



MINISTRY OF EDUCATION, SINGAPORE
in collaboration with
CAMBRIDGE ASSESSMENT INTERNATIONAL EDUCATION
General Certificate of Education Ordinary Level

PHYSICS

6091/01

Paper 1 Multiple Choice

For examination from 2024

SPECIMEN PAPER

1 hour

Additional Materials: Multiple Choice Answer Sheet

READ THESE INSTRUCTIONS FIRST

Write in soft pencil.

Do not use staples, paper clips, glue or correction fluid.

Write your name, Centre number and index number on the Answer Sheet in the spaces provided unless this has been done for you.

DO NOT WRITE ON 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.

The use of an approved scientific calculator is expected, where appropriate.

This document consists of **16** printed pages.



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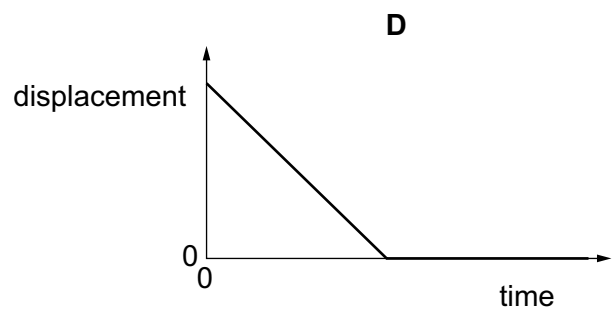
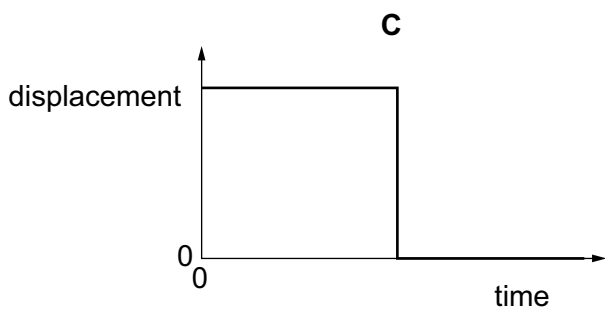
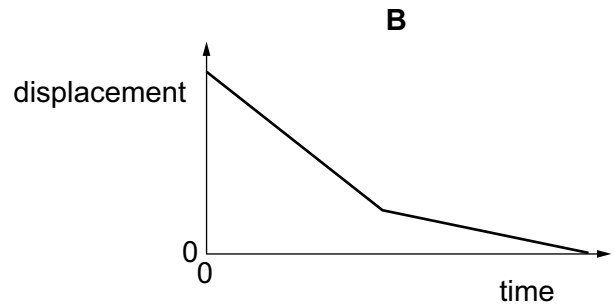
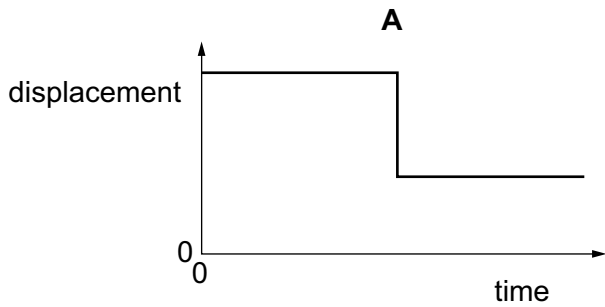
- 1 A cyclist, riding at a speed of 5.0 m/s , brakes with uniform deceleration and stops in 3.0 m .

How long does the cyclist take to stop?

- A** 0.60 s **B** 1.2 s **C** 1.3 s **D** 3.0 s

- 2 A free-fall parachutist falls at a constant speed. He then opens his parachute and continues to fall to Earth at a lower, constant speed.

Which diagram shows how the displacement of the parachutist varies with time?

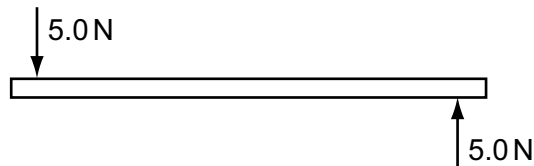


- 3 The acceleration of free fall on the Moon is 1.6 m/s^2 . The acceleration of free fall on the Earth is 10 m/s^2 .

A rock has a mass of 10 kg on the Earth.

Which statement about the rock is correct?

- A Its mass on the Moon is 1.6 kg.
 - B Its mass on the Moon is 10 kg.
 - C Its weight on the Moon is zero.
 - D Its weight on the Earth is 10 N.
- 4 Two forces act on a rod, as shown in the diagram.



Which effect is produced by these two forces?

