**Cambridge International Examinations**
Cambridge International General Certificate of Secondary Education

**PHYSICS** **0625/23**

Paper 2 Multiple Choice (Extended) **October/November 2017**

**45 minutes**

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

**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 **18** printed pages and **2** blank pages.

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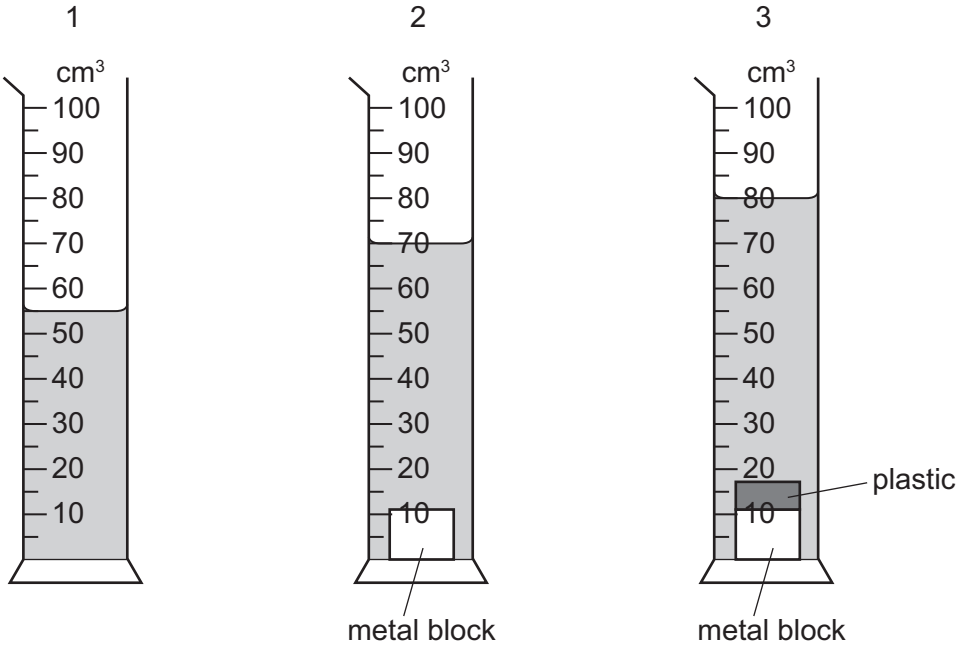
CAMBRIDGE International Examinations

**1** A measuring cylinder contains some water. A small metal block is slowly lowered into the water and is then removed.

Finally a piece of plastic is attached to the metal block and the block is again slowly lowered into the water.

View solution

The diagrams show the measuring cylinder at each stage of this process.




What is the volume of the piece of plastic?

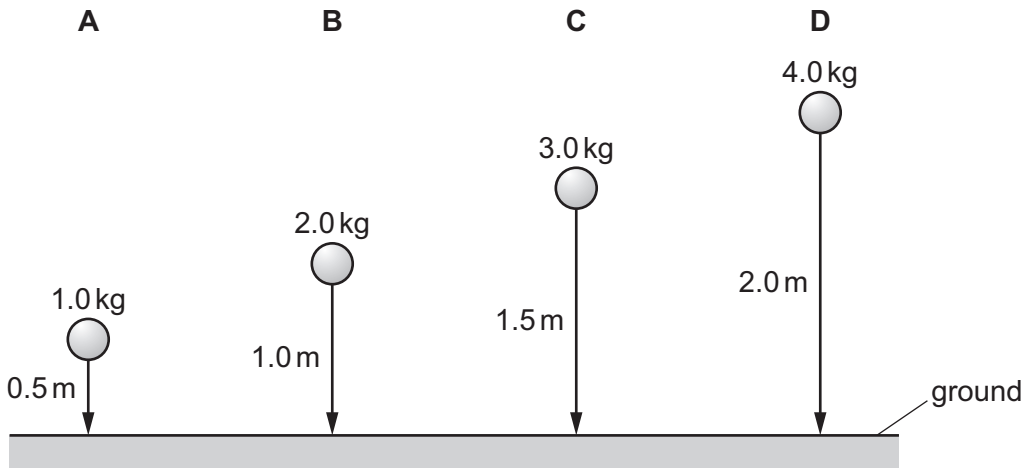
**A** 10 cm$^3$ **B** 25 cm$^3$ **C** 70 cm$^3$ **D** 80 cm$^3$

**2** Four balls with different masses are dropped simultaneously from the heights shown.

View solution

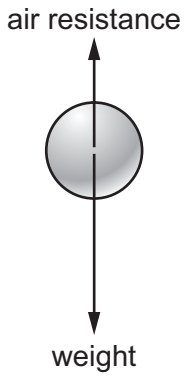
Air resistance may be ignored.

