



MINISTRY OF EDUCATION, SINGAPORE
in collaboration with
CAMBRIDGE ASSESSMENT INTERNATIONAL EDUCATION
General Certificate of Education Normal (Academic) Level

SCIENCE (PHYSICS)

5105/01

Paper 1 Multiple Choice

For examination from 2024

SPECIMEN PAPER

Papers 1 and 2: 1 hour 15 minutes

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 **twenty** 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.

Answers to Paper 1 and Paper 2 must be handed in separately.

Each correct answer will score one mark. A mark will not be deducted for a wrong answer.

You are advised to spend no more than **30 minutes** on **Paper 1**.

You may proceed to answer Paper 2 as soon as you have completed Paper 1.

Any rough working should be done in this booklet.

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

This document consists of **9** printed pages and **1** blank page.

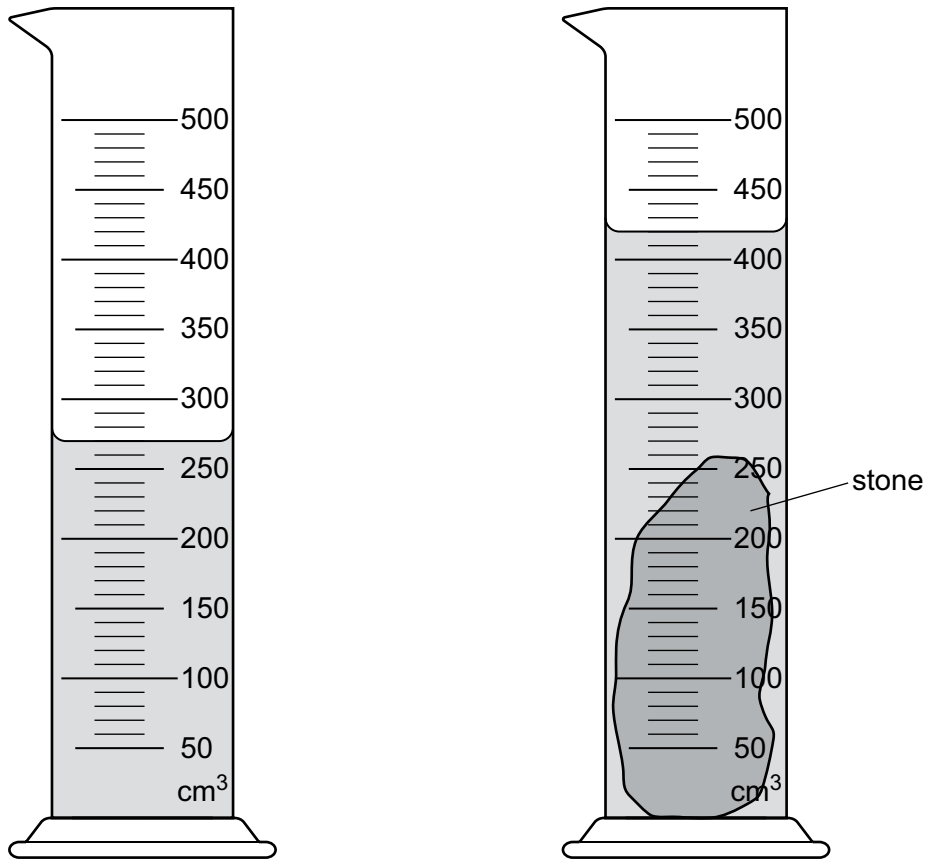


Singapore Examinations and Assessment Board



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- 1 A stone is carefully lowered into a measuring cylinder containing water. The diagram shows the level of water in the measuring cylinder before and after the stone is added.



What is the volume of the stone?

- A** 150 cm³ **B** 270 cm³ **C** 420 cm³ **D** 690 cm³
- 2 The force of gravity on a body is a vector quantity.

Which describes a vector quantity?

- A** It acts in a vertical direction.
B It has a direction but no size.
C It has a direction and a size.
D It is a force of attraction.

- 3 Four students try to explain what is meant by acceleration.

