Cambridge
O Level

Cambridge International Examinations
Cambridge Ordinary Level

PHYSICS **5054/11**

Paper 1 Multiple Choice **October/November 2018**

1 hour

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

7390144058

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.

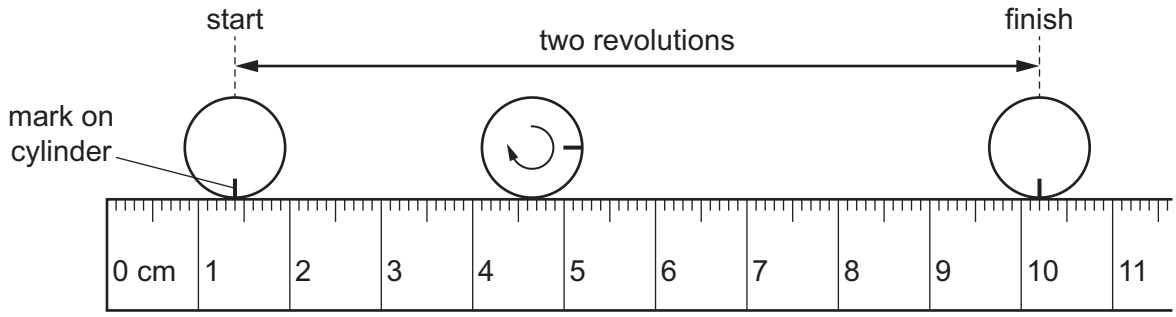
This document consists of **14** printed pages and **2** blank pages.

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1 What is a possible mass for a normal adult person?

A 7.5 kg **B** 75 kg **C** 750 kg **D** 7500 kg

2 A small cylinder is rolled along a ruler and completes two revolutions.



The circumference is the distance around the outside of a circle.

What is the circumference of the cylinder?

A 4.4 cm **B** 5.2 cm **C** 8.8 cm **D** 10.2 cm

3 A skydiver is falling at terminal velocity.



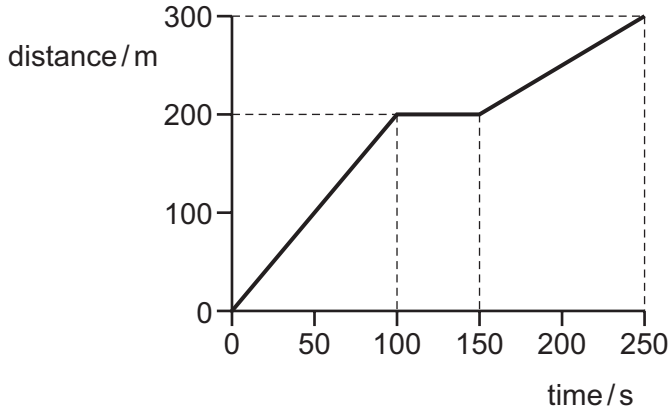
Which row describes the acceleration of the skydiver and the velocity of the skydiver?

	acceleration of the skydiver	velocity of the skydiver
A	downwards	constant
B	downwards	zero
C	zero	constant
D	zero	zero

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4 A cyclist takes a ride lasting 250 s.

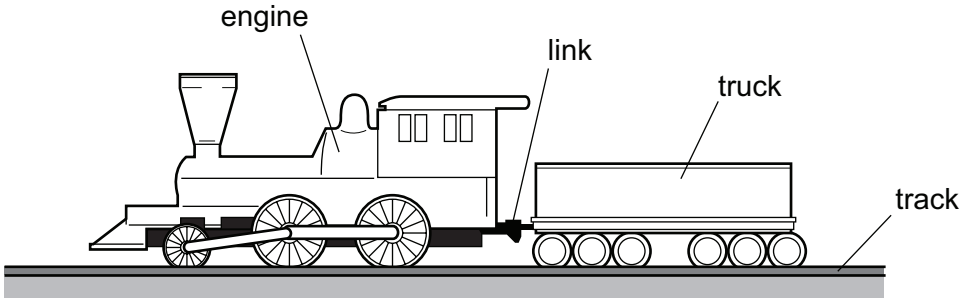
The graph shows how the distance from the starting position varies with time.



What is his average speed for the whole journey?

A 1.0 m / s **B** 1.2 m / s **C** 1.5 m / s **D** 2.0 m / s

5 An engine pulls a truck at constant speed on a level track.



The link between the engine and the truck breaks. The driving force on the engine remains constant.

What effect does this have on the engine and on the truck?

	engine	truck
A	speed stays constant	slows down
B	speeds up	slows down
C	speed stays constant	stops immediately
D	speeds up	stops immediately

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6 What happens to an object when it is moved to a location where the gravitational field strength is slightly greater?