Which ball hits the floor first?



**3** The diagram shows the vertical forces acting on a ball as it falls vertically through the air. The ball does not reach terminal velocity.

View solution

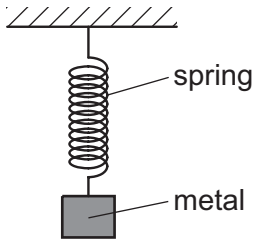



Which row describes what happens to the resultant force on the ball and what happens to the acceleration of the ball as it falls through the air?

| | resultant force | acceleration |
|---|---|---|
| **A** | decreases | decreases |
| **B** | decreases | increases |
| **C** | increases | decreases |
| **D** | increases | increases |

View solution

**4** A spring is stretched by hanging a piece of metal from it.




Which name is given to the force that stretches the spring?

**A** friction

**B** mass

**C** pressure

**D** weight

**5** On the Moon, all objects fall with the same acceleration.

View solution

Which statement explains this?

**A** On the Moon, all objects have the same weight.

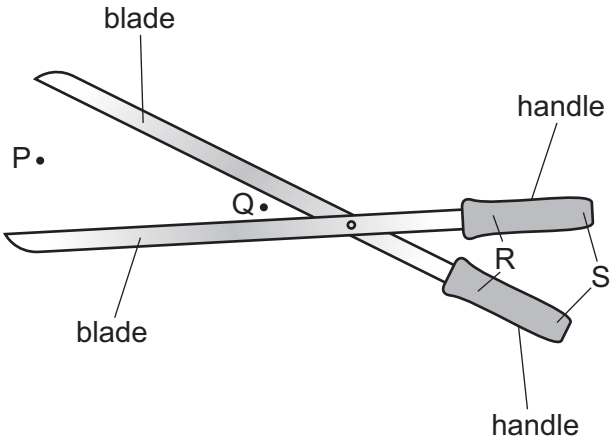
**B** The Moon has a smaller gravitational field strength than the Earth.

**C** The weight of an object is directly proportional to its mass.

**D** The weight of an object is inversely proportional to its mass.

**6** A pair of cutters is used to cut a rope.

View solution

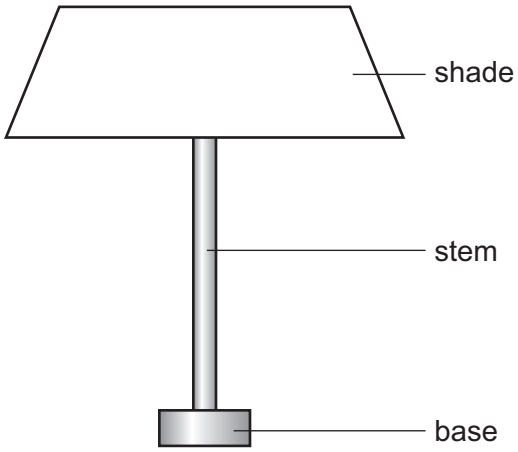



Where should the rope be positioned and at which labelled points should the hands be positioned to produce the greatest cutting force?

| | rope positioned | hands positioned |
|---|---|---|
| **A** | P | R |
| **B** | P | S |
| **C** | Q | R |
| **D** | Q | S |

**7** The lamp in the diagram is not very stable and falls over easily.

View solution

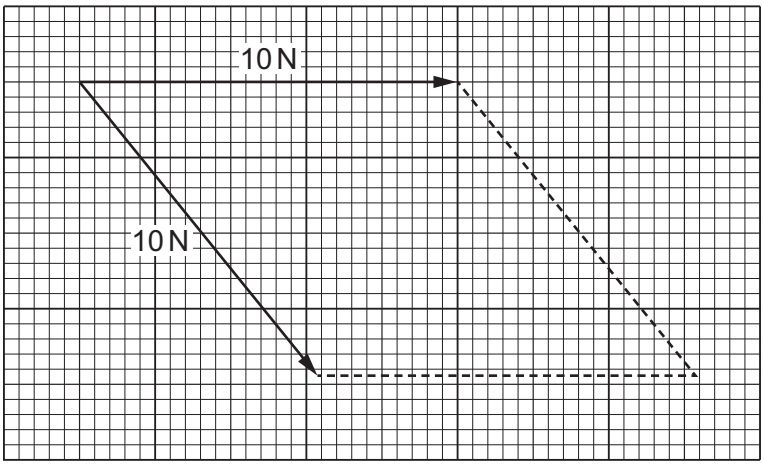



Which row shows changes that would definitely make the lamp more stable?

