Cambridge International Examinations
Cambridge International General Certificate of Secondary Education

PHYSICS **0625/22**

Paper 2 Multiple Choice (Extended) **October/November 2016**

45 minutes

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

* 0 2 0 9 9 2 4 1 0 4 *

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.

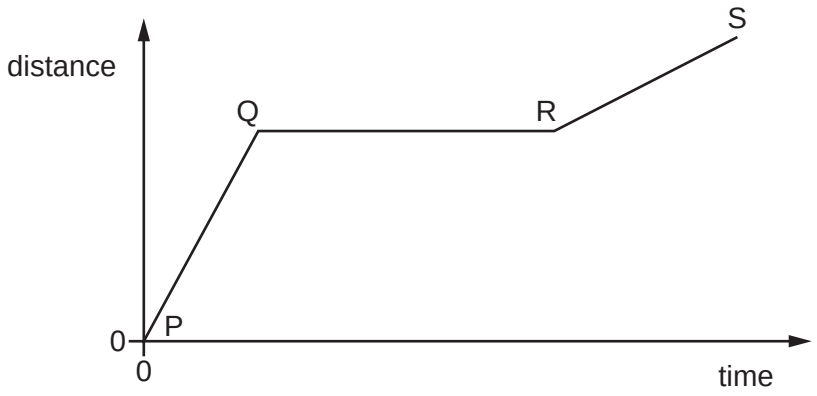
Each correct answer will score one mark. A mark will not be deducted for a wrong answer.
Any rough working should be done in this booklet.
Electronic calculators may be used.
Take the weight of 1.0 kg to be 10 N (acceleration of free fall = 10 m / s^2).

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 **16** printed pages.

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1 The graph shows how the distance travelled by a vehicle changes with time.



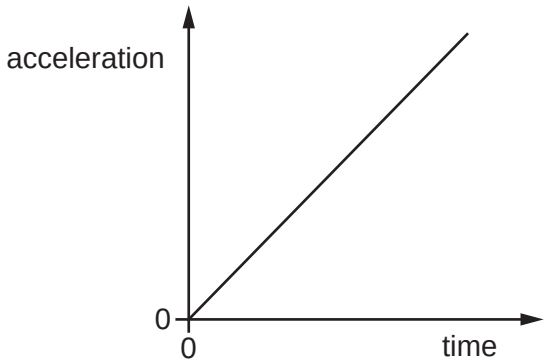
Which row describes the speed of the vehicle in each section of the graph?

	P to Q	Q to R	R to S
A	constant	zero	constant
B	constant	zero	decreasing
C	increasing	constant	decreasing
D	increasing	zero	constant

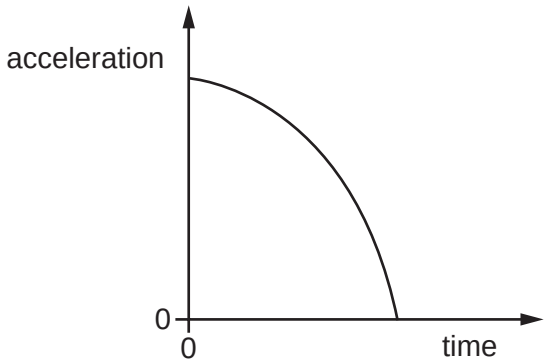
2 A stone falls freely from the top of a cliff. Air resistance may be ignored.

Which graph shows how the acceleration of the stone varies with time as it falls?

