Cambridge
O Level

Cambridge International Examinations
Cambridge Ordinary Level

PHYSICS **5054/12**

Paper 1 Multiple Choice **May/June 2014**

1 hour

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

6663626430

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 **14** printed pages and **2** blank pages.

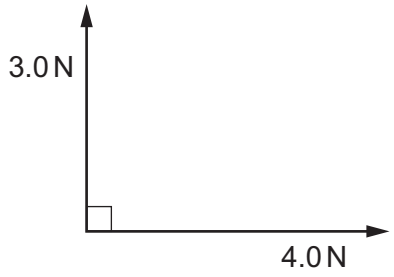
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1 Each row contains a vector and a scalar.

In which row is the size of the vector equal to the size of the scalar?

	vector	scalar
A	displacement of a car	speed of the car
B	velocity of a car	distance travelled by the car
C	velocity of a car	speed of the car
D	weight of a car	mass of the car

2 What is the size of the resultant of the two forces shown in the diagram?



A 1.0 N **B** 3.5 N **C** 5.0 N **D** 7.0 N

3 A student measures, as **accurately** as possible, the length and internal diameter of a straight glass tube.

The length is approximately 25 cm and the internal diameter is approximately 2 cm.

What is the best combination of instruments for the student to use?

	internal diameter	length
A	ruler	micrometer
B	ruler	ruler
C	vernier calipers	micrometer
D	vernier calipers	ruler

4 An object falls from rest through the air. Its velocity increases until it reaches terminal velocity.

Which quantity **increases** until its terminal velocity is reached?

A acceleration

B air resistance

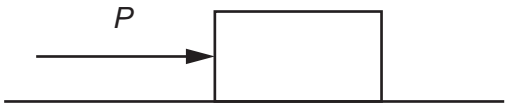
C resultant force

D weight

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5 The diagram shows a block of stone on a rough horizontal surface.

Force *P* acts on the block as shown.

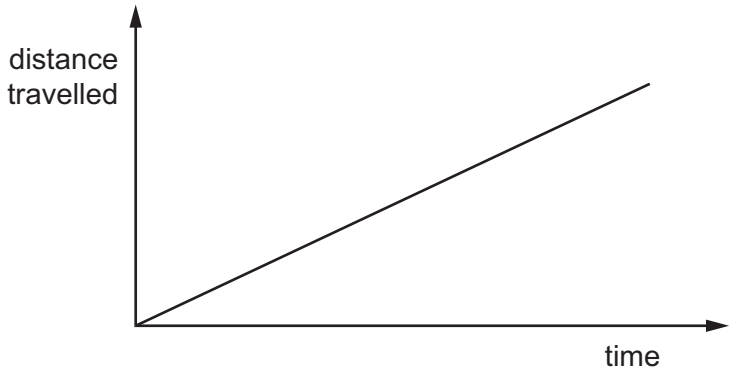


The block is at rest. A frictional force *F* acts on the block.

Which row shows the direction and size of *F*?

	direction of *F*	size of *F*
A	to the left	more than *P*
B	to the right	more than *P*
C	to the left	same as *P*
D	to the right	same as *P*

6 The distance travelled by a car is increasing uniformly as it is driven along a straight road up a hill.



Which quantity for the car is constant but not zero?

A acceleration

B gravitational potential energy

C kinetic energy

D resultant force

7 Four rocks on different planets have masses and weights as shown.

Which planet has the greatest gravitational field strength?

	mass / kg	weight / N
A	2.0	14
B	2.5	20
C	3.0	21
D	3.5	19

8 A stone has a mass of 390 g and a density of 2.7 g / cm^3.

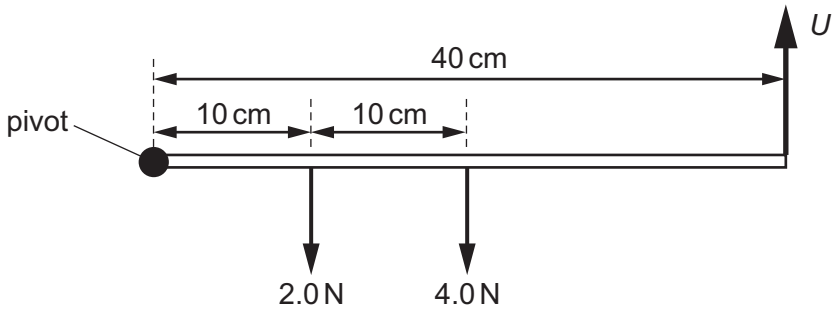
Cooking oil has a density of 0.90 g / cm^3.