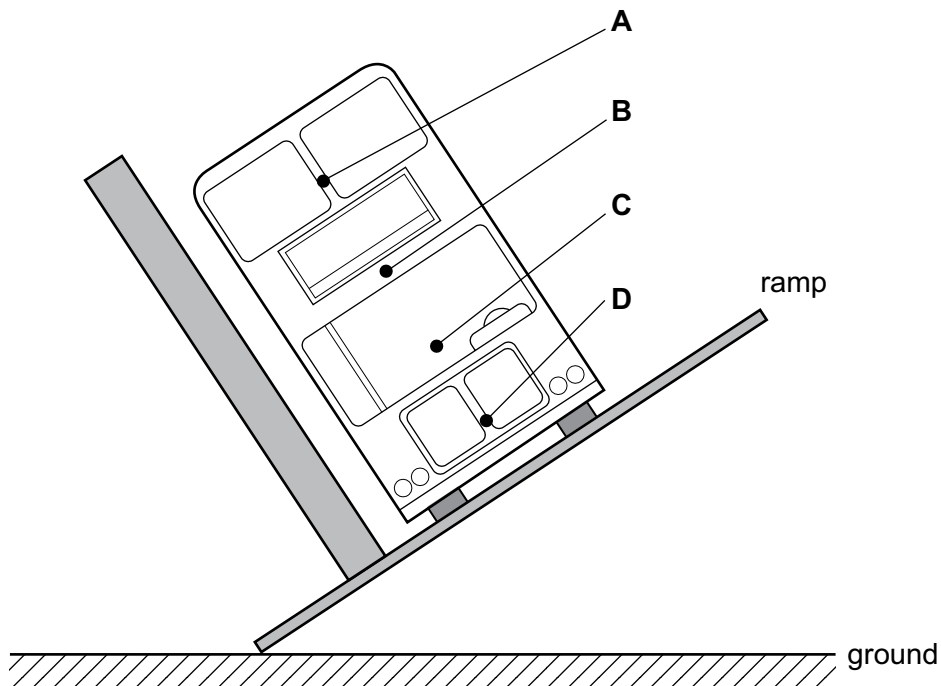
- A both rotation and movement in a straight line
 - B rotation only
 - C no effect because the forces are balanced
 - D movement in a straight line only
- 5 A force of 20 N pushes an object of mass 5.0 kg along a rough horizontal surface where the frictional force is 5.0 N.

What is the acceleration of the object?

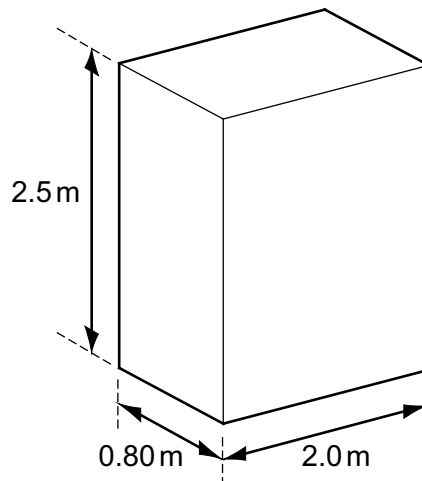
- A 1.0 m/s^2
- B 2.0 m/s^2
- C 3.0 m/s^2
- D 4.0 m/s^2

- 6 The stability of a bus is tested by tilting it on a ramp. The diagram shows a bus that is just about to topple over.

Where is the centre of gravity of the bus?



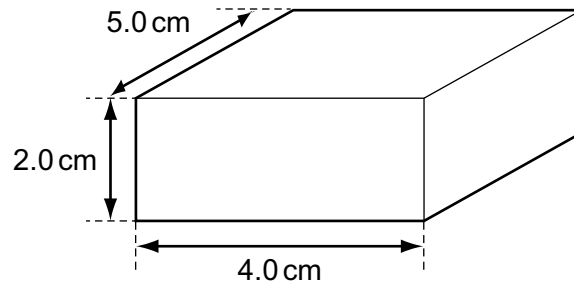
- 7 The base for a statue rests on level ground. The base is made from stone and is 2.0 m long, 2.5 m high and 0.80 m wide. It has a weight of 96 000 N.



What is the pressure on the ground due to the base?

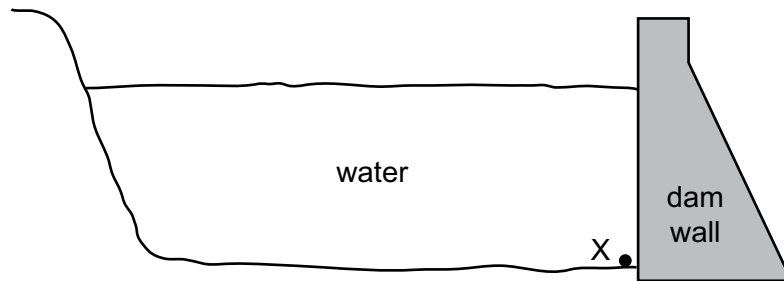
- A 19 kPa B 24 kPa C 48 kPa D 60 kPa

- 8 The diagram shows a solid with dimensions $5.0\text{ cm} \times 4.0\text{ cm} \times 2.0\text{ cm}$. It has a mass of 100 g .