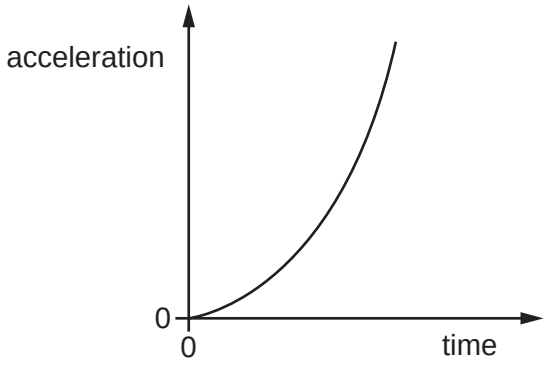
A



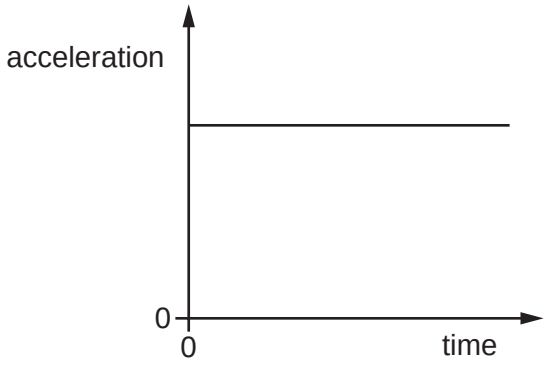
B



C

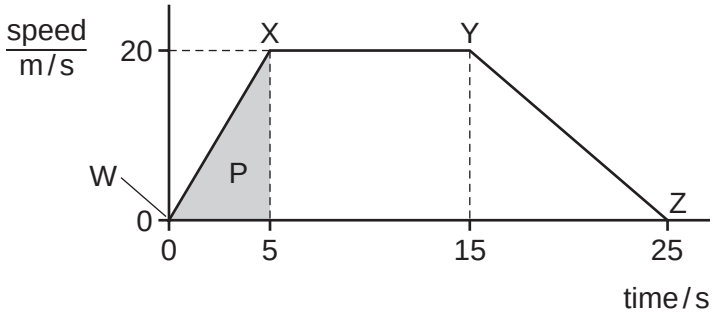


D



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3 The speed-time graph for an object is shown.



Below are four statements about the acceleration of the object.

Which statement is correct?

A The acceleration in the first 5 s is given by area P.

B The acceleration increases between W and X.

C The acceleration is negative between Y and Z.

D The deceleration between Y and Z is $(20 \div 25)\,m/s^2$.

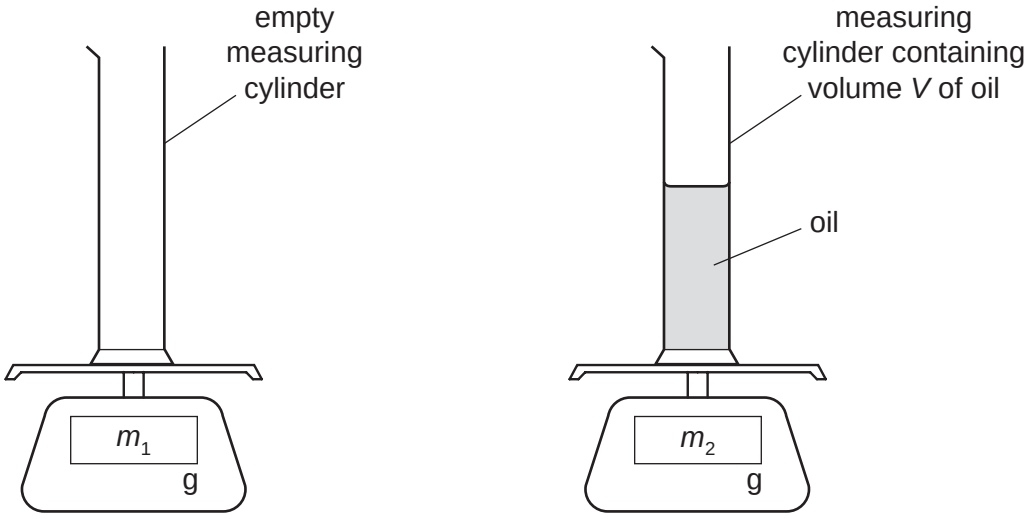
4 An object tends to keep moving with the same speed and in the same direction due to a certain property.

The object also has weight due to the action of a field.

What is the name of the property, and what is the name of the field?

	property	field
A	mass	electric
B	mass	gravitational
C	volume	electric
D	volume	gravitational

5 A student uses a measuring cylinder and a balance to find the density of oil. The diagram shows the arrangement used.



Which calculation gives the density of the oil?

A $\frac{V}{m_2}$ **B** $\frac{V}{(m_2 - m_1)}$ **C** $\frac{m_2}{V}$ **D** $\frac{(m_2 - m_1)}{V}$

6 An object travels in a circular path at constant speed.

Which statement about the object is correct?