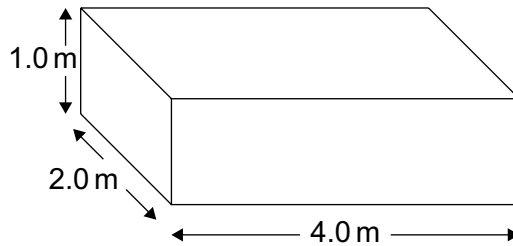
Which explanation is correct?

- A It is the distance an object travels in one second.
 - B It is the change in the velocity of an object in one second.
 - C It is the force acting on an object divided by the distance it travels in one second.
 - D It is the force acting on an object when it is near the Earth.
- 4 An asteroid is made of iron and has a volume of $500\,000\text{ m}^3$.

The density of iron is 7800 kg/m^3 .

What is the mass of the asteroid?

- A 3.9Gg
 - B 39Gg
 - C 0.39Tg
 - D 3.9Tg
- 5 The block shown has a weight of 2400 N.

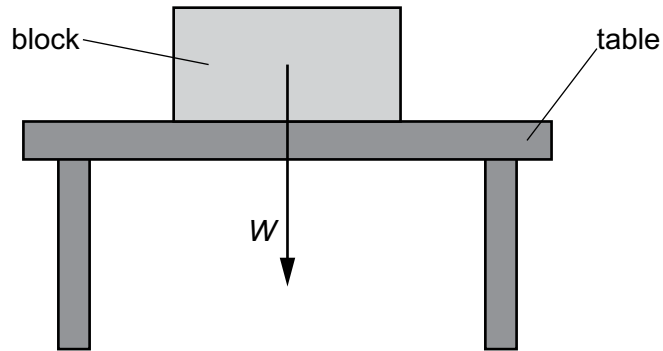


The block rests with one of its rectangular faces on a horizontal surface.

What is the pressure due to the block when it is on the face with the smallest area?

- A 300 N/m^2
- B 600 N/m^2
- C 1200 N/m^2
- D 2400 N/m^2

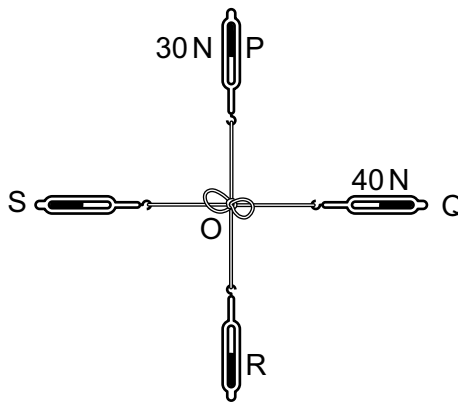
- 6 A block of weight W is at rest on a table.



Force F and force W are an action-reaction pair of forces.

Which describes force F ?

- A the downward normal force that the table exerts on the block
 - B the force that the block exerts on the Earth towards the block
 - C the gravitational force that the Earth exerts on the table
 - D the upward contact force that the table exerts on the block
- 7 The diagram shows four spring balances, viewed from above, joined by pieces of string tied in a knot at O. The strings are at 90° to each other.



The knot at O does **not** move and the readings on P and Q are as shown in the diagram.

What are the readings on R and on S?

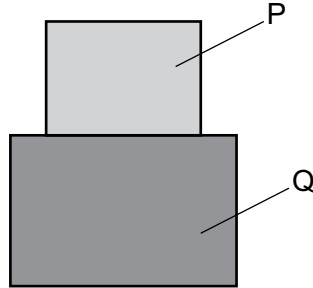
	reading on R/N	reading on S/N
A	0	70
B	30	40
C	40	30
D	70	0

- 8 The resultant force acting on an object of mass 10 kg is 25 N.

What is the acceleration of the object?

- A 0.40 m/s^2 B 2.5 m/s^2 C 4.0 m/s^2 D 25 m/s^2

- 9 A solid block P is at rest on top of a solid block Q which is also at rest.



Energy is transferred by heating from P to Q.