| | base | centre of gravity |
|---|---|---|
| **A** | narrower | higher |
| **B** | narrower | lower |
| **C** | wider | higher |
| **D** | wider | lower |

**8** The diagram shows an incomplete scale drawing to find the resultant of two 10 N forces acting at a point in the directions shown.

View solution




What is the magnitude of the resultant force?

**A** 7.5 N **B** 8.6 N **C** 18 N **D** 20 N

**9** An object has a mass of 60 kg.

View solution

It decelerates from 50 m / s to 20 m / s when a resultant force of 300 N acts on it.

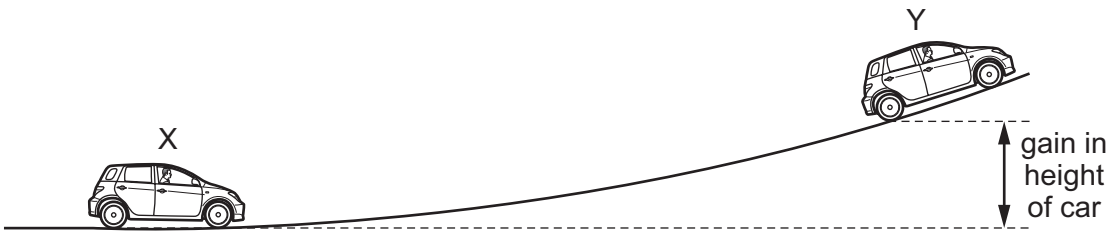
For how long does the force act?

**A** 0.071 s **B** 0.17 s **C** 6.0 s **D** 14 s

**10** A car, starting from rest at position X, accelerates up a hill. The car reaches a speed of 10 m / s at position Y.

The kinetic energy of the car at position Y is equal to its gain in gravitational potential energy from X to Y.

View solution




Take the gravitational field strength *g* to be 10 N / kg.

What is the gain in height of the car between X and Y?

**A** 0.50 m **B** 5.0 m **C** 10 m **D** 50 m

**11** A 150 W filament lamp has an efficiency of 10%. A 40 W compact fluorescent lamp (CFL) has an efficiency of 30%.

View solution

Each lamp is switched on for the same amount of time.

Which lamp produces more light and which lamp converts more energy into other forms of energy?

| | produces more light | converts more energy into other forms |
|---|---|---|
| **A** | CFL lamp | CFL lamp |
| **B** | CFL lamp | filament lamp |
| **C** | filament lamp | CFL lamp |
| **D** | filament lamp | filament lamp |

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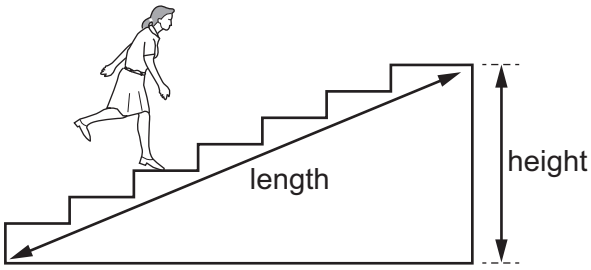
**12** A student runs up a flight of stairs.

View solution




Which information is **not** needed to calculate the rate at which the student is doing work against gravity?

