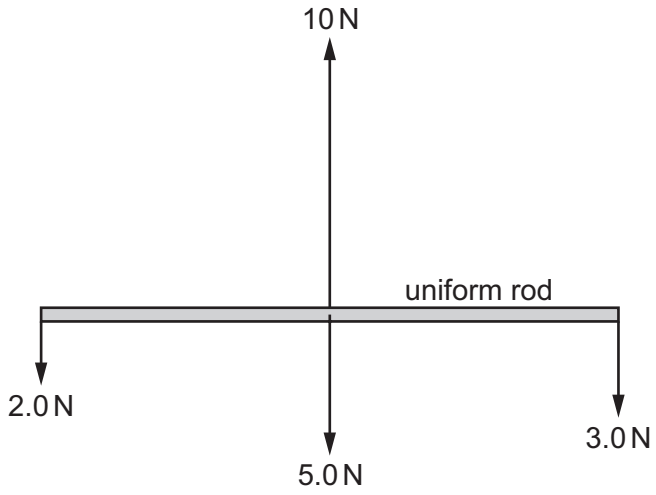
C weight only

D no forces act

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7 A uniform rod of weight 5.0 N is held initially at rest.

The diagram shows the forces acting on the rod when it is released.



What happens to the rod when it is released?

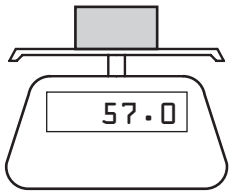
A It does not move.

B It moves to the right.

C It moves upwards.

D It starts to rotate.

8 A block of metal is placed on an electronic balance to record its mass.



What is the unit of the reading on the electronic balance and what is the unit of weight?

	unit on electronic balance	unit of weight
A	g	g
B	g	N
C	N	g
D	N	N

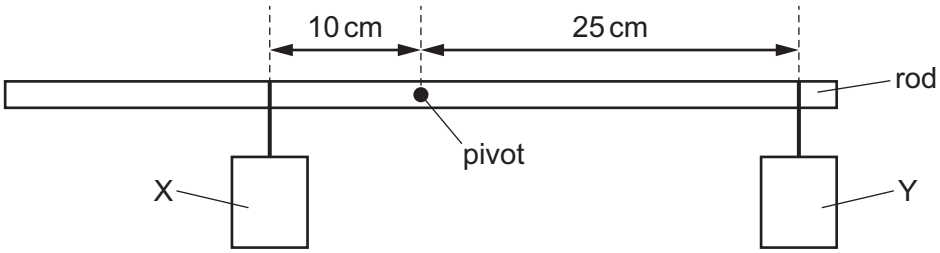
9 A body of mass 10 kg falling freely in the gravitational field close to the Moon's surface has an acceleration of 1.6 m/s^2.

What is the gravitational field strength on the Moon?

A 0 N/kg **B** 1.6 N/kg **C** 10 N/kg **D** 16 N/kg

10 Two objects X and Y are suspended from a uniform rod, pivoted at its centre.

The rod is in equilibrium.



Which statement about X and Y is correct?

A The mass of X is 0.4 times the mass of Y.

B The mass of X is 2.5 times the mass of Y.

C The mass of X is 3.5 times the mass of Y.

D The mass of X is equal to the mass of Y.

11 A force of 1600 N accelerates a car, of mass 800 kg, from rest.

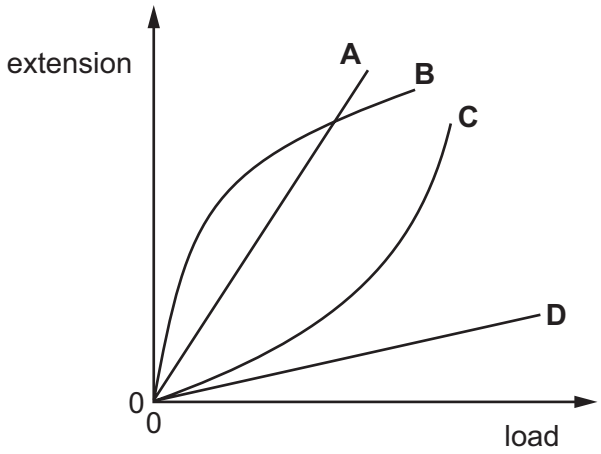
What is the car's acceleration and its velocity after 4.0 s?