What is the density of the solid?

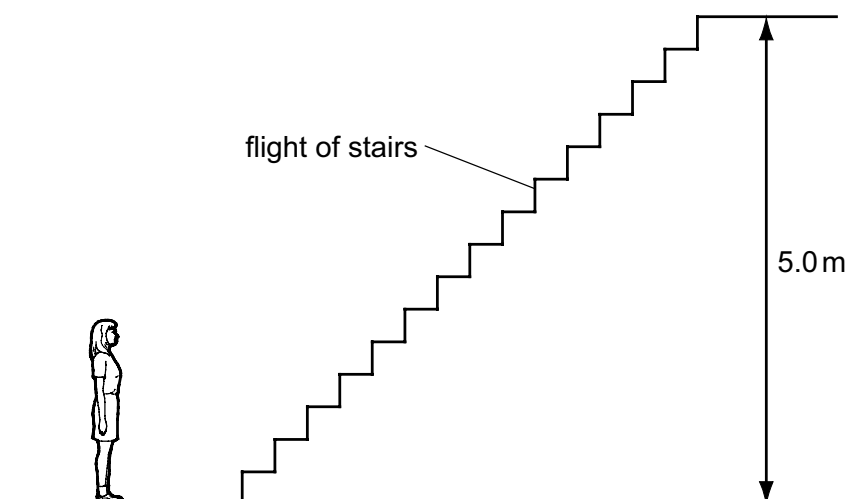
- A** 0.40 g/cm^3 **B** 2.5 g/cm^3 **C** 5.0 g/cm^3 **D** 10 g/cm^3
- 9 The diagram shows water held in a reservoir by a dam wall.



Which factor determines the pressure at X?

- A** the depth of the water in the reservoir
B the surface area of the reservoir
C the weight of the dam wall
D the thickness of the dam wall

- 10 A girl of weight 500 N runs up a flight of stairs in 10 s. The vertical height of the stairs is 5.0 m.



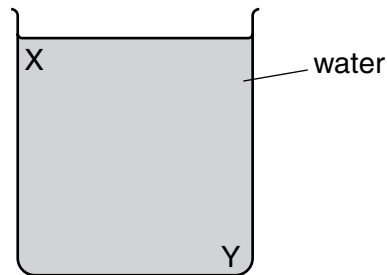
What is the average useful power developed by the girl?

- A** 50 W **B** 100 W **C** 250 W **D** 1000 W
- 11 A parachutist opens his parachute and falls to Earth at constant speed.
- What is the principal energy transfer taking place as he falls?
- A** kinetic store to gravitational potential store of energy
B kinetic store to internal store of energy
C gravitational potential store to kinetic store of energy
D gravitational potential store to internal store of energy
- 12 According to the kinetic theory, matter is made up of very small particles in a constant state of motion.

Which row best describes the particle behaviour in the liquid state?

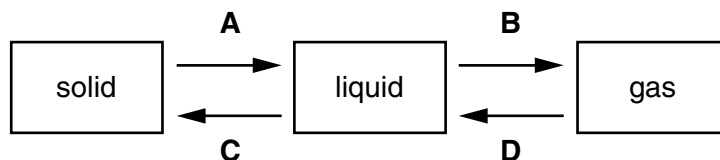
	forces between particles	motion of particles
A	strong	move randomly at high speed
B	strong	vibrate and slide over each other
C	strong	vibrate around a fixed position
D	weak	move randomly at high speed

- 13 Why does the pressure of a fixed mass of gas increase when it is heated at constant volume?
- A More particles are created by the heating.
 - B The average mass of the particles increases.
 - C The average speed of the particles increases.
 - D The average separation of the particles increases.
- 14 A beaker contains water at room temperature.



Which action sets up a convection current in the water?

- A cooling the water at X
 - B cooling the water at Y
 - C stirring the water at X
 - D stirring the water at Y
- 15 Which arrow shows condensation?



- 16 Which statement describes what happens when sulfur solidifies?
- A There is a transfer of energy and a change in temperature.
 - B There is a transfer of energy but no change in temperature.
 - C There is no transfer of energy and no change in temperature.
 - D There is no transfer of energy but there is a change in temperature.

- 17 A liquid evaporates rapidly.

Why does this cause the liquid to cool?

- A Energy is lost by conduction.
- B Energy is lost by convection currents.
- C Some of the most energetic molecules leave the liquid.
- D The molecules have less room to move around.

- 18 An ice cube has a mass of 7.50g. The specific latent heat of fusion of ice is 334 J/g.