**A** the height of the flight of stairs

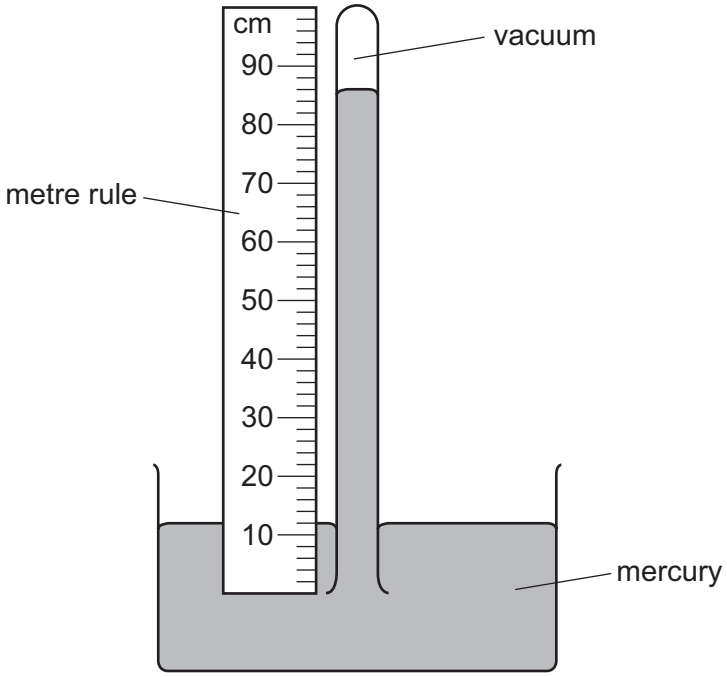
**B** the length of the flight of stairs

**C** the time taken to run up the stairs

**D** the weight of the student

**13** The diagram shows a simple mercury barometer.

View solution




Which length is used to find the value of atmospheric pressure?

**A** 12 cm **B** 74 cm **C** 86 cm **D** 100 cm

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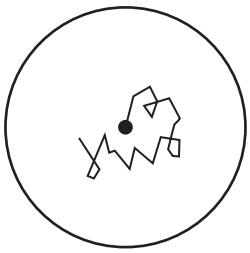
**14** A pollen grain in a beaker of still water is viewed through a microscope.

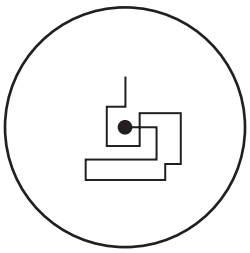
View solution

Which diagram shows the most likely movement of the pollen grain?

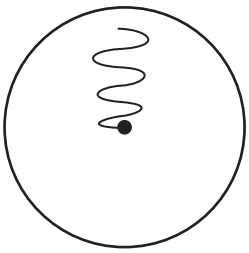
**A**



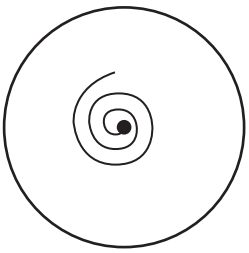
**B**



**C**



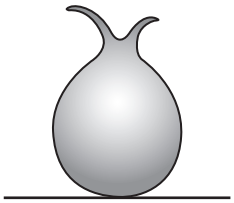
**D**



**15** The diagram shows an air-filled rubber toy. A child sits on the toy and its volume decreases.

View solution

The temperature of the air in the toy does not change.





How does the air pressure in the toy change and why?

| | pressure | reason |
|---|---|---|
| **A** | decreases | air molecules move more slowly |
| **B** | decreases | air molecules strike the rubber less frequently |
| **C** | increases | air molecules move more quickly |
| **D** | increases | air molecules strike the rubber more frequently |

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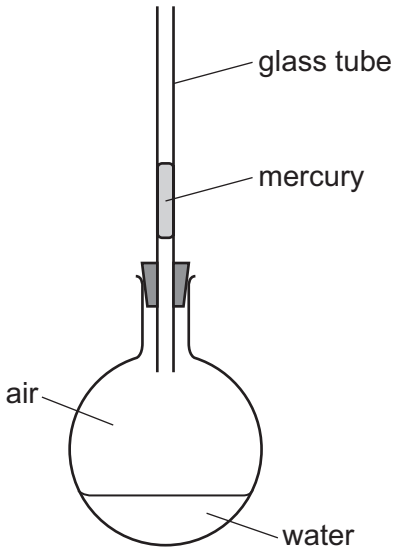
**16** The diagram shows a glass flask, sealed with a small volume of mercury in a glass tube. When the flask is gently warmed the mercury rises up the tube.

View solution




What is the main cause of the movement of the mercury?

**A** expansion of air in the flask

**B** expansion of the glass flask

**C** expansion of the glass tube

**D** expansion of the mercury

View solution

**17** Which property **cannot** be used for the measurement of temperature?

**A** half-life of a radioactive isotope

**B** length of a solid metal bar

**C** pressure of a gas

**D** volume of a liquid

View solution

**18** A student uses an immersion heater to heat some water in a beaker.

The water is heated from 20 °C to 80 °C.

The energy supplied to the water is 60.0 kJ.

