Cambridge International Examinations
Cambridge International General Certificate of Secondary Education

PHYSICS **0625/22**

Paper 2 Multiple Choice (Extended) **May/June 2018**

45 minutes

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

7737316887

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.

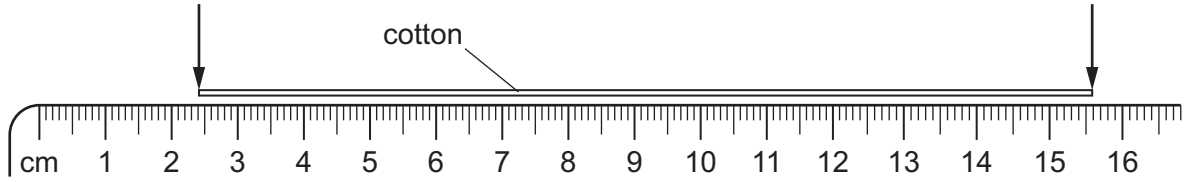
Each correct answer will score one mark. A mark will not be deducted for a wrong answer.
Any rough working should be done in this booklet.
Electronic calculators may be used.
Take the weight of 1.0 kg to be 10 N (acceleration of free fall = 10 m / s^2).

The syllabus is approved for use in England, Wales and Northern Ireland as a Cambridge International Level 1/Level 2 Certificate.

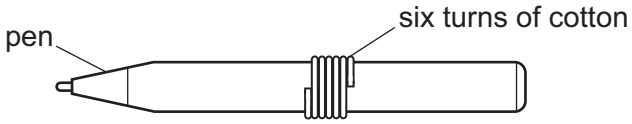
This document consists of **14** printed pages and **2** blank pages.

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1 A length of cotton is measured between two points on a ruler.



When the length of cotton is wound closely around a pen, it goes round six times.



What is the distance once round the pen?

A 2.2 cm **B** 2.6 cm **C** 13.2 cm **D** 15.6 cm

2 When does an object falling vertically through the air reach terminal velocity?

A when the acceleration of the object becomes negative

B when the acceleration of the object is equal to *g*

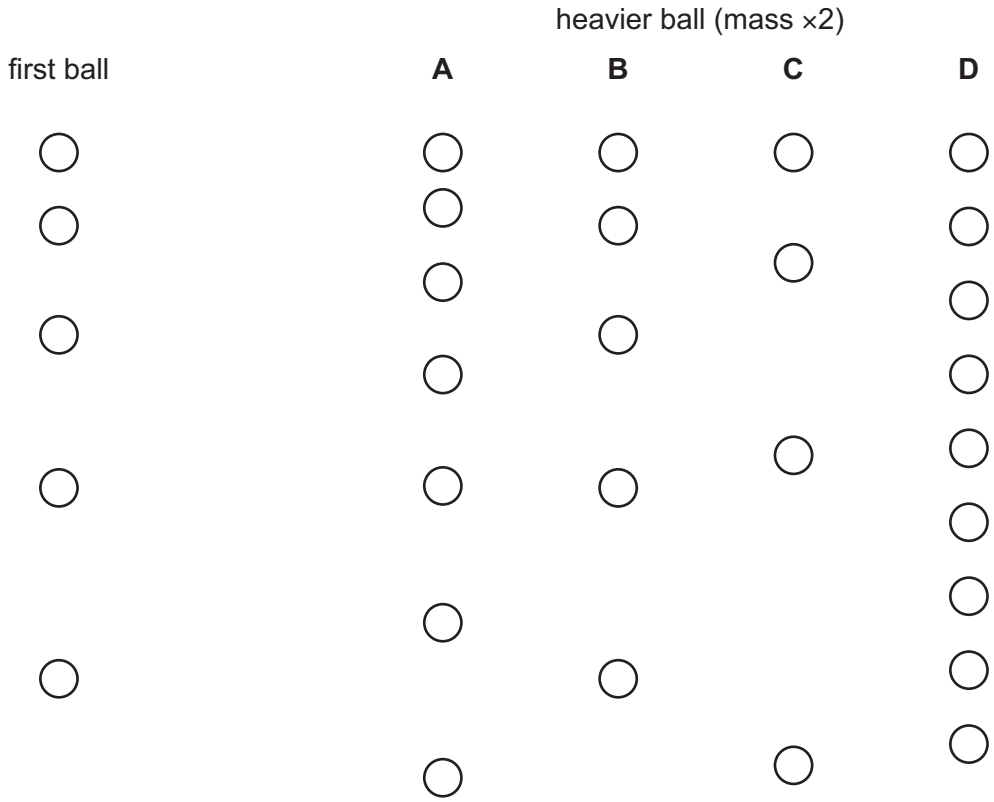
C when the air resistance equals the weight of the object

D when the air resistance is greater than the weight of the object

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3 A ball is dropped in an evacuated tube. A series of photographs is taken at equal time intervals from the time of release. Another ball of the same size but twice the mass is also dropped in the same evacuated tube and photographed.