	acceleration m/s^2	velocity m/s
A	0.50	0.13
B	0.50	0.50
C	2.0	2.0
D	2.0	8.0

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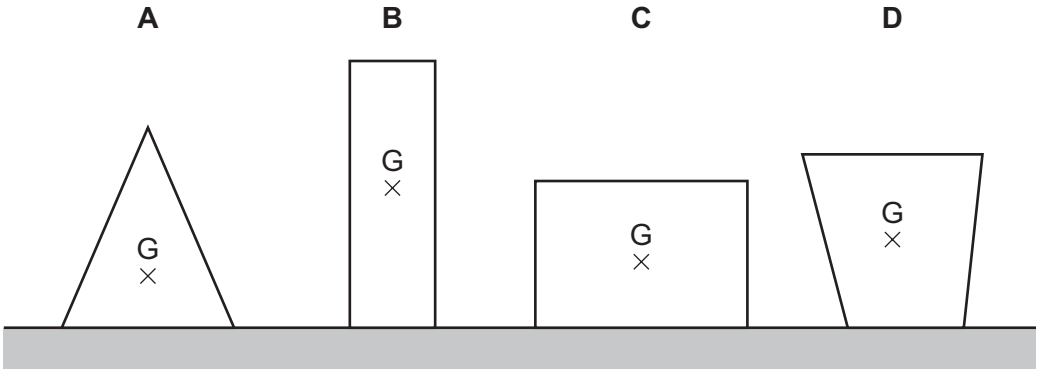
12 The graph shows extension-load curves for four fibres.

Which fibre is the most difficult to stretch over the range of loads shown?



13 Four objects of equal mass rest on a table. The centre of mass of each object is labelled G.

Which object is the least stable?



14 Which power station produces carbon dioxide when operating?

A gas-fired power station

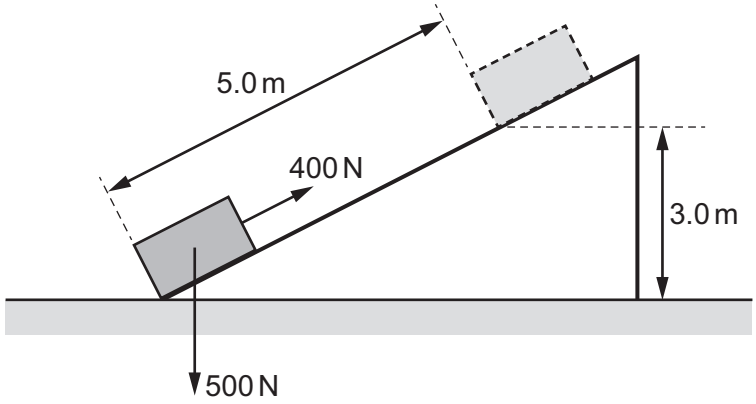
B geothermal power station

C nuclear power station

D wind power station

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15 Work is done when a force of 400 N pulls a crate of weight 500 N at a constant speed along a ramp, as shown.

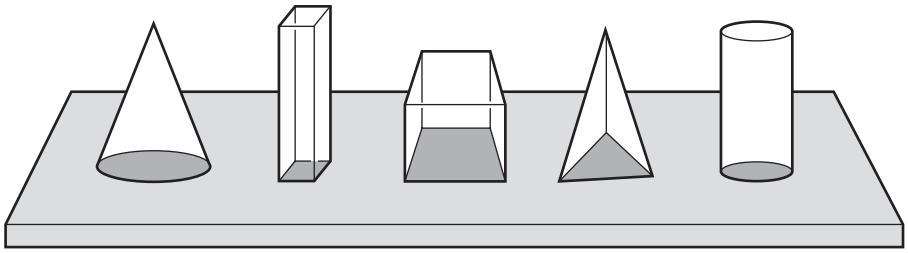


Part of the work done increases the gravitational potential energy E of the crate and the rest is work done W against friction.

What are the values of E and W?