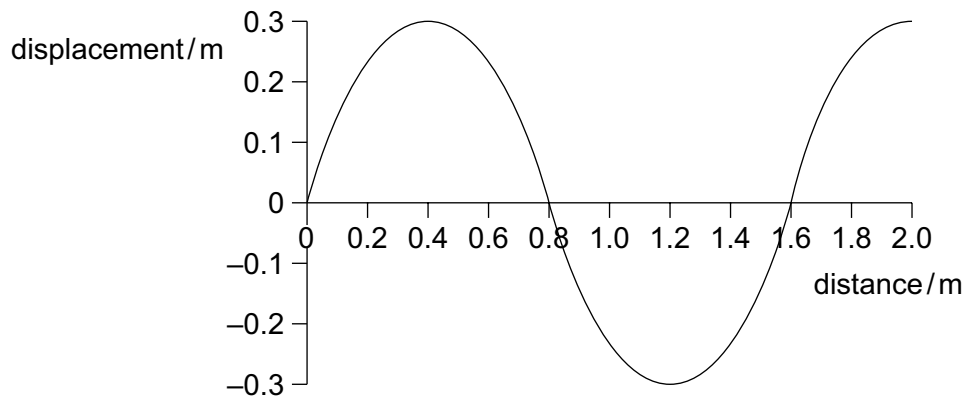
The ice cube starts at 0°C. Energy from the surroundings is transferred to the ice cube at an average rate of 1.25 J/s.

How long does it take for the ice to completely melt?

- A 35.6s
- B 55.7s
- C 2000s
- D 3130s

- 19 A long rope is stretched out on the floor. One end of the rope is then shaken.

The graph shows the rope at a particular time.



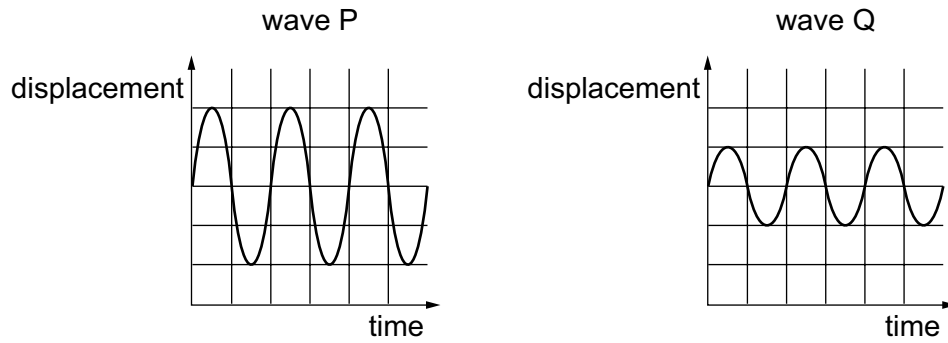
What is the wavelength of the wave?

- A 0.3m
- B 0.6m
- C 0.8m
- D 1.6m

- 20 Which waves produce compressions as they travel through the air?

- A light waves
- B microwaves
- C radio waves
- D sound waves

21 The diagrams represent two different sound waves. The scales of both sets of axes are the same.



How do the frequency and the pitch of P compare with the frequency and the pitch of Q?

	frequency of P	pitch of P
A	greater than Q	higher than Q
B	greater than Q	same as Q
C	same as Q	higher than Q
D	same as Q	same as Q

22 A student stands 50 m from a wall and knocks two wooden blocks together. When the frequency of knocking is 3 knocks per second, the echo of a knock is heard at the instant of the next one.

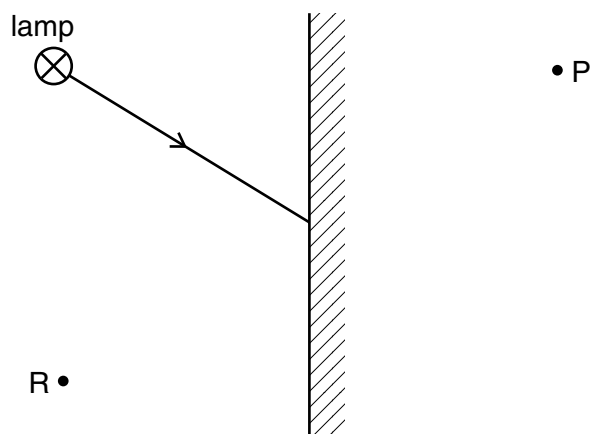
What is the speed of sound calculated using these measurements?

- A** 150 m/s **B** 200 m/s **C** 300 m/s **D** 350 m/s

23 Which waves are used by a television remote controller?

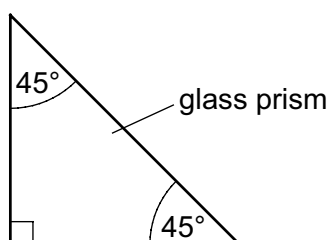
- A** infrared waves
B microwaves
C ultrasound waves
D ultraviolet waves

- 24 The diagram shows a ray of light from one point on a lamp striking a plane mirror.



Which statement describes the image of the point on the lamp formed by the mirror?