Which diagram shows the motion of the heavier ball?



4 Which statement about the mass and the weight of an object is correct?

A They are both affected by changes in the acceleration of free fall.

B They are both forces.

C They have different units.

D Weight is calculated by dividing mass by the acceleration of free fall.

5 Which statement about the mass of an object is correct?

A It is equal to the density divided by the volume.

B It is equal to weight multiplied by the gravitational field strength.

C It is the effect of a gravitational field on the object.

D It is the property that resists a change in velocity.

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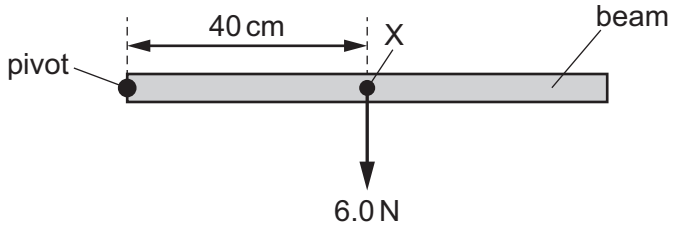
6 An object decelerates from 25.0 m / s to 5.0 m / s in a time of 4.0 s.

It has a mass of 50 kg.

What is the resultant force on the object?

A 0.63 N **B** 10 N **C** 250 N **D** 4000 N

7 A beam is pivoted at one end, as shown.



The beam weighs 6.0 N and its weight acts at a point X, 40 cm from the pivot.

A force of 4.0 N is applied to the beam causing it to balance horizontally.

In which direction and where is the 4.0 N force applied?

A downwards at 20 cm to the left of X

B downwards at 20 cm to the right of X

C upwards at 20 cm to the left of X

D upwards at 20 cm to the right of X

8 A spacecraft is travelling in space with no resultant force and no resultant moment acting on it.

Which statement about the spacecraft is correct?

A Its direction is changing.

B It is in equilibrium.

C Its speed is decreasing.

D Its speed is increasing.

9 A car of mass 1000 kg travelling at 8.0 m / s collides with a lorry of mass 3000 kg that is travelling at 2.0 m / s in the same direction. After colliding, the two vehicles stick together.

What is their speed after the collision?

A 2.0 m / s **B** 2.5 m / s **C** 3.5 m / s **D** 5.0 m / s

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10 What is the main process by which energy is released in the Sun?

A α-decay

B β-decay

C nuclear fission

D nuclear fusion

11 The work done W by a force is related to the magnitude F of the force and the distance d moved in the direction of the force.

Which equation for W is correct?

A $W = d \div F$

B $W = d + F$

C $W = F \div d$

D $W = F \times d$

12 A crane on a construction site lifts concrete beams.

The useful work done by the crane is 4000 kJ in a time of 160 s.

What is the useful output power of the crane?

A 0.04 kW **B** 25 W **C** 25 kW **D** 640 kW

13 A submarine is in water of density 1.0×10^3 kg / m^3. The submarine changes its depth. This causes the pressure on it to change by 0.10 MPa.

What is the change in depth of the submarine?

A 0.10 m **B** 10 m **C** 100 m **D** 1000 m

14 An oil tank has a base of area 2.5 m^2 and is filled with oil to a depth of 1.2 m.

The density of the oil is 800 kg / m^3.

What is the force exerted on the base of the tank due to the oil?

A 960 N **B** 2400 N **C** 9600 N **D** 24 000 N

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15 When molecules of a gas rebound from a wall of a container, the wall experiences a pressure.

What is the cause of this pressure?

A the change in energy of the molecules

B the change in momentum of the molecules

C the change in power of the molecules

D the change in speed of the molecules

16 A student wishes to calibrate a mercury-in-glass thermometer with a °C scale.

Which values should she use for the lower fixed point and for the upper fixed point?

	lower fixed point	upper fixed point
A	melting point of ice	boiling point of mercury
B	melting point of ice	boiling point of water
C	melting point of mercury	boiling point of mercury
D	melting point of mercury	boiling point of water

17 In an experiment, an object is heated.

The data from the experiment is shown.

- The energy transferred to the object is 3.0 kJ.
- The mass of the object is 2.0 kg.
- The rise in temperature of the object is 10 °C.
- The specific heat capacity of the object is 150 J / (kg °C).