What is the cause of this energy transfer?

- A Block P exerts a force on block Q.
B The energy in the internal store of P is greater than in the internal store of Q.
C The temperature of P is greater than the temperature of Q.
D There is more energy in the gravitational potential store of P than of Q.
- 10 Energy is transferred through a metal bar by thermal conduction.
- Which statement is correct?
- A Energy is transferred by movement of electrons and by vibration of atoms.
B Energy is transferred by movement of electrons but **not** by vibration of atoms.
C Energy is transferred by vibration of electrons and by movement of atoms.
D Energy is transferred by vibration of atoms but **not** by movement of electrons.

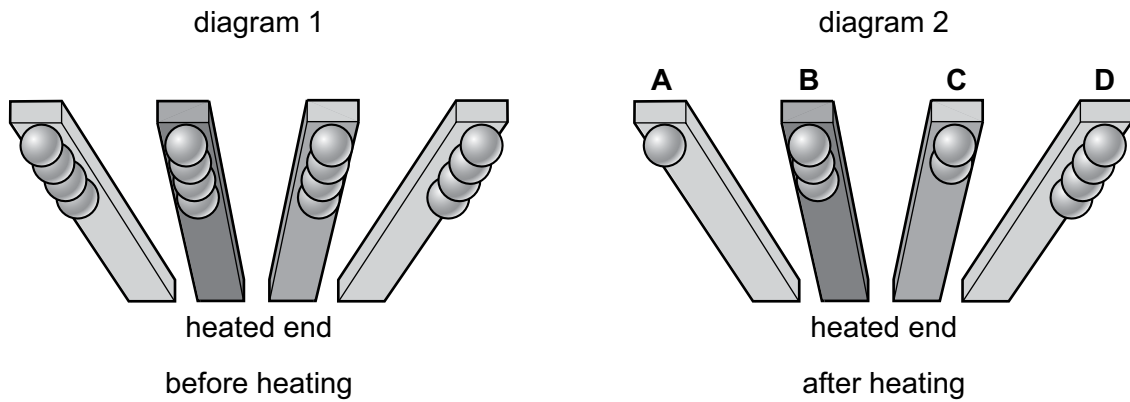
11 An experiment is set up to investigate which metal is the best conductor of heat.

Small balls are attached to rods of different metals with wax, as shown in diagram 1.

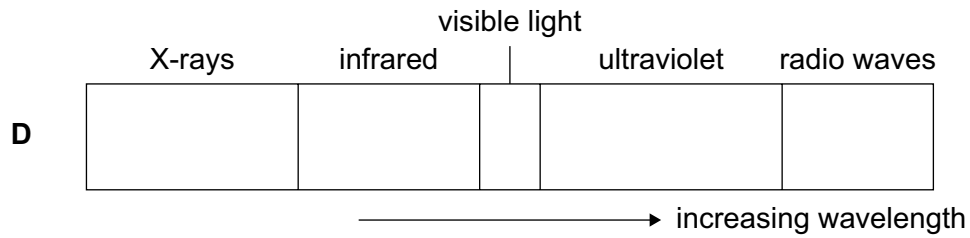
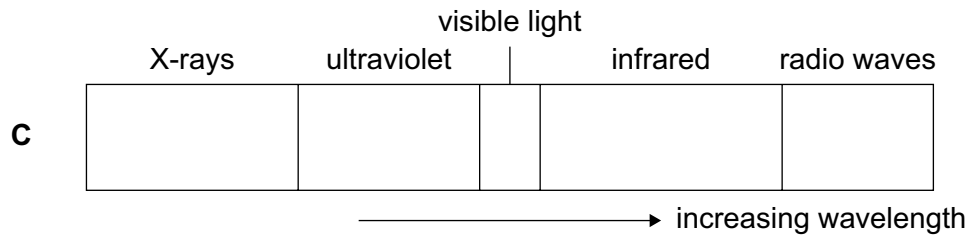
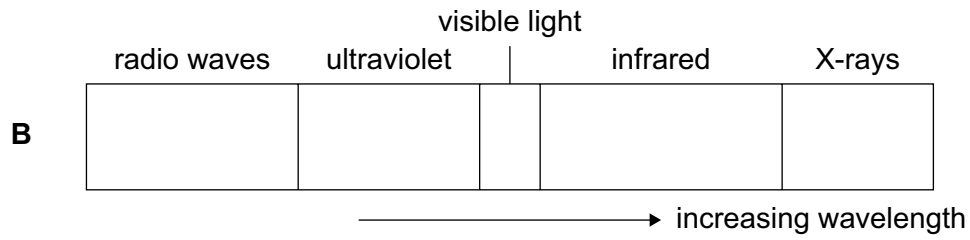
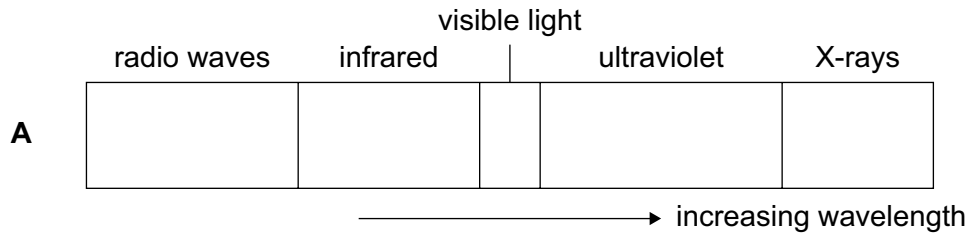
The rods are heated at one end. Some of the balls fall off.