	E / J	W / J
A	1500	500
B	1500	2000
C	2000	2500
D	3500	500

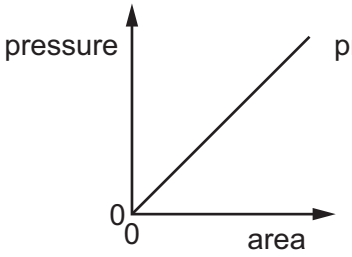
16 Five blocks have the same mass but different base areas. They all rest on a horizontal table.



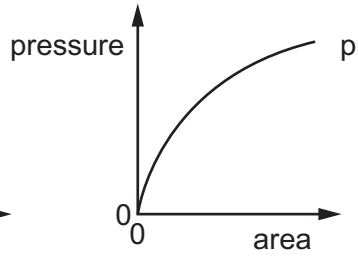
A graph is plotted to show the relationship between the pressure exerted on the table and the base area of the block.

Which graph shows this relationship?

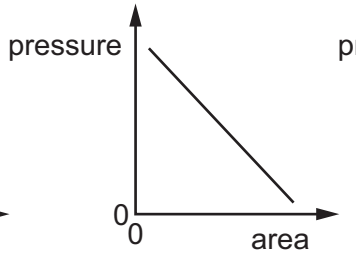
A



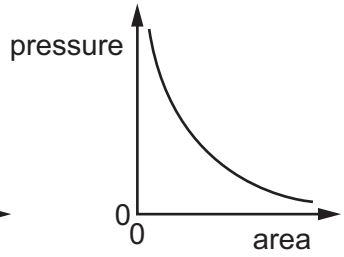
B



C



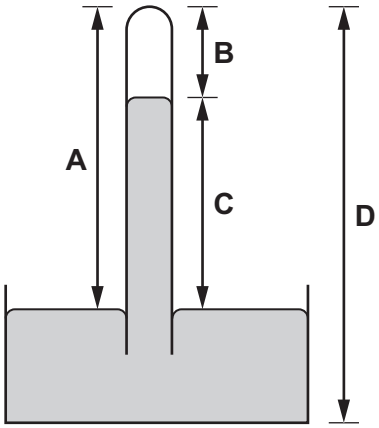
D



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17 The diagram shows a simple mercury barometer.

Which height is a measure of the atmospheric pressure?



18 A sealed packet containing air and a snack is purchased at an airport. The sealed packet is taken on board an aircraft. During the flight the packet becomes larger.

What causes the packet to become larger?

A The density of the air inside the packet increases.

B The mass of the packet increases.

C The pressure of the air outside the packet decreases.

D The volume of the air inside the packet decreases.

19 A sealed container of gas is heated and the pressure inside increases.

What happens to the molecules of the gas to cause this increase in pressure?

A Their kinetic energy decreases.

B They become heavier.

C They expand.

D They hit the container more frequently.

20 Equal masses of copper and water are heated to the same temperature. As they cool down, the copper and the water lose thermal energy at the same rate.

The temperature of the copper falls faster.

Why is this?

A Copper has a larger specific heat capacity.

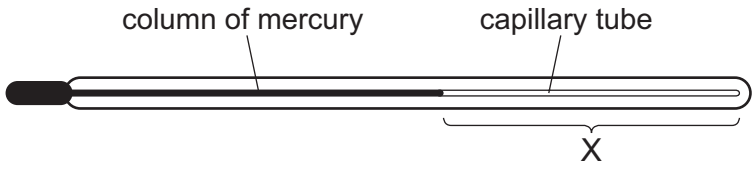
B Copper has a larger specific latent heat.

C Copper has a smaller specific heat capacity.

D Copper has a smaller specific latent heat.

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21 The diagram shows a thermometer.



What is in region X of the capillary tube?