A It has changing kinetic energy.

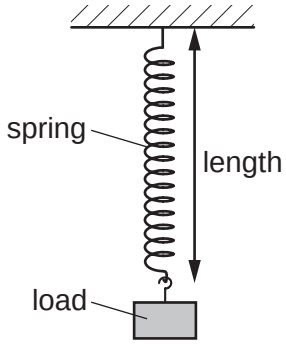
B It has changing momentum.

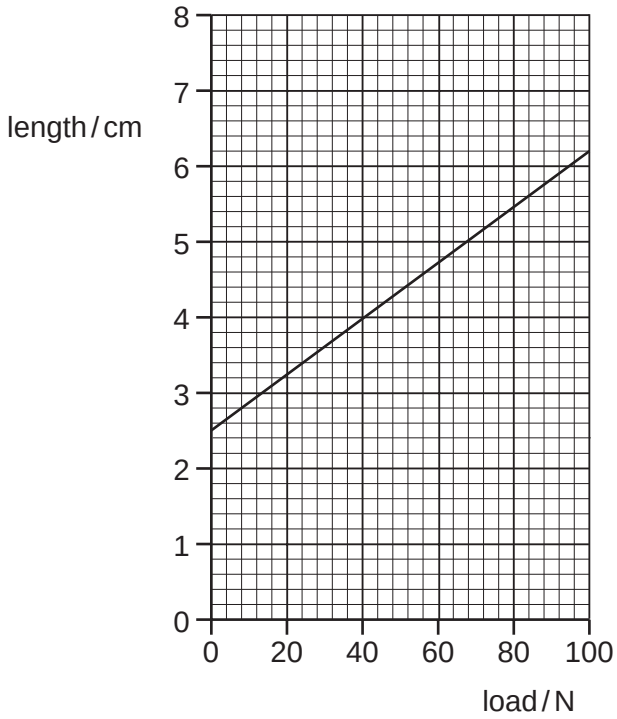
C It has constant velocity.

D It is not accelerating.

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7 The diagrams show a spring and a graph of the length of the spring against the load applied to it.





What is the extension of the spring when a load of 40 N is applied to it?

A 1.5 cm **B** 2.5 cm **C** 4.0 cm **D** 6.5 cm

8 A girl of mass 50 kg runs at 6.0 m / s.

What is her momentum?

A 300 J **B** 300 kg m / s **C** 900 J **D** 900 kg m / s

9 Which list contains only vector quantities?

A acceleration, energy, force, mass

B acceleration, force, momentum, velocity

C distance, energy, mass, speed

D distance, momentum, power, speed

10 Electricity can be generated using different energy resources.

Which energy resource is used to generate electricity without needing any moving parts?

A geothermal

B hydroelectric

C solar

D water waves

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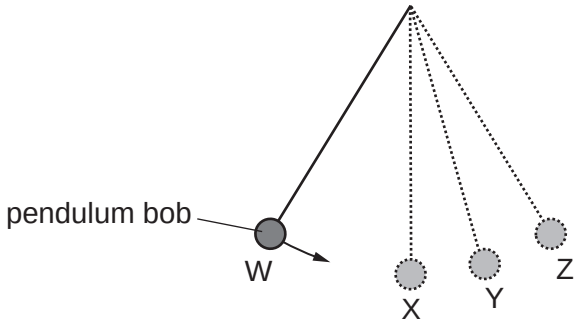
11 A lamp has a power input of 5.0 W. It wastes 1.0 W of power heating the surroundings.

What is the efficiency of the lamp?

A 20% **B** 50% **C** 80% **D** 120%

12 A pendulum bob swings along the path WXYZ and back again.

Resistive forces can be ignored.



Which statement describes the total energy of the bob?

A It has a maximum value at X.

B It has a maximum value at Y.

C It has a maximum value at Z.

D It has the same value at W, X, Y and Z.

13 The equation used to find the pressure caused by a liquid can be written as

$$p = h \times Y \times Z$$

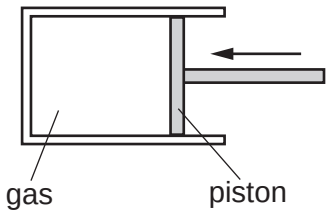
where p is the pressure and h is the depth of the liquid.