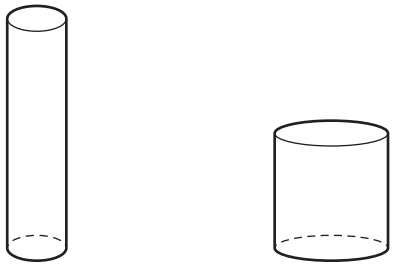
A Its density decreases.

B Its mass decreases.

C Its weight increases.

D Its volume increases.

7 Two cylinders P and Q are made of copper.



The height of P is twice the height of Q. The diameter of P is half the diameter of Q.

Which statement is correct?

A The density of cylinder P is four times that of cylinder Q.

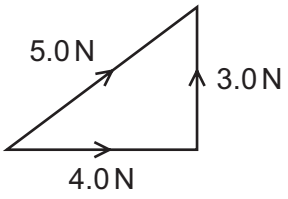
B The density of cylinder P is twice that of cylinder Q.

C The density of cylinder P is equal to that of cylinder Q.

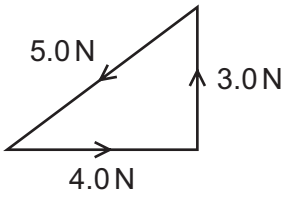
D The density of cylinder P is half that of cylinder Q.

8 Which diagram shows the addition of the 4.0 N and the 3.0 N forces?

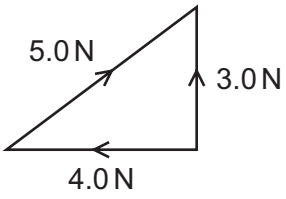
A



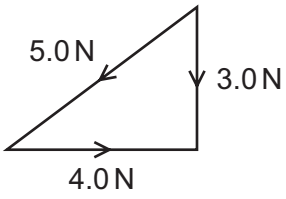
B



C



D



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9 An electric motor, connected to the mains, is used to lift bricks to the top of a building.

There is a fuse in the plug.

How can the efficiency of the motor be increased?

A Increase the friction in the motor.

B Reduce the energy losses in the motor.

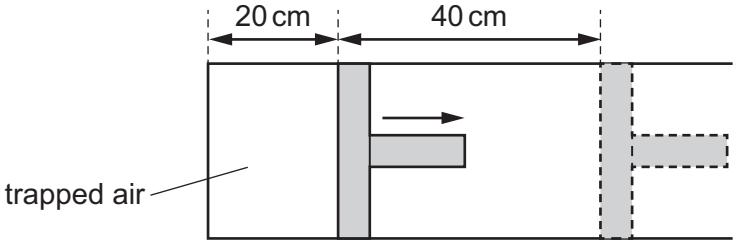
C Use a fuse with a higher current rating.

D Use a fuse with a lower current rating.

10 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.

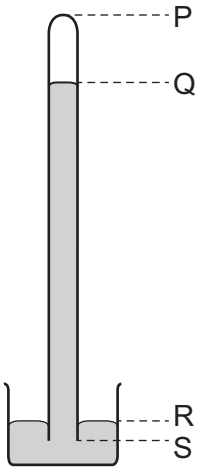
The temperature of the air remains constant.



What is the new air pressure?

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

11 A long tube, full of mercury, is inverted in a small dish of mercury.



The mercury level in the tube falls, leaving a vacuum at the top.

When the atmospheric pressure decreases, which length decreases?

A PQ **B** PS **C** QR **D** RS

12 Some gas is trapped in a closed container. The gas is cooled and the volume of the container is kept constant.

What happens to the gas molecules?

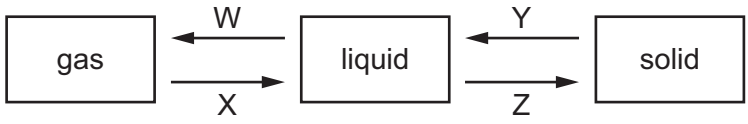
A They collide with the walls more often.

B They contract.

C They get closer together.

D They move more slowly.

13 The diagram shows four changes of state W, X, Y and Z.



Which row gives the names of the four changes of state?

	W	X	Y	Z
A	condensation	boiling	freezing	melting
B	condensation	boiling	melting	freezing
C	boiling	condensation	freezing	melting
D	boiling	condensation	melting	freezing

14 What increases when a liquid becomes a gas at its boiling point?

A the average kinetic energy of the molecules

B the molecular size

C the molecular spacing

D the total number of molecules

15 A metal lid fits tightly on a glass jar.

Which process makes it easier to remove the lid from the jar?