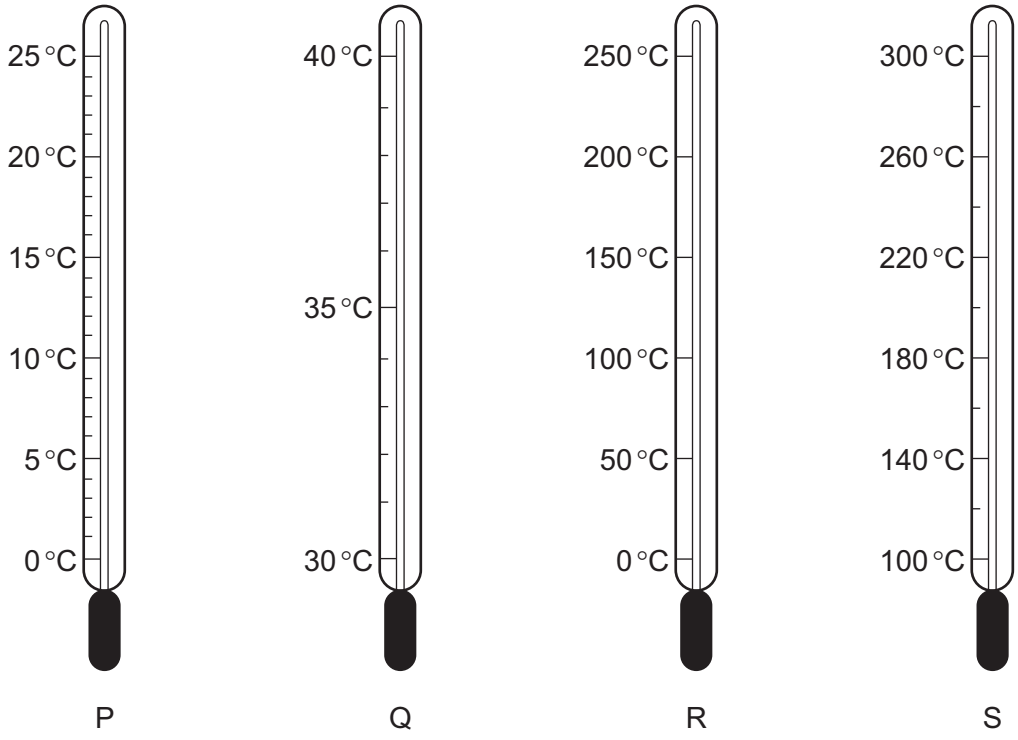
A a vacuum

B alcohol

C steam

D water

22 The diagrams represent four thermometers.



Which thermometer has the greatest sensitivity and which thermometer has the greatest range?

	greatest sensitivity	greatest range
A	P	R
B	P	S
C	Q	R
D	Q	S

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[Turn over

23 The resistance R of a wire increases uniformly with temperature. The values of R at the fixed points are shown in the table.

	0 °C	100 °C
R/Ω	100	250

What is the temperature when $R = 160\,\Omega$?

A 24 °C **B** 40 °C **C** 60 °C **D** 64 °C

24 Samples of four different materials at room temperature are heated from below and heat is transferred upwards.

In which material is all of the heat transferred by the vibration of molecules?

A air

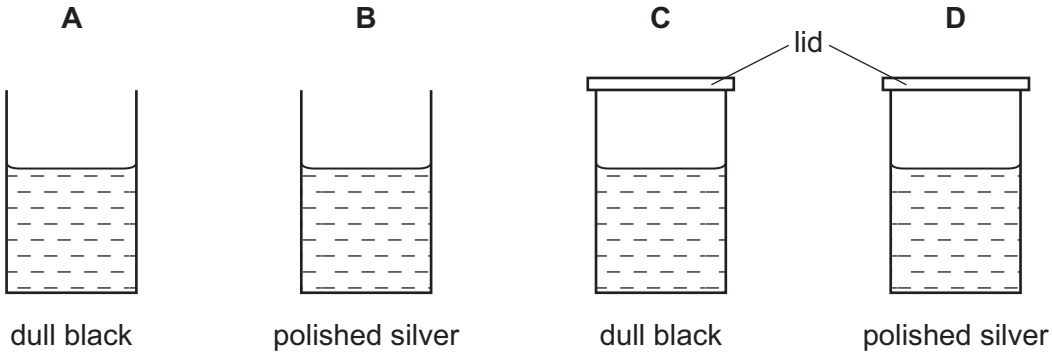
B mercury

C rubber

D water

25 The diagrams show four identical cans with their outside surfaces either polished silver or painted dull black. Each can contains the same volume of water, initially at 80 °C.

After five minutes in a cool room, which can contains the coolest water?