Which row gives the quantities Y and Z?

	Y	Z
A	cross-sectional area	gravitational field strength
B	cross-sectional area	volume
C	density	cross-sectional area
D	density	gravitational field strength

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14 The diagram shows a gas that is trapped in a cylinder by a piston. The volume of the gas is 120 cm^3 and the pressure of the gas is P.

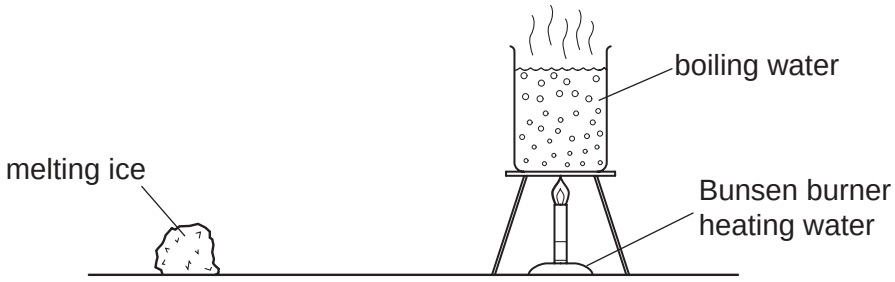


The piston is moved slowly to the left so that the volume of the gas is reduced to 30 cm^3. The temperature of the gas does not change.

What is the new pressure of the trapped gas?

A $\frac{P}{4}$ **B** $\frac{P}{2}$ **C** P **D** $4P$

15 A piece of melting ice at 0 °C and a beaker of boiling water are both in a laboratory. The laboratory is at 20 °C.



What is happening to the temperature of the melting ice and what is happening to the temperature of the boiling water?

	temperature of melting ice	temperature of boiling water
A	constant	constant
B	constant	increasing
C	increasing	constant
D	increasing	increasing

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16 A puddle of water is formed after a rain shower on a windy day.

Which statement explains the effect of the wind on the rate of evaporation of the water in the puddle?

A The wind gives molecules in the water extra kinetic energy and so increases the rate of evaporation.

B The wind removes evaporated water from near the surface and so decreases the rate of evaporation.

C The wind removes evaporated water from near the surface and so increases the rate of evaporation.

D The wind takes energy from molecules near the surface and so decreases the rate of evaporation.

17 A copper container of mass 0.20 kg contains 0.10 kg of water.

The specific heat capacity of copper is 385 J/(kg °C) and the specific heat capacity of water is 4200 J/(kg °C).

How much energy, in joules, is needed to raise the temperature of the copper container and the water by 10 °C?

A $(0.20 \times 385 \times 10) - (0.10 \times 4200 \times 10)$

B $(0.20 \times 385 \times 10) + (0.10 \times 4200 \times 10)$

C $(0.10 + 0.20) \times \left(\frac{4200 + 385}{2} \right) \times 10$

D $(0.10 + 0.20) \times (4200 + 385) \times 10$

18 On a very cold day, a boy puts one hand on the metal handlebars of his bicycle. He puts the other hand on the rubber hand grip.

The metal feels colder than the rubber hand grip, although they are both at the same temperature.

Why is this?

A The metal has a higher melting point than the rubber.

B The metal has a lower thermal capacity than the rubber.

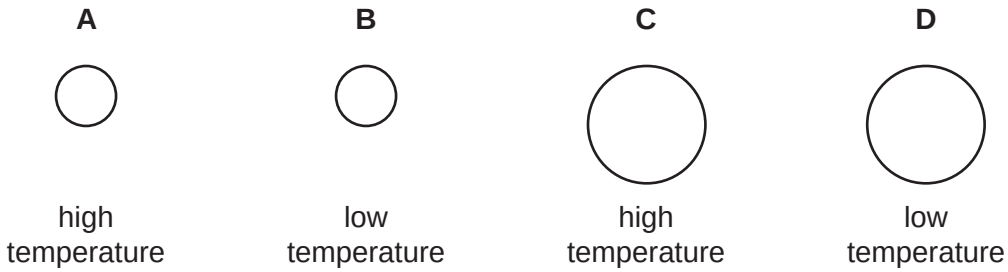
C The metal is a better thermal conductor than the rubber.