What is the thermal capacity of the water? (Ignore any heat loss.)

**A** 667 J / °C **B** 750 J / °C **C** 1000 J / °C **D** 3000 J / °C

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**19** Why is the heating coil of a domestic immersion heater placed at the bottom of the tank?

View solution

**A** Cold water is less dense than hot water and therefore sinks.

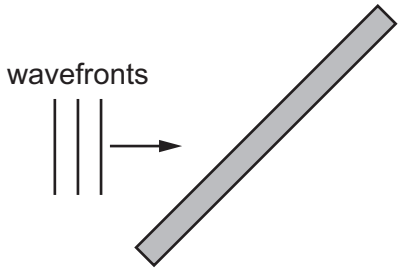
**B** Cold water is more dense than hot water and therefore rises.

**C** Hot water is less dense than cold water and therefore rises.

**D** Hot water is more dense than cold water and therefore sinks.

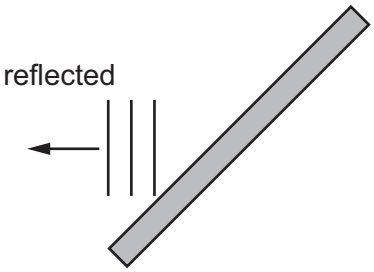
**20** The diagram represents plane wavefronts of a water wave about to strike a solid barrier.

View solution

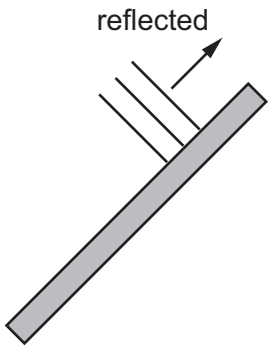



Which diagram shows the position of the wavefronts after reflection at the barrier?

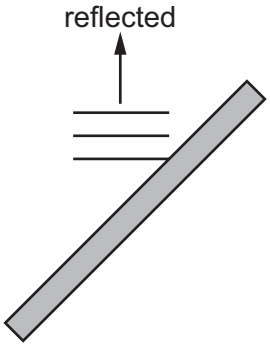
**A**



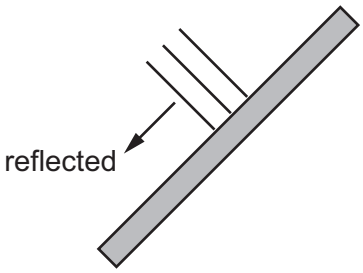

**B**




**C**



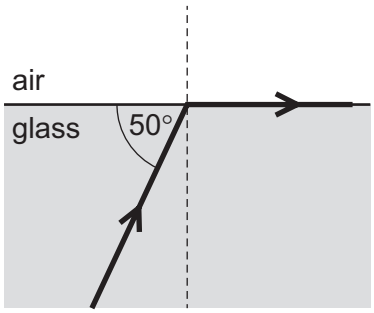

**D**



**21** The diagram shows a ray of light in glass. The ray reaches a boundary with air.

View solution

One weak ray of light is missing from the diagram.




Which statement is correct?

**A** At the boundary, the speed of the light will become less.

**B** The critical angle for light at this boundary is 50°.

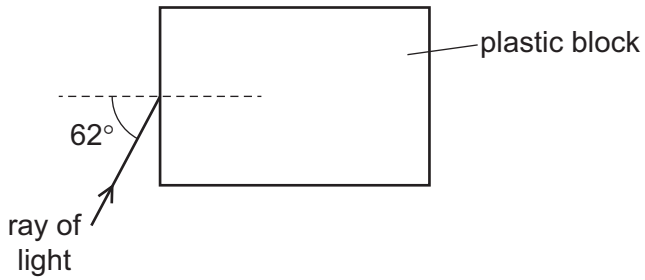
**C** The diagram shows an example of diffraction of light.

**D** The missing ray is a weak reflected ray.

**22** Light travelling in air enters a plastic block at an angle of incidence of 62°.

View solution

The plastic has a refractive index of 1.48.




What is the angle of refraction?

**A** 18° **B** 28° **C** 37° **D** 42°

**23** A sound wave travels from a medium in one state into the same medium but in another state. This causes the speed of the wave to change from approximately 300 m / s to approximately 3000 m / s.

View solution

Between which two states is the sound wave travelling?

**A** gas to solid

**B** liquid to gas

**C** liquid to solid

**D** solid to liquid

**24** The Moon is 380 000 km from the Earth. A laser light beam is directed from the Earth to the Moon. The beam is reflected back to the Earth.