26 A communications system uses microwaves with a wavelength of 15 cm. The speed of light is 3.0×10^8 m/s.

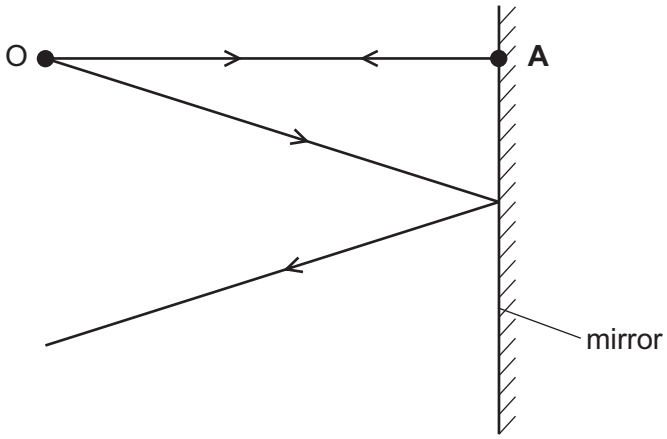
What is the frequency of the microwaves?

A 2.0×10^7 Hz **B** 4.5×10^7 Hz **C** 2.0×10^9 Hz **D** 4.5×10^9 Hz

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27 The diagram shows two divergent rays of light from an object O being reflected from a plane mirror.

At which position is the image formed?



● **B**

● **C**

● **D**

28 Which statement about blue light is correct?

A Blue light has a smaller frequency than red light.

B Blue light has a longer wavelength than red light.

C Blue light has the same speed in glass as red light.

D Blue light is refracted more by a glass prism than red light.

29 Which device uses total internal reflection?

A magnifying glass

B optical fibre

C photographic enlarger

D projector

30 A television controller emits an infra-red beam.

Which statement about infra-red radiation is correct?

A It causes ionisation.

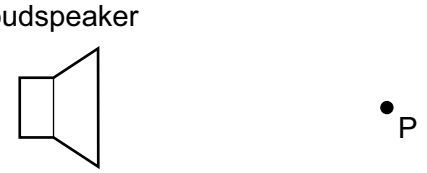
B It consists of longitudinal waves.

C It has a higher frequency than ultra-violet light.

D It travels at the speed of light.

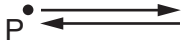
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31 The diagram shows a loudspeaker that is producing a continuous sound wave of frequency 200 Hz in air.

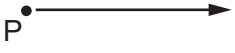


Which diagram best shows how the sound wave causes a molecule at P to move during $\frac{1}{200}$ s ?

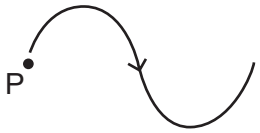
A



B



C



D



32 Which frequency is in the range heard by a healthy human ear?

A 12 mHz **B** 12 Hz **C** 12 kHz **D** 12 MHz

33 What is one of the uses of ultrasound?

A cleaning jewellery

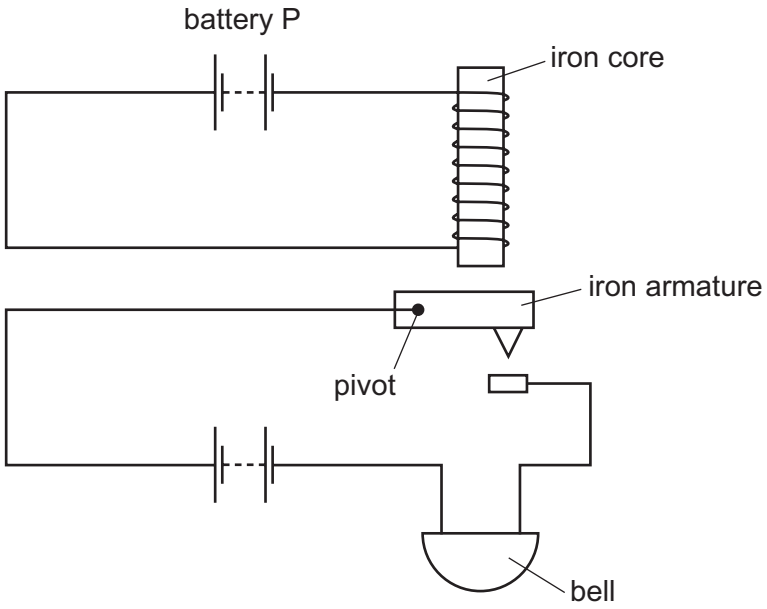
B satellite communication

C fluorescent tubes

D optical fibres

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34 The diagram shows an alarm system.