D The metal radiates more infra-red radiation than the rubber.

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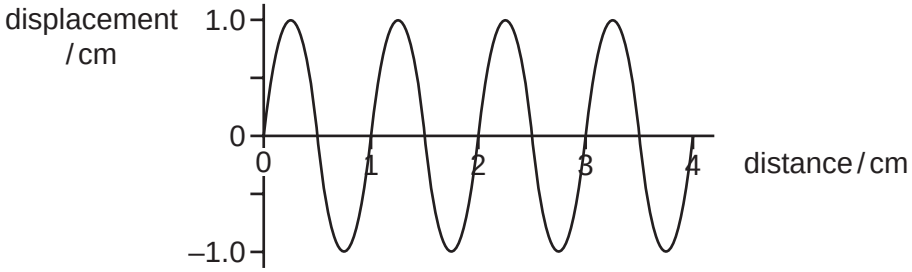
19 The diagrams show four spherical objects of the same colour and same type of surface. Two of the objects are small and two are large. Two of the objects are at the same high temperature and two are at the same low temperature.

Which object emits infra-red radiation at the greatest rate?

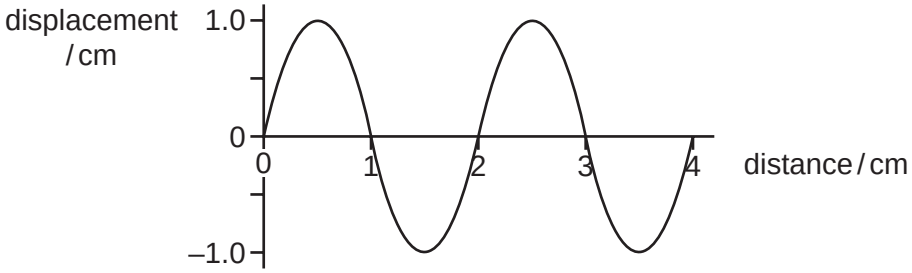


20 Which wave has an amplitude equal to half its wavelength?

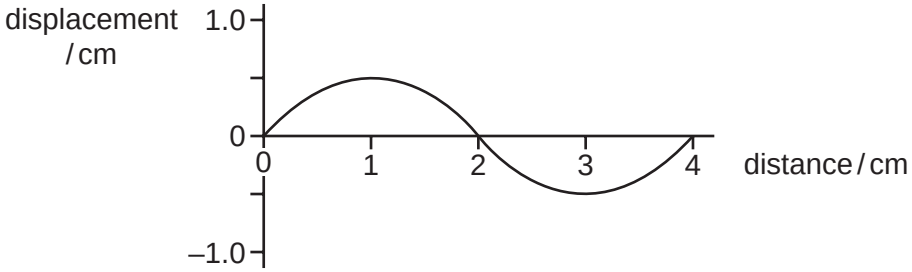
A



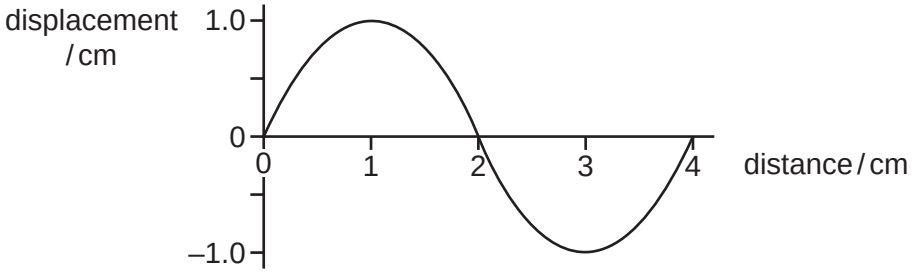
B



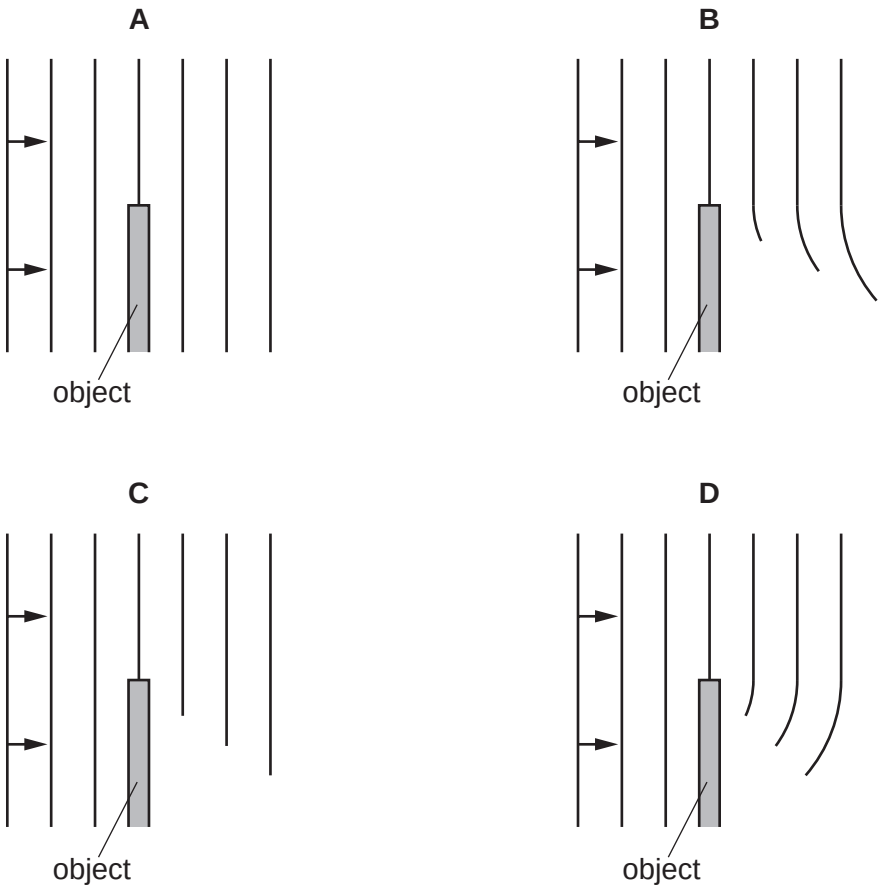
C



D



21 Which diagram shows what happens when plane waves pass the edge of the object shown?



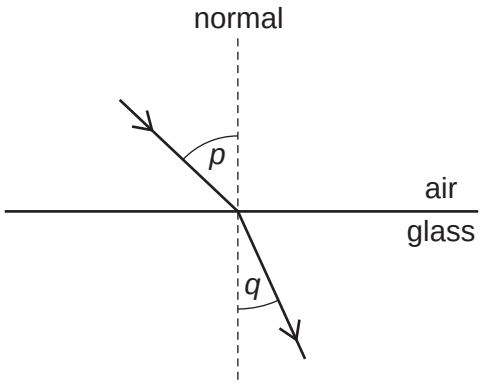
22 An image is formed by a plane mirror. A second image is formed by a lens used as a magnifying glass.

Which row states the nature of each of these images?

	plane mirror	magnifying glass
A	real	real
B	real	virtual
C	virtual	real
D	virtual	virtual

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23 The diagram shows light passing from air into glass. Two angles *p* and *q* are marked.



Which pair of equations can both be used to calculate the refractive index *n* of the glass?

A $n = \frac{\text{speed of light in air}}{\text{speed of light in glass}}$, $n = \frac{\sin p}{\sin q}$

B $n = \frac{\text{speed of light in glass}}{\text{speed of light in air}}$, $n = \frac{\sin p}{\sin q}$

C $n = \frac{\text{speed of light in air}}{\text{speed of light in glass}}$, $n = \frac{\sin q}{\sin p}$

D $n = \frac{\text{speed of light in glass}}{\text{speed of light in air}}$, $n = \frac{\sin q}{\sin p}$

24 Which part of the electromagnetic spectrum is used to send television signals from a satellite to Earth?

A infra-red

B microwaves

C ultraviolet

D visible light

25 A girl notices that, when she shouts into a cave, she hears an echo.

Which wave property causes the echo?