View solution

How long does it take for the light to travel to the Moon and back to the Earth?

**A** 1.27 ms **B** 2.53 ms **C** 1.27 s **D** 2.53 s

View solution

**25** Which statement about radio waves is correct?

**A** They are used in television remote controllers.

**B** They can be detected by the human eye.

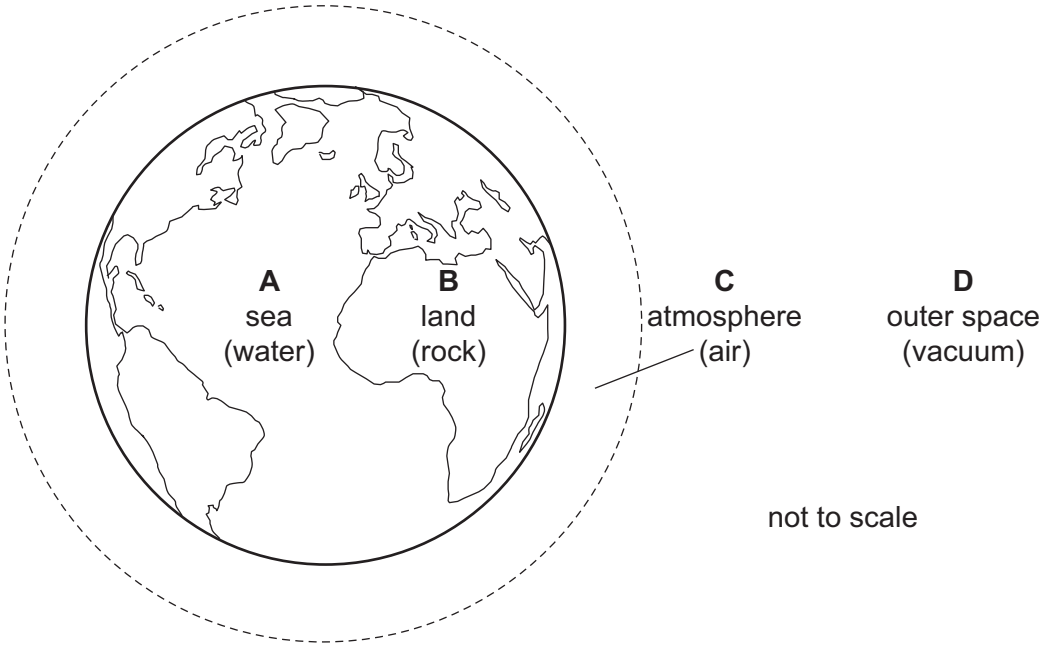
**C** They travel as longitudinal waves.

**D** They have the same speed in a vacuum as ultraviolet waves.

View solution

**26** The diagram shows the Earth and its surroundings.

Through which labelled region can sound **not** be transmitted?



**27** Different waves travel through air.

View solution

Which waves have the greatest difference in speed?

**A** ultrasound waves and sound waves

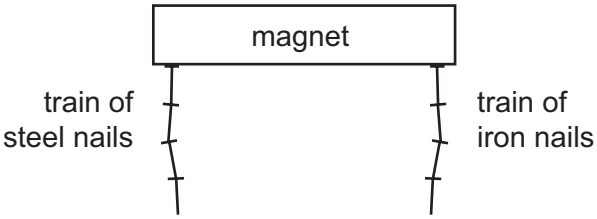
**B** ultrasound waves and ultraviolet waves

**C** ultraviolet waves and light waves

**D** ultraviolet waves and radio waves

**28** A train of steel nails and a train of iron nails hang from a strong magnet.

View solution




The trains are then carefully removed from the magnet.

What happens to the trains?

**A** Both trains fall apart.

**B** Both trains stay together.

**C** Only the train of iron nails falls apart.

**D** Only the train of steel nails falls apart.

**29** What is the best method to demagnetise a steel rod?

View solution

**A** Pass the rod through a coil connected to an a.c. supply.

**B** Pass the rod through a coil connected to a d.c. supply.

**C** Place the rod next to another magnet.

**D** Stroke the rod with another magnet.

**30** There is a current in a metal wire.

View solution

Which particles in the wire move to cause this current?