Which mass of oil has the same volume as the stone?

A 130 g **B** 160 g **C** 900 g **D** 1200 g

9 A beam of length 40 cm is pivoted at one end.

The weight of the beam is 4.0 N and acts at a point 20 cm from the pivot. A 2.0 N weight hangs 10 cm from the pivot.



An upward force *U* is needed to keep the beam horizontal.

What is the size of *U*?

A 0.5 N **B** 1.5 N **C** 2.5 N **D** 6.0 N

10 A man uses clay to make a pot. He wants the pot to be as stable as possible when placed on a flat surface.

Which two features of the pot must the man consider?

A the area of the base and the height of the centre of gravity

B the density of the clay and the area of the base

C the density of the clay and the height of the centre of gravity

D the weight and the height of the centre of gravity

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11 A force is applied to a body.

Which property of the body **cannot** be changed by the force?

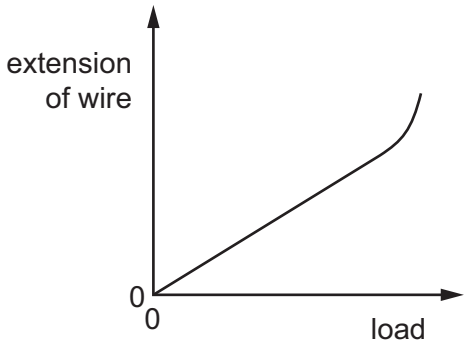
A its mass

B its shape

C its size

D its velocity

12 The graph shows the extension of a piece of copper wire as the load on it is increased.



What does the graph show?

A At a certain load the wire becomes easier to extend.

B At a certain load the wire becomes harder to extend.

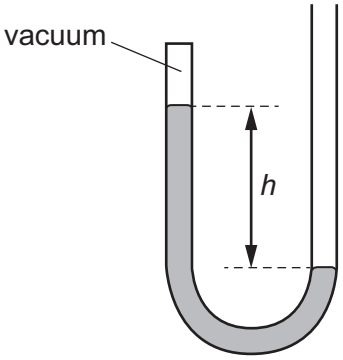
C The load and extension are directly proportional for all loads.

D The load and extension are inversely proportional for all loads.

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[Turn over

13 The diagram shows a manometer containing mercury that is sealed at one end.



What happens to the distance *h* when the manometer is taken to the top of a mountain?

A It decreases, because atmospheric pressure decreases with height.

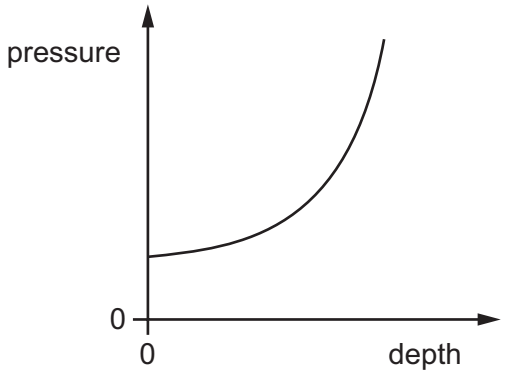
B It decreases, because atmospheric pressure increases with height.

C It increases, because atmospheric pressure decreases with height.

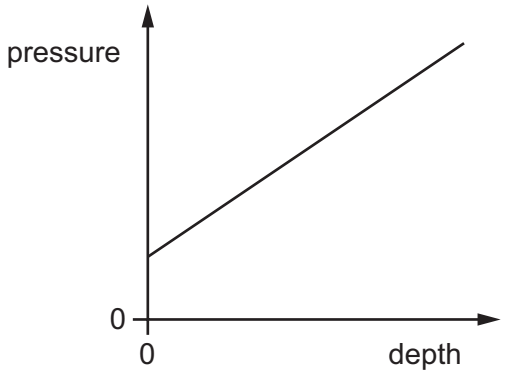
D It increases, because atmospheric pressure increases with height.