A cool the lid only

B put the jar and lid in a refrigerator

C warm the jar only

D warm the lid only

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16 The specific heat capacity of lead is 130 J / (kg °C). Lead of mass 0.50 kg is heated from 10 °C to 35 °C.

Which calculation gives the amount of thermal energy, in J, absorbed by the lead?

A $0.50 \times 130 \times 25$

B $0.50 \times 130 \times 35$

C $\frac{0.50 \times 130}{25}$

D $\frac{0.50 \times 130}{35}$

17 A cold solid is placed on top of a hot solid. Thermal energy flows from the hot solid to the cold one.

What is the explanation for this?

A A hot solid expands, so its molecules will move further apart.

B Energy is passed from one molecule to the next.

C Heat always rises.

D Molecules are free to move randomly through the solids.

18 Which term is the number of crests of a wave passing a point per second?

A amplitude

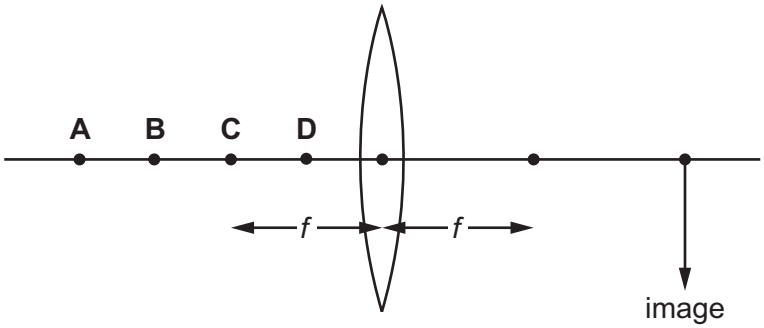
B frequency

C speed

D wavelength

19 The diagram shows a thin converging lens of focal length *f*.

Where must an object be placed to produce a real image in the position shown?



20 White light is dispersed by a prism. Compared with blue light, the **red** light is

A slowed down less and refracted less.

B slowed down less and refracted more.

C slowed down more and refracted less.

D slowed down more and refracted more.

21 What is the approximate value for

$$\frac{\text{speed of light in air}}{\text{speed of sound in air}}?$$

A 10^2 **B** 10^4 **C** 10^6 **D** 10^8

22 What are the lowest frequency and the highest frequency of the sound that a human being with normal hearing can hear?

	lowest frequency	highest frequency
A	2.0 Hz	2.0 kHz
B	2.0 Hz	20 000 Hz
C	20 Hz	20 kHz
D	20 kHz	20 000 kHz

23 Ultrasound has a number of uses in engineering and medicine.

What is ultrasound **not** used for?

A cleaning

B pre-natal scanning

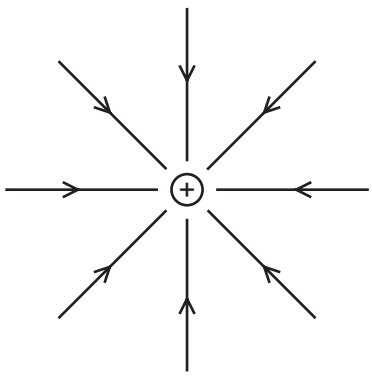
C quality control

D sterilising medical equipment

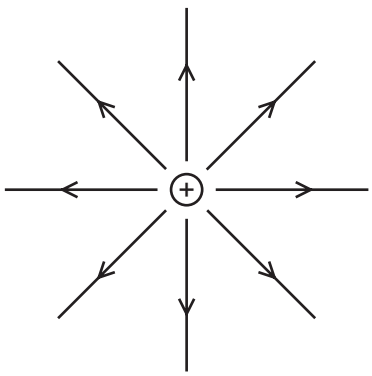
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24 Which diagram shows the electric field around an isolated point positive charge?