**A** $\alpha$-particles

**B** electrons

**C** neutrons

**D** protons

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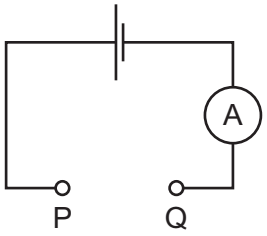
**31** The diagram shows a circuit with a gap between points P and Q.

Four pieces of metal wire of the same material are connected, in turn, between points P and Q in the circuit.

View solution




The table gives the diameters and lengths of the wires.

In which wire is the current the largest?

| | diameter / mm | length / m |
|---|---|---|
| **A** | 0.10 | 1.0 |
| **B** | 0.10 | 2.0 |
| **C** | 0.20 | 1.0 |
| **D** | 0.20 | 2.0 |

**32** A battery is connected to a circuit. It is switched on for 1.0 minute. During that time, there is a current of 0.40 A in the circuit and the battery supplies a total of 48 J of energy.

View solution

Which row gives the charge that passes and the electromotive force (e.m.f.) of the battery?

| | charge that passes in 1.0 minute / C | e.m.f. of the battery / V |
|---|---|---|
| **A** | 0.40 | 2.0 |
| **B** | 0.40 | 120 |
| **C** | 24 | 2.0 |
| **D** | 24 | 120 |

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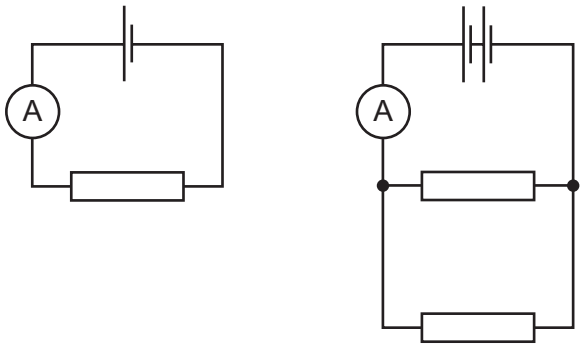
**33** Identical cells and identical resistors are used to make the circuits shown.

View solution




circuit 1 circuit 2

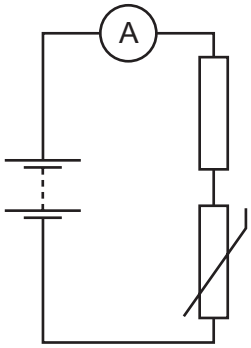
In circuit 1, the ammeter reads 2.0 A.

What is the ammeter reading in circuit 2?

**A** 1.0 A **B** 2.0 A **C** 4.0 A **D** 8.0 A

**34** The diagram shows a circuit with a fixed resistor connected in series with a thermistor and an ammeter.

View solution




Which row shows how temperature change affects the resistance of the thermistor and the current in the circuit?

| | temperature | resistance of thermistor | current in circuit |
|---|---|---|---|
| **A** | decreases | decreases | increases |
| **B** | decreases | increases | decreases |
| **C** | increases | decreases | decreases |
| **D** | increases | increases | increases |

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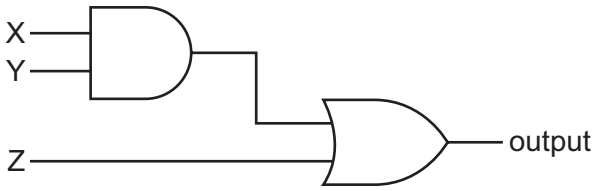
**35** The diagram shows an AND gate and an OR gate connected together.

View solution

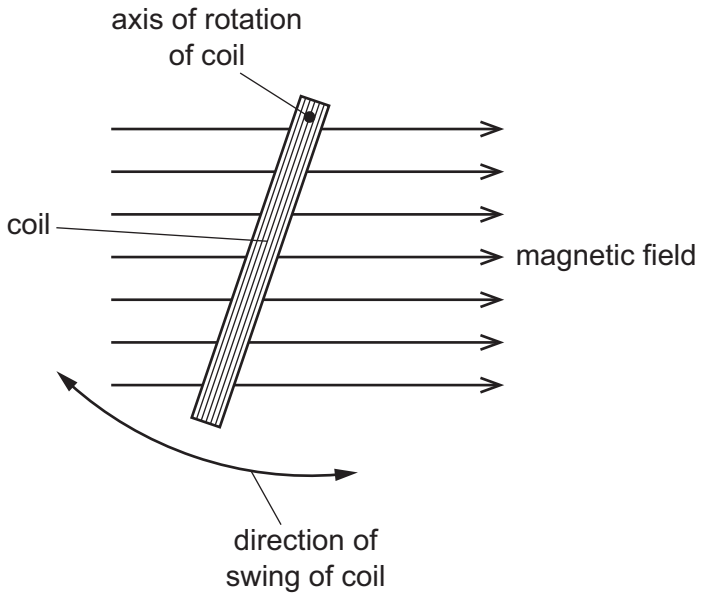



Which combination of inputs X, Y and Z gives an output of 0?