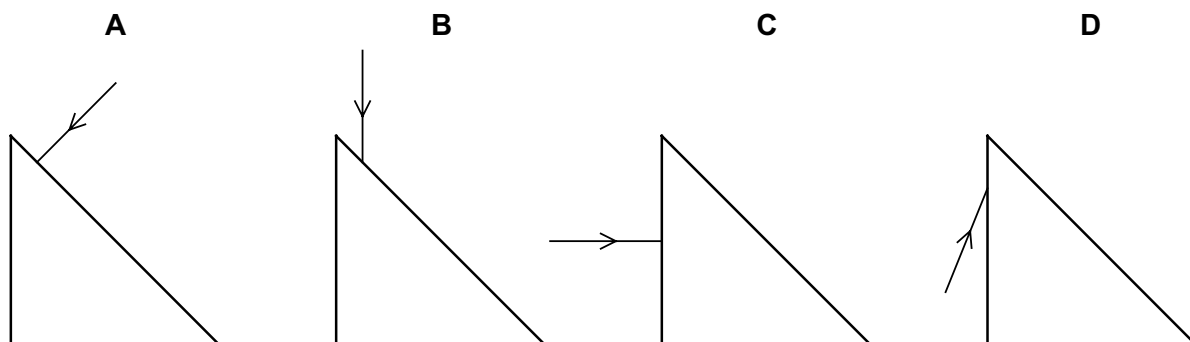
- A The image is at P and is real.
 - B The image is at P and is virtual.
 - C The image is at R and is real.
 - D The image is at R and is virtual.
- 25 A glass prism has angles of 45° , 90° and 45° .



The critical angle for glass is 42° .

A narrow beam of light is directed onto the prism.

Which arrangement makes the beam undergo total internal reflection twice before any light leaves the prism?

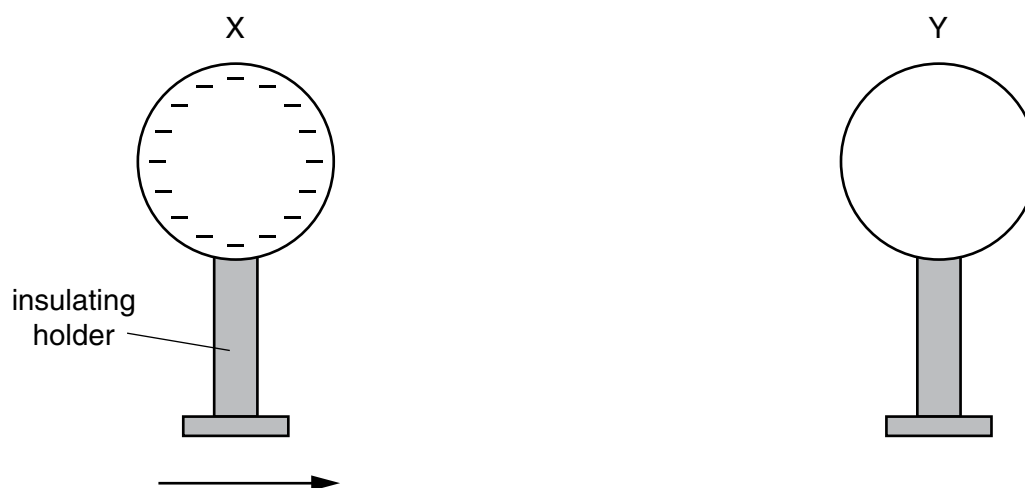


- 26 A piece of plastic is rubbed with a cloth. The plastic becomes negatively charged and the cloth becomes positively charged.

What happens to the plastic and to the cloth to cause this?

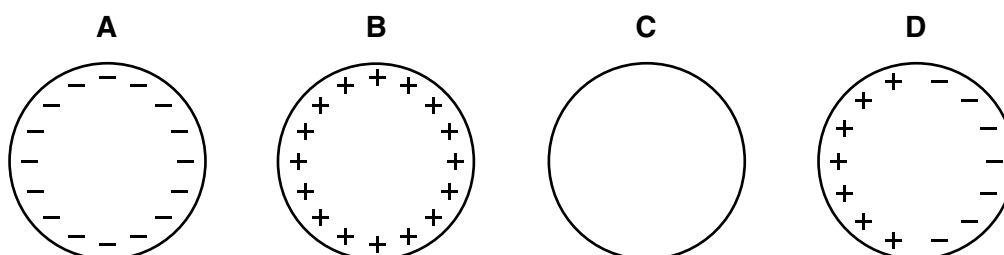
	plastic	cloth
A	gains electrons	gains protons
B	gains electrons	loses electrons
C	loses protons	gains protons
D	loses protons	loses electrons

- 27 A negatively charged sphere X is moved close to an identical uncharged sphere Y. The spheres do **not** touch.



Sphere Y is earthed by touching it with a finger, which is then removed. Sphere X is then moved away from sphere Y.

What is the final charge on sphere Y?