What is the thermal capacity of the object?

A 30 J / °C **B** 300 J / °C **C** 3000 J / °C **D** 9000 J / °C

18 Four thermometers, with their bulbs painted different colours, are placed at equal distances from a radiant heater.

Which thermometer shows the slowest temperature rise when the heater is first switched on?

A matt black

B matt white

C shiny black

D shiny white

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19 A tank contains water. Ripples are produced on the surface of the water.

What causes the ripples to refract?

A The cold water in the tank is replaced by warm water.

B The ripples change speed as they move from deep to shallow water.

C The ripples hit the wall of the tank.

D The ripples pass through a narrow gap.

20 Light travels at a speed of $2.0 \times 10^{8}\,\text{m/s}$ in a glass block.

In the glass, the wavelength of the light is $4.0 \times 10^{-7}\,\text{m}$.

What is the frequency of the light?

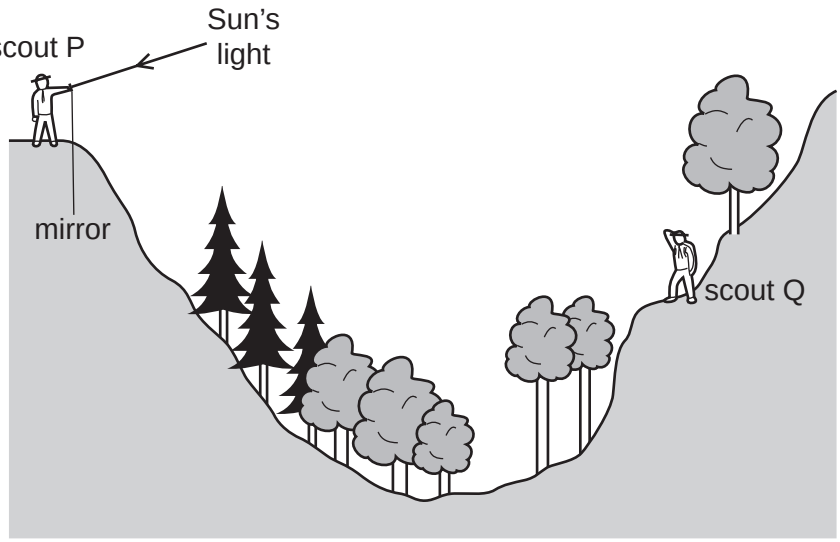
A $2.0 \times 10^{-15}\,\text{Hz}$

B $1.3 \times 10^{-2}\,\text{Hz}$

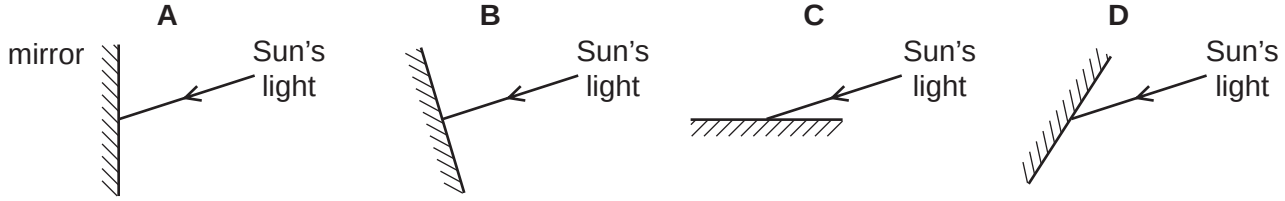
C $80\,\text{Hz}$

D $5.0 \times 10^{14}\,\text{Hz}$

21 Scout P signals to scout Q on the other side of a valley by using a mirror to reflect the Sun's light.



Which mirror position allows the Sun's light to be reflected to scout Q?



22 A scientist describes light as being monochromatic.

What does this tell you about the light?

A It has a single frequency.

B It has more than one wavelength.

C It travels at a single speed in a single direction.

D It travels at different speeds in different directions.

23 Which statement is **not** correct?

A The speed of long-wavelength infra-red radiation in a vacuum is greater than that of short-wavelength ultraviolet light.

B The speed of microwaves in air is approximately $3.0 \times 10^8\,\text{m/s}$.

C The speed of γ-rays emitted from a sample of cobalt-60 is $3.0 \times 10^5\,\text{km/s}$.

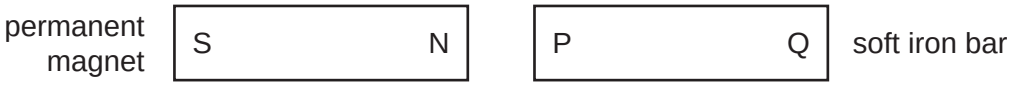
D The X-rays emitted in a supernova explosion reach the Earth at the same time as the visible light emitted.