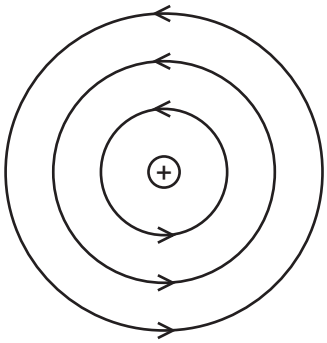
A



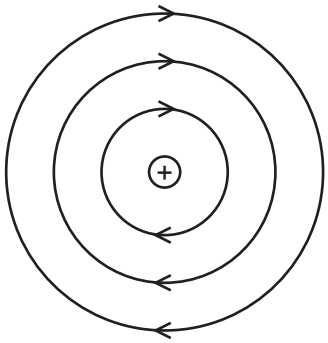
B



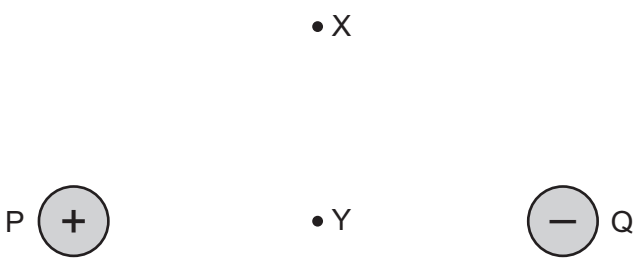
C



D



25 An electric field is formed by two isolated, equal and opposite charges P and Q.



How does the field at X compare with the field at Y?

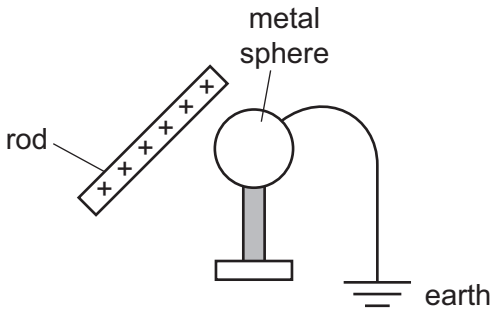
A It is stronger at X than at Y and is in the opposite direction.

B It is stronger at X than at Y and is in the same direction.

C It is weaker at X than at Y and is in the opposite direction.

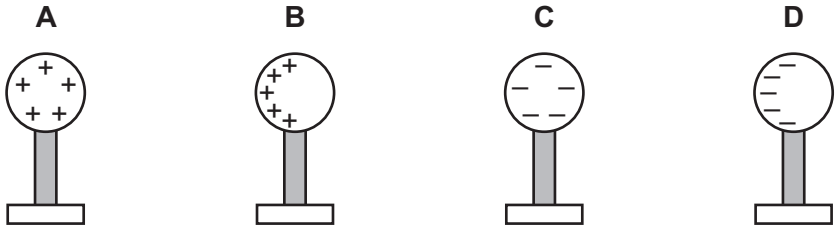
D It is weaker at X than at Y and is in the same direction.

26 A positively charged rod is held close to an insulated metal sphere. The sphere is earthed as shown.



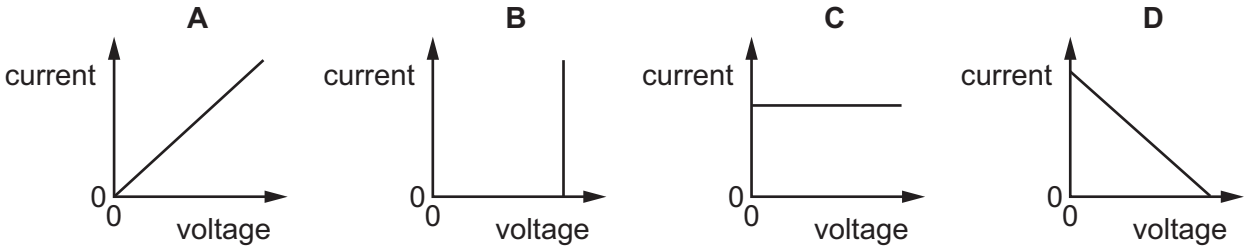
The earth connection is removed and then the rod is removed.

Which diagram shows the charges on the sphere after the rod is removed?



27 The voltage across a resistor of fixed resistance changes.

Which graph shows how the current in the resistor changes with the voltage?



28 A wire of length 0.50 m and cross-sectional area $1.0 \times 10^{-6}\,m^2$ has a resistance of 0.75 Ω.

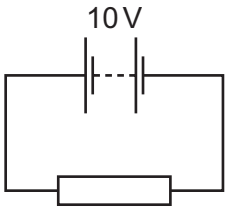
Another wire of the same material has a length of 2.0 m and a cross-sectional area of $0.50 \times 10^{-6}\,m^2$.

What is the resistance of the longer wire?

A 0.094 Ω **B** 0.38 Ω **C** 1.5 Ω **D** 6.0 Ω

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29 A battery of electromotive force (e.m.f.) 10 V is connected to a resistor.