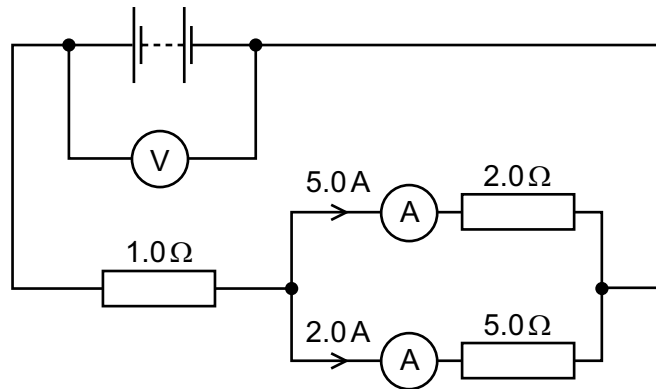
- 28 A charge of 60 C passes through a resistor in 120 s.

In 1.0 s, the energy transferred in the resistor is 5.0 J.

What is the potential difference across the resistor?

- A** 5.0 V **B** 10 V **C** 12 V **D** 24 V

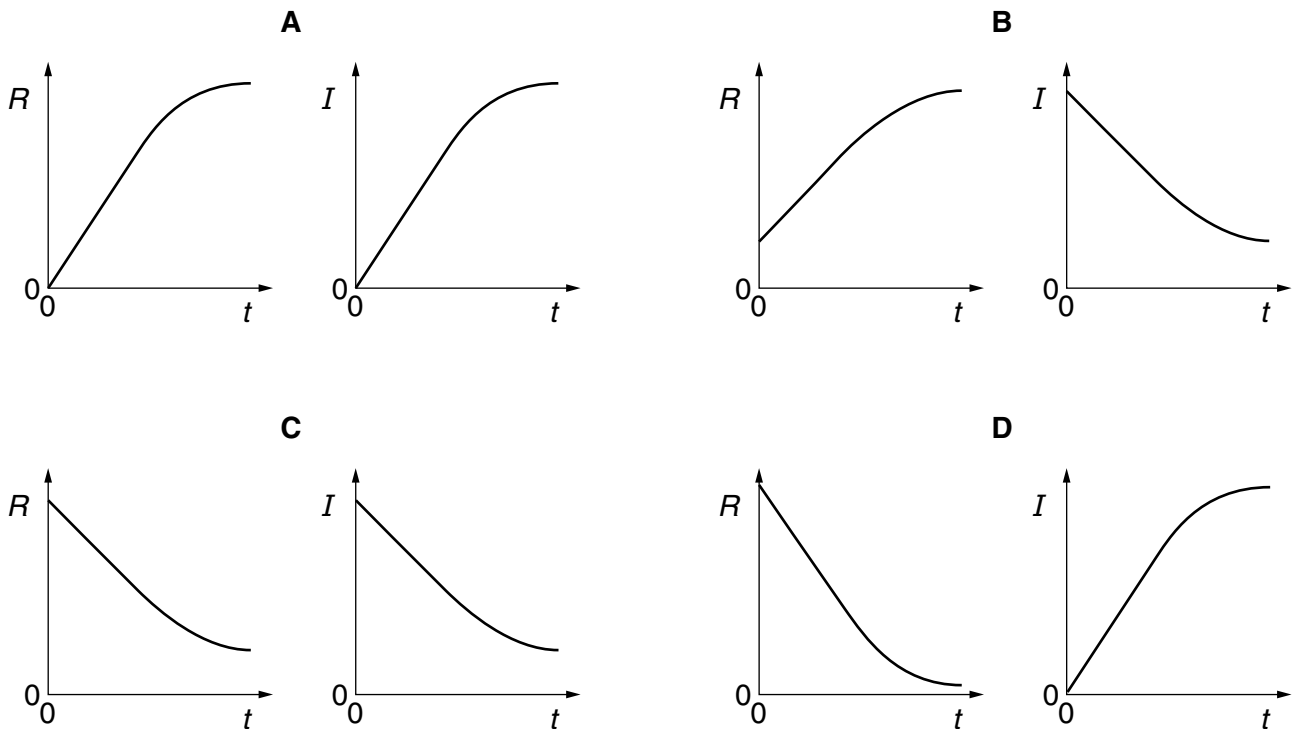
- 29 The circuit diagram shows a 1.0Ω resistor connected in series with a parallel arrangement of a 2.0Ω resistor and a 5.0Ω resistor. The current readings for the parallel arrangement are shown.



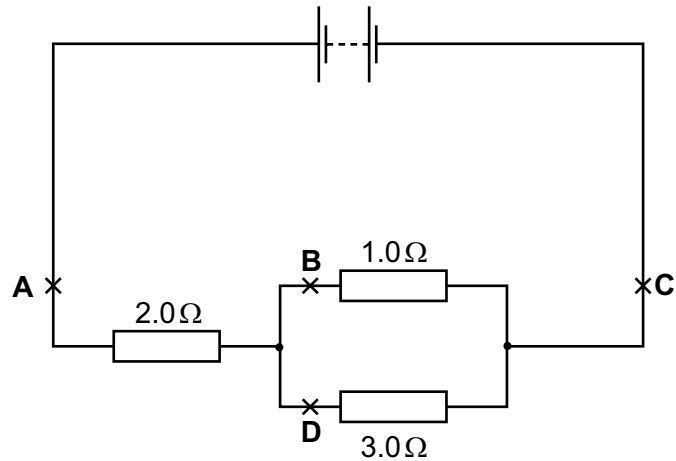
What is the reading on the voltmeter?