A diffraction

B dispersion

C reflection

D refraction

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[Turn over

26 Which property of a sound wave affects the loudness of the sound?

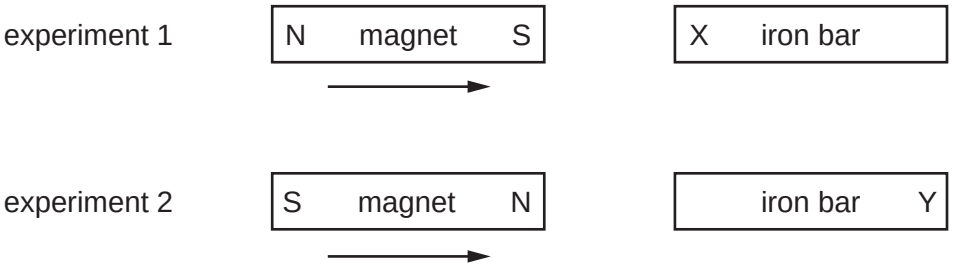
A amplitude

B frequency

C speed

D wavelength

27 In two separate experiments, a magnet is brought near to an unmagnetised iron bar. This causes the bar to become magnetised.



Which magnetic pole is induced at X and at Y?

	pole induced at X	pole induced at Y
A	N	N
B	N	S
C	S	N
D	S	S

28 A student suggests three methods for demagnetising a piece of steel.

1 placing it in an east-west direction and hammering it hard

2 placing it in an east-west direction and heating it until red hot

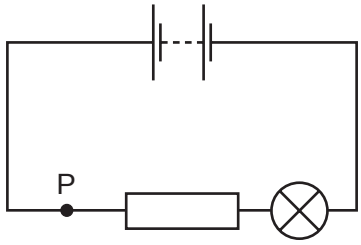
3 removing it slowly from a coil carrying alternating current

Which of the methods will demagnetise the piece of steel?

A 1 only **B** 2 only **C** 3 only **D** 1, 2 and 3

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29 The diagram shows a lamp in a circuit.



Which change to the circuit would increase the current in the lamp?

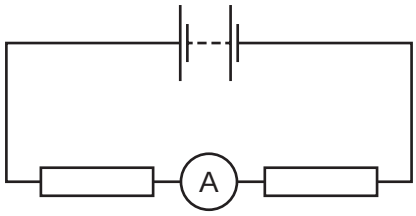
A adding another resistor in parallel with the one in the circuit

B adding another resistor in series with the one in the circuit

C decreasing the electromotive force (e.m.f.) of the battery in the circuit

D moving the lamp to point P in the circuit

30 The diagram shows a circuit.



The reading on the ammeter is 12 A.

How much charge passes through the ammeter in 2.0 minutes?

A 0.10 C **B** 6.0 C **C** 24 C **D** 1440 C

31 A copper wire has a resistance of 2.0 Ω.

A second copper wire is twice as long as the first wire, and its diameter is twice the diameter of the first wire.

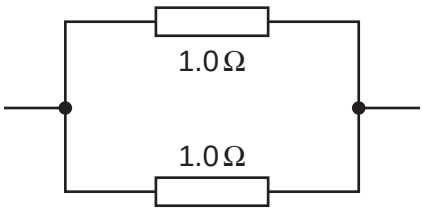
What is the resistance of the second wire?

A 1.0 Ω **B** 2.0 Ω **C** 8.0 Ω **D** 16.0 Ω

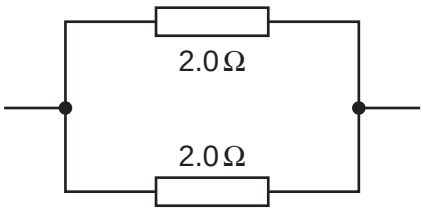
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32 Which combination of resistors in parallel has an effective resistance of 0.50 Ω?