24 A siren is emitting a sound. As time passes, the sound becomes louder and higher pitched.

What is happening to the amplitude and to the frequency of the emitted sound wave?

	amplitude	frequency
A	decreasing	decreasing
B	decreasing	increasing
C	increasing	decreasing
D	increasing	increasing

25 A permanent magnet is placed close to a bar of soft iron.



What are the polarities of end P and of end Q?

	end P	end Q
A	N	N
B	N	S
C	S	N
D	S	S

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26 Which method is used to demagnetise a bar magnet?

A lower it into water

B heat it with a Bunsen burner

C place it in a metal box

D suspend it in a sling

27 What is the electromotive force (e.m.f.) of a cell?

A the amount of charge that passes through the cell per unit time

B the energy gained per unit charge as charge passes through the cell

C the total amount of charge flowing through the cell

D the total energy stored in the cell

28 A student measures the potential difference across a device and the current in the device.

Which calculation gives the resistance of the device?

A current + potential difference

B current ÷ potential difference

C potential difference ÷ current

D potential difference × current

29 A piece of wire is 40 cm long and has a diameter of 2.0 mm.

Its resistance is 0.30 Ω.

Which wire of the same material has a resistance of 0.15 Ω?

	length / cm	diameter / mm
A	20	1.0
B	20	4.0
C	80	1.0
D	80	4.0

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[Turn over

30 A diode is used as a rectifier.

What is the purpose of a rectifier?

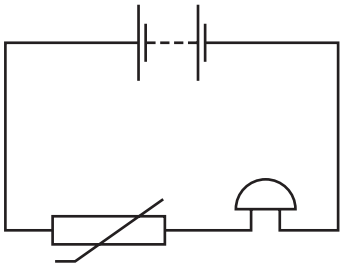
A to allow current to pass in either direction

B to change alternating current into direct current

C to switch off the circuit in case of a large current

D to provide an efficient source of light

31 A student sets up this circuit.



What is the purpose of the circuit?

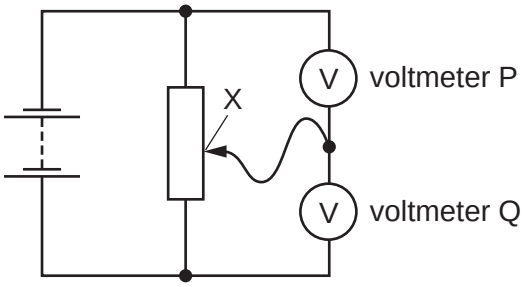
A to allow a lamp to be made dimmer or brighter as required

B to amplify the sound of a voice

C to light a lamp in the dark

D to sound a bell when the temperature rises

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



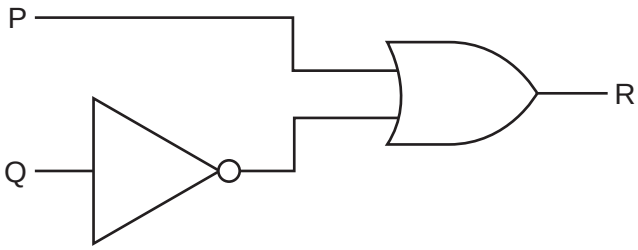
The sliding connection at point X is moved towards the top of the diagram.

What happens to the reading on P and to the reading on Q?

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

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33 The circuit shown contains two gates.



Which truth table describes the operation of the circuit?

A

P	Q	R
0	0	0
0	1	1
1	0	1
1	1	1

B

P	Q	R
0	0	0
0	1	0
1	0	1
1	1	1

C

P	Q	R
0	0	1
0	1	0
1	0	0
1	1	0

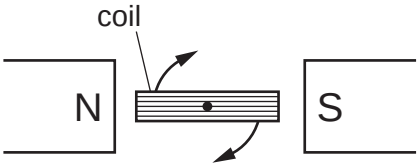
D

P	Q	R
0	0	1
0	1	0
1	0	1
1	1	1

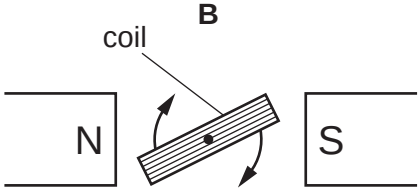
34 In an a.c. generator, a coil is rotated in a magnetic field and an electromotive force (e.m.f.) is induced in the coil.

In which position of the coil does the e.m.f. have the largest value?