14 Which graph shows the total external pressure acting on a submarine at different depths below the surface of the sea?

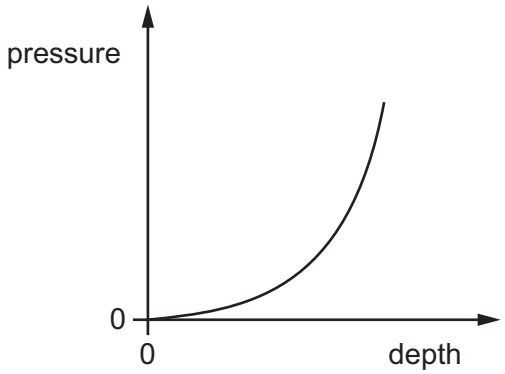
A



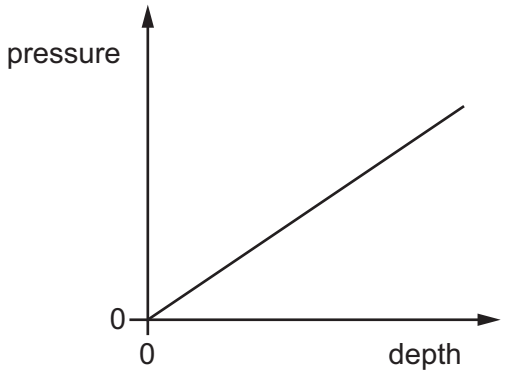
B



C



D



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15 A gas occupies a volume of 2.0 m^3 in a cylinder at a pressure of 240 kPa. A piston compresses the gas until the volume is 0.50 m^3, the temperature remaining constant.

What is the new pressure of the gas?

A 60 kPa **B** 240 kPa **C** 480 kPa **D** 960 kPa

16 Which source releases carbon dioxide, a greenhouse gas, when generating electricity?

A fossil fuels

B geothermal

C hydroelectric

D nuclear

17 Where is energy released by the fusion of hydrogen nuclei to form helium?

A in a nuclear power station

B in a radioactive isotope emitting alpha-particles

C in the core of the Earth

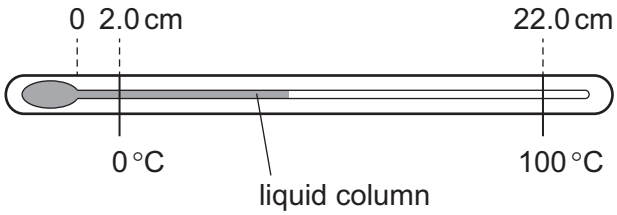
D in the core of the Sun

18 A crane lifts a load of 6000 N through a vertical distance of 15 m in 30 s.

What is the average useful power during this operation?

A 200 W **B** 400 W **C** 3000 W **D** 12 000 W

19 The diagram shows a liquid-in-glass thermometer.



At 0 °C, the length of the liquid column is 2.0 cm. At 100 °C, the length of the liquid column is 22.0 cm.

What is the length of the liquid column at 40 °C?

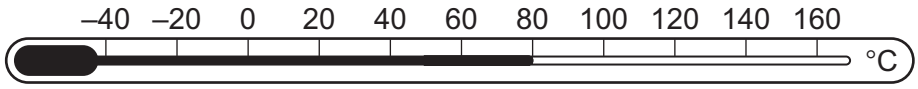
A 6.0 cm **B** 8.0 cm **C** 8.8 cm **D** 10.0 cm

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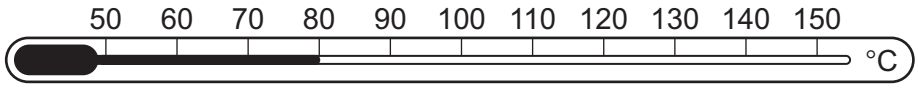
20 A thermometer is used to measure a temperature of 80 °C.

Which thermometer is the most sensitive?

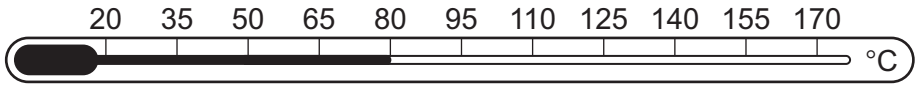
A



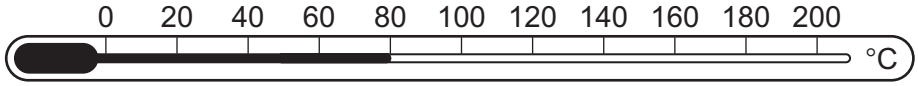
B



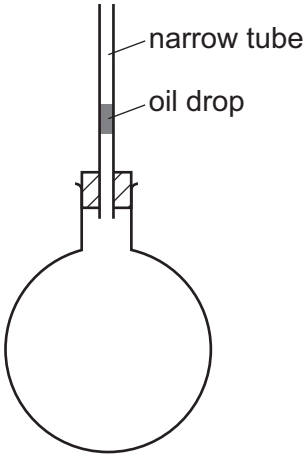
C



D



21 The diagram shows a flask containing air. The air is trapped by a drop of oil in a narrow tube.



When the flask is heated the oil drop rises up the tube.