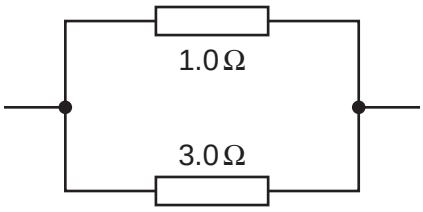
A



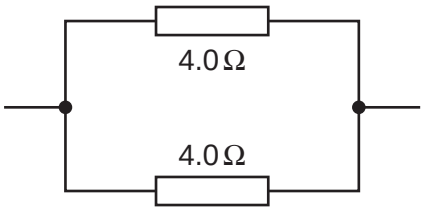
B



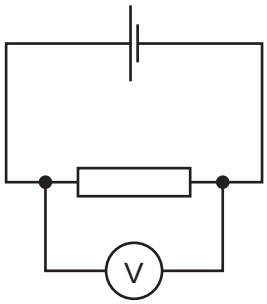
C



D



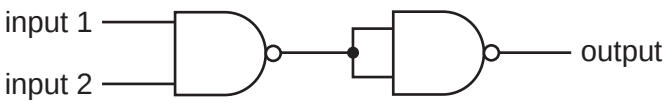
33 In the circuit shown, the voltmeter reads 2.0 V. A charge of 5.0 C passes through the resistor in a certain time.



How much energy is supplied to the resistor in this time?

A 0.40 J **B** 2.5 J **C** 10 J **D** 20 J

34 Two NAND gates are connected together as shown.



The arrangement acts like a single logic gate.

What is the name of this single logic gate?

A AND **B** NOR **C** NOT **D** OR

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35 An electric kettle has a metal casing. The cable for the kettle contains a wire that is connected to the earth pin of the plug.

Which danger does this guard against?

A the cable to the kettle becoming too hot

B the casing of the kettle becoming live

C the casing of the kettle becoming wet on the outside

D the casing of the kettle overheating

36 An electric current can produce a heating effect and a magnetic effect.

Which row shows the effect that a relay uses and one application of a relay?

	effect used by a relay	one application of a relay
A	heating effect	allowing a small current to switch on a large current
B	heating effect	changing the voltage of an a.c. supply
C	magnetic effect	allowing a small current to switch on a large current
D	magnetic effect	changing the voltage of an a.c. supply

37 What happens in the process of nuclear fission?

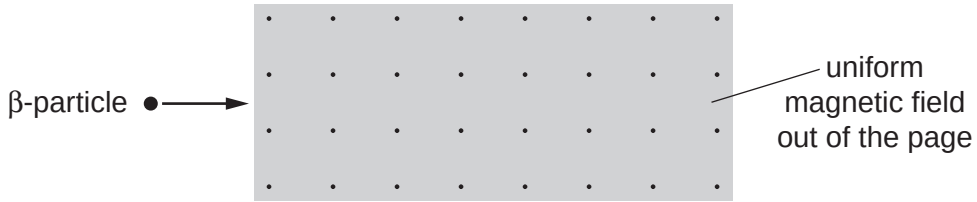
A electrons are added to a nucleus

B electrons are removed from a nucleus

C the nucleus of an atom splits

D two atomic nuclei join together

38 A β-particle enters a uniform magnetic field directed out of the page.



In which direction is the β-particle deflected by the field?

A towards the top of the page

B into the page

C out of the page

D towards the bottom of the page

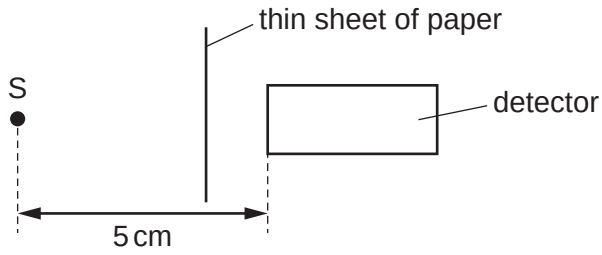
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39 The radioactive nucleus $^{214}_{83}Bi$ decays to another nucleus by the emission of a β-particle.

What is the proton number and what is the nucleon number of the nucleus formed by this decay?

	proton number	nucleon number
A	81	210
B	81	212
C	84	213
D	84	214

40 Radioactive source S emits α-particles, β-particles and γ-rays. A detector is placed 5 cm away from S. A thin sheet of paper is placed as shown in the diagram.



Which emissions from the source can be detected?

A α-particles and β-particles only

B α-particles and γ-rays only

C β-particles and γ-rays only

D α-particles, β-particles and γ-rays

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