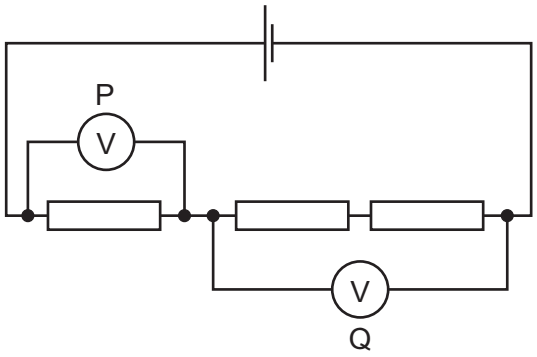


A charge of 2.0 coulombs passes through the resistor.

How much work is done as the charge passes through the resistor?

A 0.20 J **B** 2.0 J **C** 5.0 J **D** 20 J

30 Three identical resistors are joined in series to a cell.



Voltmeter Q reads 8.0 V.

What is the reading on voltmeter P and what is the e.m.f. of the cell?

	reading on P / V	e.m.f. of cell / V
A	4.0	8.0
B	4.0	12
C	8.0	8.0
D	8.0	12

31 The power of an electrical heater is 3.0 kW.

The heater is switched on for a time of 2 hours and 30 minutes.

The cost of using the heater for this time is 120 c.

What is the cost of 1.0 kW h of electrical energy?

A 16 c **B** 17 c **C** 40 c **D** 48 c

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32 In a lighting circuit, the switch is placed in the live wire.

Why is this?

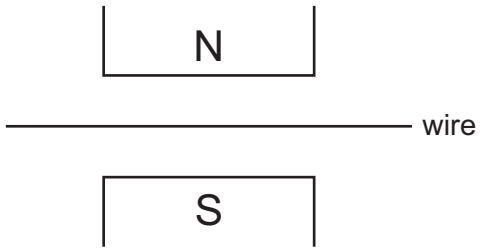
A A lamp in the circuit can be isolated from the supply.

B The fuse is in the neutral wire.

C The switch does not work in the neutral wire.

D Too much current flows in the earth wire.

33 A wire is placed in the magnetic field between the poles of a magnet, as shown.



When there is a current in the wire, it experiences a force.

Which change increases the size of this force?

A reverse both the direction of the current and the poles of the magnet

B reverse just the direction of the current

C use a stronger magnet

D use a thicker wire with the same current

34 A 12 V lamp glows at normal brightness when connected to the secondary coil of a mains transformer. The mains voltage is 240 V.

The transformer is 100% efficient and the primary coil has 200 turns.

How many turns are there on the secondary coil?

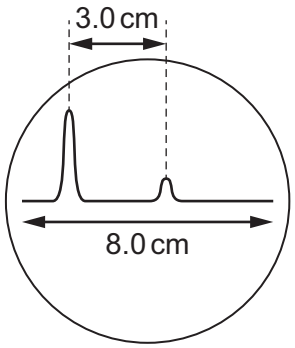
A 10 **B** 14 **C** 4000 **D** 580 000

35 Which row shows how the electrical energy produced by a power station is transmitted to distant towns?

	current	voltage
A	alternating	low
B	alternating	very high
C	direct	low
D	direct	very high

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36 The diagram shows the trace on an oscilloscope screen. The first peak occurs when a pulse of sound is emitted. The second, smaller peak is the echo received from a wall.

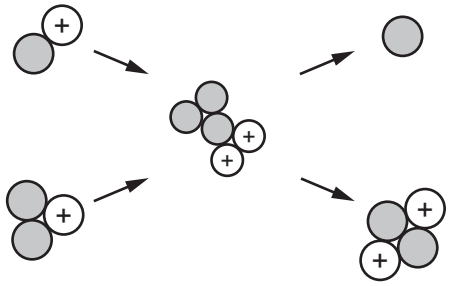


The trace moves across the screen in a time of 24 ms.

How long does it take for the sound to travel to the wall?

A 4.5 ms **B** 9.0 ms **C** 12 ms **D** 32 ms

37 The diagram shows a nuclear reaction.



The shaded particles are uncharged.

What are the products shown in this reaction?

A a helium atom and a neutron

B a helium atom and a proton

C a helium nucleus and a neutron

D a helium nucleus and a proton

38 The results of the alpha-particle scattering experiment gave evidence for which of the following?

A nuclear fusion

B radioactive decay

C the existence of isotopes

D the nuclear atom

39 What does the alpha-radiation given off by radioactive nuclei consist of?

A fast-moving protons

B helium nuclei

C microwaves

D radio waves

40 One nucleus of a uranium isotope contains 238 nucleons of which 146 are neutrons.

Which is the nucleus of another isotope of uranium?

	number of nucleons in the nucleus	number of neutrons in the nucleus
A	235	143
B	237	147
C	238	144
D	241	146

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