Which statement is **not** correct?

A The air molecules each get larger.

B The air molecules hit the container with greater force.

C The air molecules move faster.

D The air molecules move further apart.

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22 Thermal energy is transferred to a solid. First it melts and then it boils to produce a gas.

Which statement about the temperature is correct?

A When melting and boiling the temperature does not change.

B When melting and boiling the temperature increases.

C When melting the temperature increases but when boiling the temperature stays the same.

D When melting the temperature stays the same but when boiling the temperature increases.

23 Steam at 100 °C is passed into some water in a beaker. All the steam condenses in the water.

The mass of water in the beaker rises from 120.0 g to 122.0 g.

The specific latent heat of vaporisation of water is 2250 J / g.

How much thermal energy is lost by the steam as it condenses?

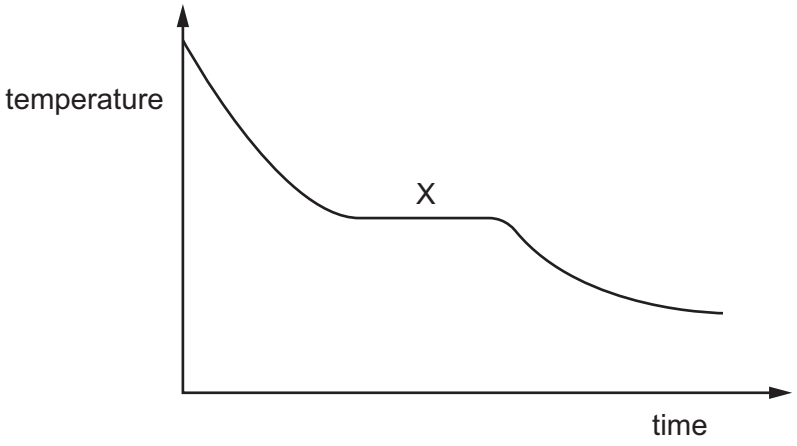
A 8.9×10^{-4} J

B 1.1×10^{3} J

C 4.5×10^{3} J

D 2.7×10^{5} J

24 A hot liquid is poured into a beaker. The graph shows how the temperature of the liquid changes as it cools towards room temperature.



What is occurring at region X?

A boiling and evaporation

B condensation only

C evaporation only

D solidification and evaporation

25 What is the frequency of a wave?

A The number of waves passing a fixed point per second.

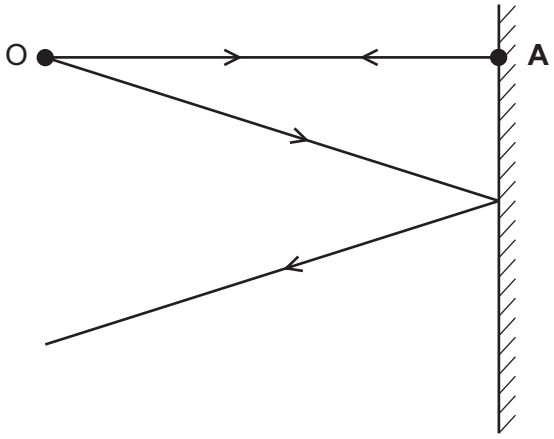
B The number of peaks added to the number of troughs passing a fixed point per second.

C The time taken for one wave to pass a fixed point.

D The time taken for the displacement to change from maximum to minimum.

26 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**

27 Which statement is correct for all electromagnetic waves?

A They are transverse.

B They cannot travel in a vacuum.

C They have the same frequency.

D They travel through lead.

28 Which frequency is in the ultrasound range?

A 35 Hz **B** 350 Hz **C** 3500 Hz **D** 35 000 Hz

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29 In an experiment to determine the speed of sound in air, a student stands 200 m away from a cliff and claps two pieces of wood together.

His class-mates standing next to him start stopwatches when the two pieces of wood meet and stop the stopwatches when they hear the echo.

Their times are:

1.44 s 1.70 s 1.58 s 1.76 s

Which value for the speed of sound do they obtain?

A 62 m/s **B** 123 m/s **C** 247 m/s **D** 340 m/s

30 What always produces a permanent bar magnet?

A an iron bar in a coil carrying alternating current (a.c.)

B an iron bar in a coil carrying direct current (d.c.)

C a steel bar in a coil carrying alternating current (a.c.)