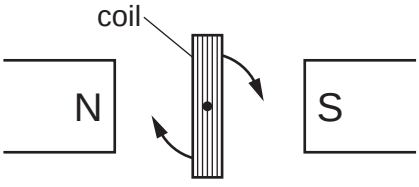
A



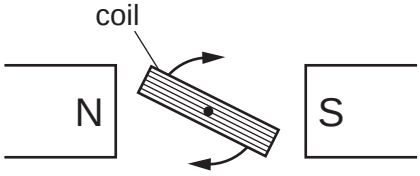
B



C



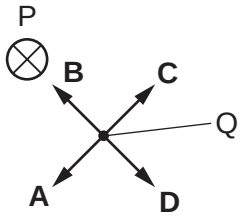
D



35 Wire P carries a current directed perpendicularly into the page. A compass is placed at point Q which is close to wire P.

The magnetic field at Q due to the current is very much larger than the magnetic field of the Earth.

In which direction does the North pole of the compass point?



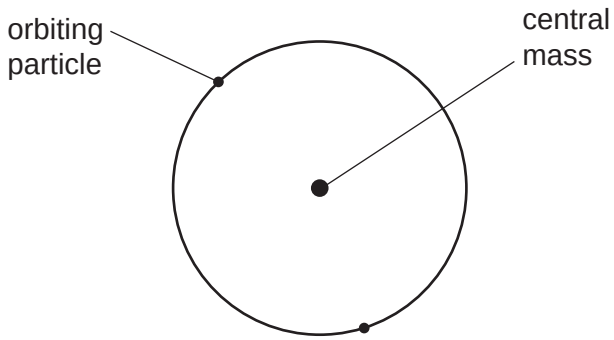
36 A transformer has N_p turns in the primary coil and N_s turns in the secondary coil.

Which row gives the values of N_p and N_s for a transformer that steps up a voltage of 1200 V to 36 000 V?

	N_p	N_s
A	2 000	60 000
B	2 000	600 000
C	60 000	2 000
D	600 000	2 000

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37 In the atomic model, an atom consists of a central mass, orbited by much smaller particles.



What is the name of the central mass and of the orbiting particles?

	central mass	orbiting particles
A	neutron	α-particles
B	neutron	electrons
C	nucleus	α-particles
D	nucleus	electrons

38 An isotope of polonium has the nuclide notation $^{218}_{84}\text{Po}$.

A nucleus of this isotope decays by emitting an α-particle. A β-particle is then emitted to form nuclide X.

What is the notation for nuclide X?

A $^{214}_{81}\text{X}$ **B** $^{213}_{82}\text{X}$ **C** $^{213}_{83}\text{X}$ **D** $^{214}_{83}\text{X}$

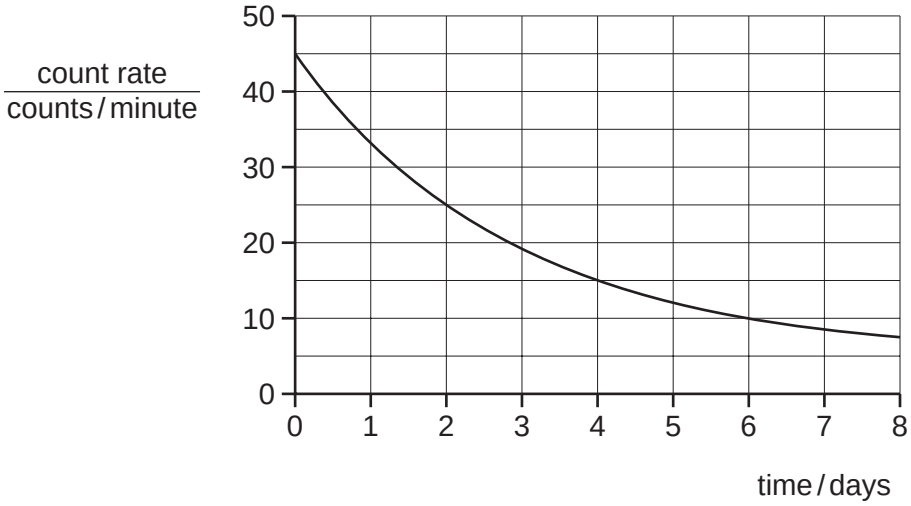
39 The table compares the penetrating abilities and ionising effects of α-radiation and of γ-radiation.

Which row is correct?

	least penetrating	most ionising
A	α	α
B	α	γ
C	γ	α
D	γ	γ

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40 The graph shows how the count rate registered by a counter near to a sample of a radioactive isotope changes over a period of a few days. The background count rate is 5 counts per minute.



What is the half-life of the isotope?

A 2.0 days **B** 2.5 days **C** 3.0 days **D** 4.0 days

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