- A 10V B 12V C 15V D 17V
- 30 When a filament lamp is switched on, there is a current in the lamp. As the temperature of the filament increases, its resistance changes.

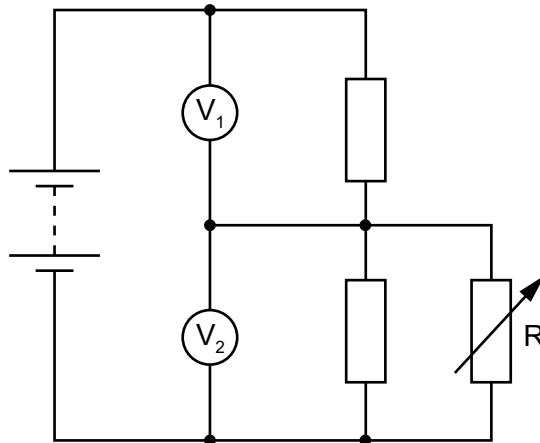
Which pair of graphs shows how the resistance R of the filament and the current I in the lamp vary with time t after the lamp is switched on?



31 At which point in the circuit is the current the smallest?



32 The circuit diagram shows a variable resistor R connected in parallel to the lower half of a potential divider.



The resistance of R increases.

What happens to the voltmeter readings?

	reading on V_1	reading on V_2
A	decreases	decreases
B	decreases	increases
C	increases	decreases
D	increases	increases

- 33 An electric cooker has a hotplate rated at 1500 W and an oven rated at 2000 W.

In one day, the hotplate is switched on for a total of 1.0 h and the oven is switched on for 3.0 h.

The cost of electricity is 24 cents per kWh.

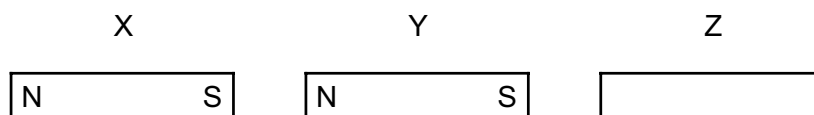
What is the cost of using the electric cooker for one day?

- A 56 cents B 84 cents C 180 cents D 336 cents
- 34 The metal case of an electric heater is earthed. The plug to the heater contains a 5A fuse. There is a current of 4.0A when the heater works normally.

The insulation on the cable to the heater becomes so worn that the live wire makes electrical contact with the case.

What happens?

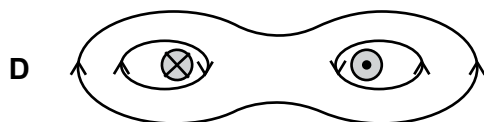
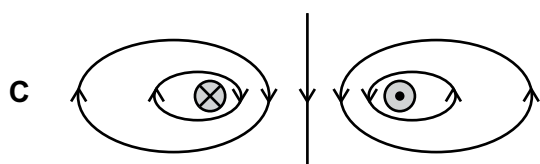
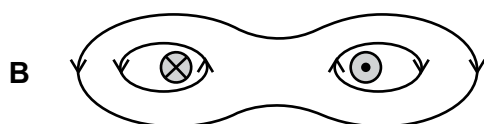
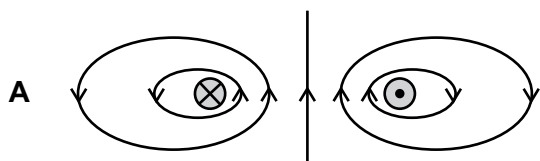
- A There is a large current in the earth wire and the fuse is not affected.
- B The fuse melts and switches off the circuit.
- C The metal case becomes live and dangerous.
- D The metal case becomes very hot.
- 35 The diagram shows three bars placed in a line. X and Y are both magnets. Z is soft iron.



What are the magnetic forces on X and Z due to magnet Y?