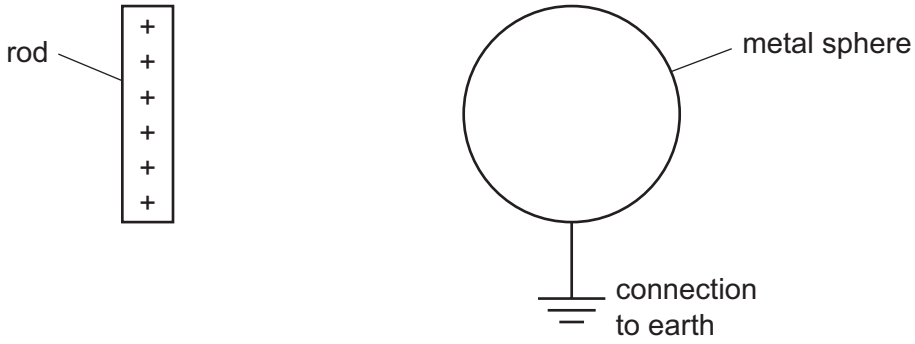
D a steel bar in a coil carrying direct current (d.c.)

31 Which row shows an electrical conductor and an insulator?

	electrical conductor	insulator
A	aluminium	rubber
B	copper	aluminium
C	plastic	copper
D	rubber	plastic

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32 A metal sphere is connected to earth. A positively charged rod approaches the sphere and stops before touching it.



What is the movement of charge on the sphere and what is the final charge on the sphere?

	movement of charge	final charge on sphere
A	negative charge moves from earth to the sphere	negative
B	negative charge moves from earth to the sphere	neutral
C	positive charge moves from the sphere to earth	negative
D	positive charge moves from the sphere to earth	neutral

33 An appliance uses a current of 3 A.

Which row is correct for the fuse in this appliance?

	most suitable fuse rating / A	fuse connected in
A	5	earth wire
B	5	live wire
C	13	earth wire
D	13	live wire

34 Which device uses the force experienced by a current in a magnetic field when in normal use?

A cathode-ray oscilloscope

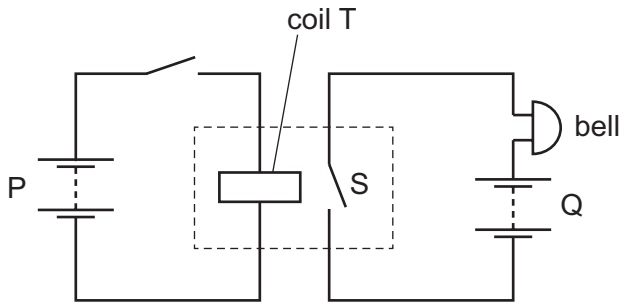
B electrostatic precipitator

C loudspeaker

D transformer

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35 A relay is used in a circuit containing a bell.



How can the apparatus be altered to make the sound of the bell louder?

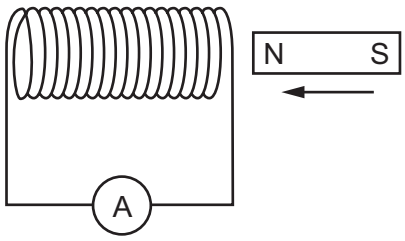
A increase the number of turns on coil T

B increase the voltage of battery P

C increase the voltage of battery Q

D move the coil closer to switch S

36 As a magnet is moved into the coil of wire as shown, there is a small reading on the sensitive ammeter.



Which change increases the size of the reading?

A moving the opposite pole into the coil

B pulling the magnet out of the coil

C pushing the magnet in faster

D unwinding some of the turns of wire

37 What are emitted by the hot filament inside a cathode-ray tube?

A alpha-particles

B atoms

C electrons

D protons

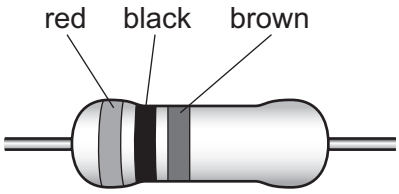
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38 The table contains part of the colour code for resistors.

black	brown	red
0	1	2

What is the resistance of the resistor with the colour bands shown?



A 102 Ω **B** 200 Ω **C** 201 Ω **D** 1000 Ω

39 Which row states the nature and range of beta-particles in air?

	nature	range in air
A	electromagnetic radiation	1-10 cm
B	electromagnetic radiation	10-100 cm
C	electron	1-10 cm
D	electron	10-100 cm

40 Which particle has the smallest mass?

A alpha-particle

B electron

C neutron

D proton

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