| | X | Y | Z |
|---|---|---|---|
| **A** | 0 | 0 | 1 |
| **B** | 0 | 1 | 1 |
| **C** | 1 | 0 | 0 |
| **D** | 1 | 1 | 0 |

**36** The diagram shows a short-circuited copper coil swinging about an axis at right-angles to a strong magnetic field. The motion induces a current in the coil.

View solution




What is the effect, if any, of this induced current in the coil?

**A** The induced current has no effect on the movement of the coil because copper is non-magnetic.

**B** The induced current produces a magnetic field of constant magnitude in the coil.

**C** The induced current produces forces that assist the change causing it.

**D** The induced current produces forces that oppose the changes causing it.

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**37** Diagram 1 shows a magnet being pushed into a coil that is connected to a centre-zero galvanometer.

View solution

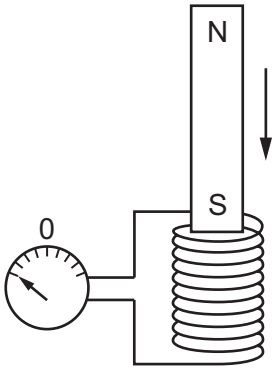



diagram 1

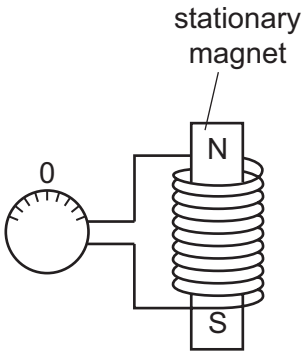



diagram 2

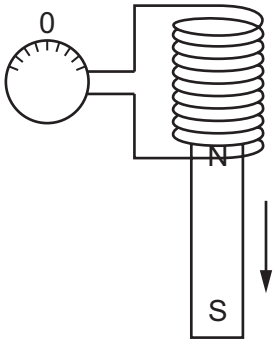



diagram 3

Which row shows the directions of the pointer when the magnet is as shown in diagrams 2 and 3?

| | diagram 2 | diagram 3 |
|---|---|---|
| **A** |  |  |
| **B** |  |  |
| **C** |  |  |
| **D** |  |  |

**38** Radioactive carbon-14 decays to nitrogen-14 by the emission of a particle.

View solution

$$^{14}_{6}C \rightarrow {}^{14}_{7}N + \text{particle}$$

Which particle has been emitted in this process?

**A** a $\beta$-particle

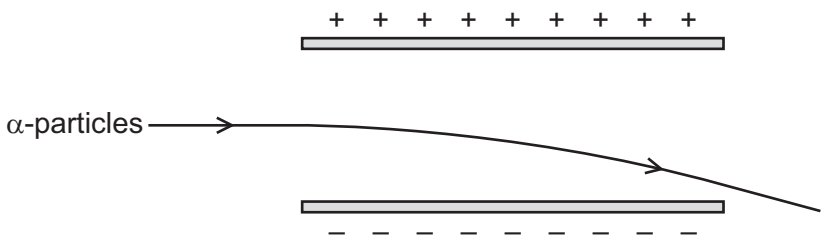
**B** an $\alpha$-particle

**C** a neutron

**D** a proton

**39** As $\alpha$-particles pass through the electric field between two charged plates, they are deflected downwards.

View solution




What happens to $\gamma$-rays passing through the same electric field?

**A** They are deflected downwards more than the $\alpha$-particles.

**B** They are deflected upwards.

**C** They are not deflected at all.

**D** They follow the same path as the $\alpha$-particles.

**40** Radioactive iodine-131 emits $\beta$-particles and has a half-life of 8 days. It decays to produce xenon-131.

View solution

Which statement about this decay is correct?

**A** After 8 days no more $\beta$-particles are emitted.

**B** After 8 days the number of xenon-131 atoms has halved.

**C** After 16 days the iodine-131 has decayed completely.

**D** After 16 days the number of iodine-131 atoms has reduced to one quarter.

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