What happens when battery P is disconnected?

	iron armature	bell
A	falls	rings
B	falls	stops ringing
C	moves up	rings
D	moves up	stops ringing

35 V is a potential difference, I is a current, R is a resistance, and t is a time.

Which expression has units of energy?

A It **B** I^2R **C** VIt **D** $\frac{V^2}{R}$

36 A step-down transformer has a primary coil and a secondary coil wound on a soft-iron core.

The primary coil is connected to a 6.0 V direct current (d.c.) supply.

Which statement about the transformer is correct?

A The output voltage is equal to 6.0 V.

B The output voltage is greater than 6.0 V.

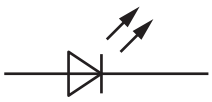
C The output voltage is less than 6.0 V but more than zero.

D There is no output voltage.

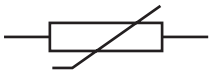
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37 Which symbol is used for a light-dependent resistor?

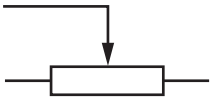
A



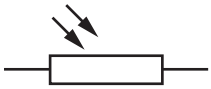
B



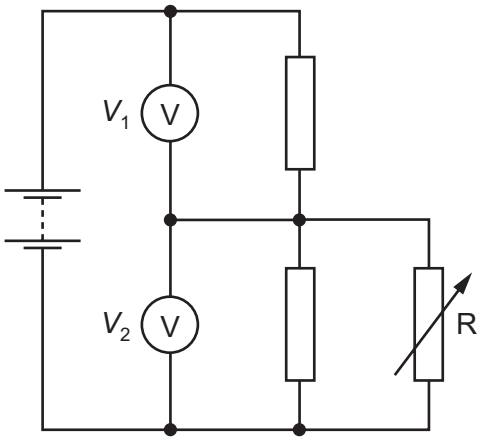
C



D



38 The circuit diagram shows a variable resistor R connected in parallel to the lower half of a potential divider.



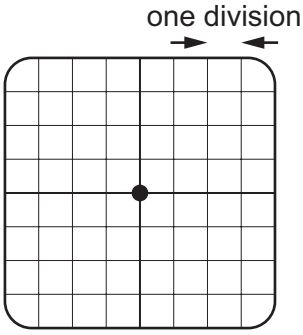
The resistance of R increases.

What happens to the two voltmeter readings?

	V_1	V_2
A	decreases	decreases
B	decreases	increases
C	increases	decreases
D	increases	increases

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39 An oscilloscope is used to measure potential difference (p.d.). The trace with no input connected is shown.

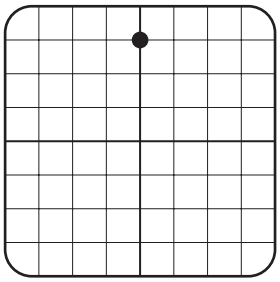


A 1.5 V d.c. supply is connected to the oscilloscope.

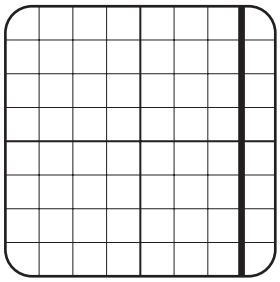
The Y-gain is set at 0.5 V / div. The time-base is set at 0.5 ms / div.

Which trace shows a supply of 1.5 V d.c.?

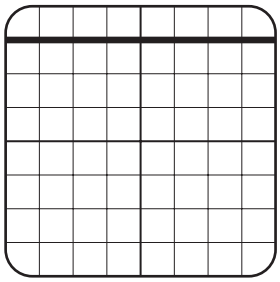
A



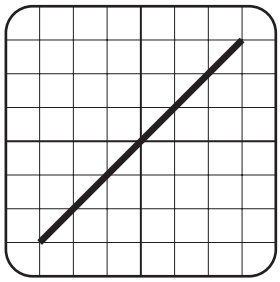
B



C



D



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

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

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