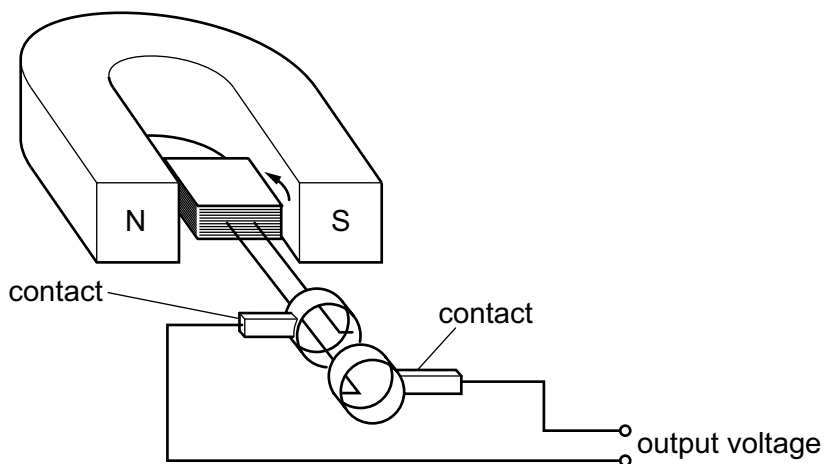
	force on X	force on Z
A	attraction	attraction
B	attraction	repulsion
C	repulsion	attraction
D	repulsion	repulsion

36 Each of the diagrams below is a cross-section through two parallel current-carrying conductors. Which diagram shows the magnetic field pattern formed by the currents in the two conductors?

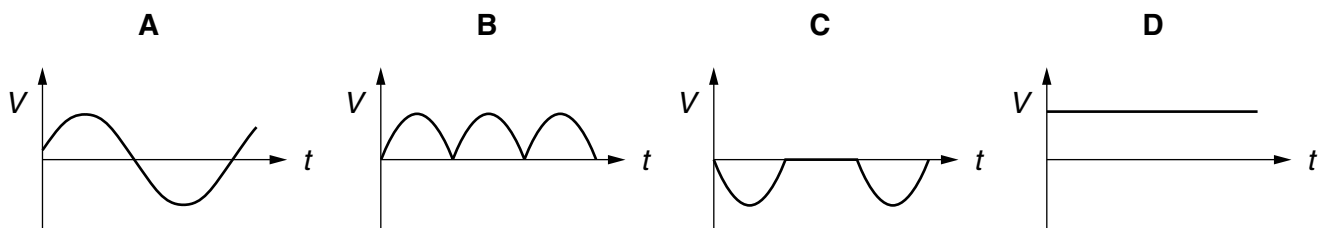


⊗ current into the page
 ⊙ current out of the page

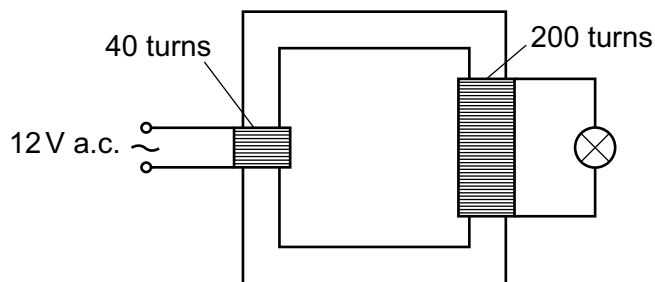
37 A coil is rotated steadily between the poles of a magnet.



Which graph shows the output voltage V against time t ?

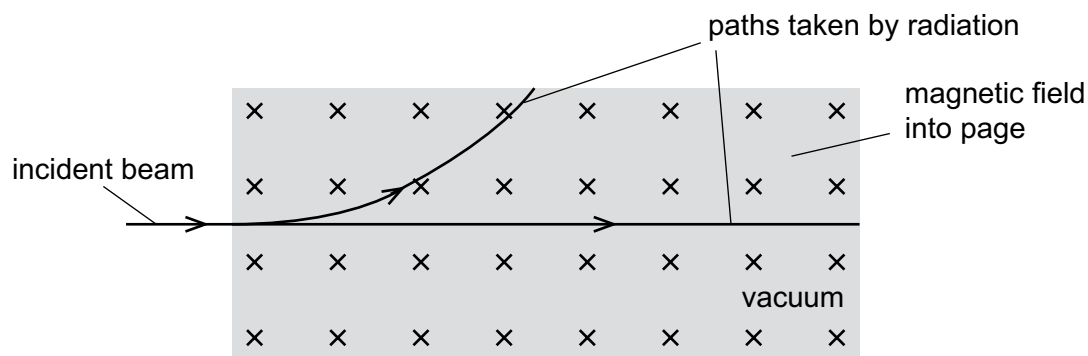


- 38 The diagram shows a lamp connected to a transformer.



What is the potential difference across the lamp?

- A** 2.4 V **B** 12 V **C** 60 V **D** 240 V
- 39 A neutral atom of an isotope has the nuclide notation ${}_{81}^{205}\text{Tl}$.
- Which statement is correct?
- A** There are 81 electrons in the nucleus of the atom.
B There are 205 neutrons in the nucleus of the atom.
C There are 43 more neutrons than electrons in the atom.
D There are 124 protons in the nucleus of the atom.
- 40 A beam of radiation enters a region in which there is a very strong, uniform magnetic field directed into the page. All the equipment is in a vacuum.



The beam splits and the curved path and the straight path taken by the radiation in the magnetic field are shown on the diagram. What types of radiation are in the incident beam?

- 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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