Diagram 2 shows that some of the balls remain attached to the rods.

Which metal rod is made from the best thermal conductor?



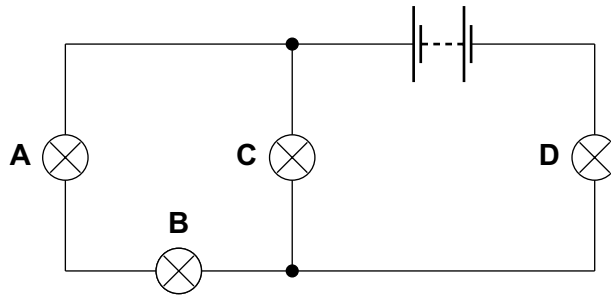
12 Which diagram shows the order of the waves in the electromagnetic spectrum?



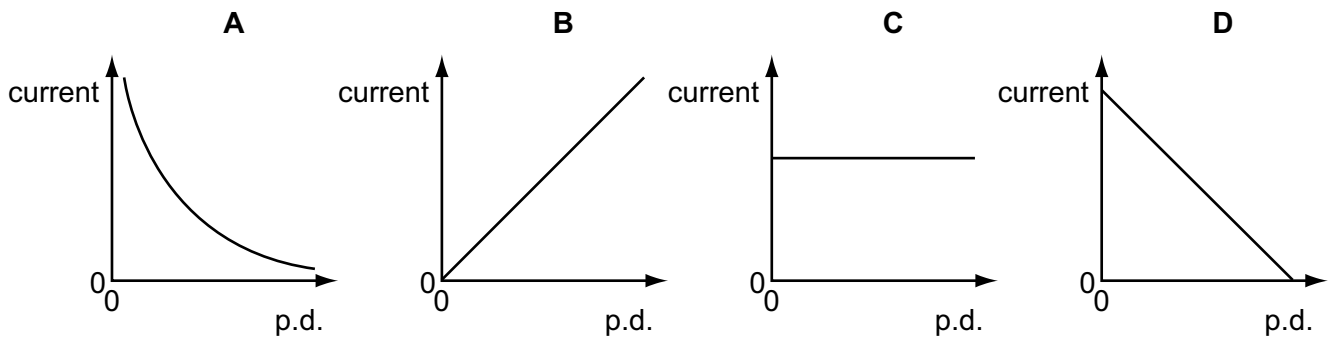
13 What is the unit of electric charge?

- A coulomb
- B ohm
- C volt
- D watt

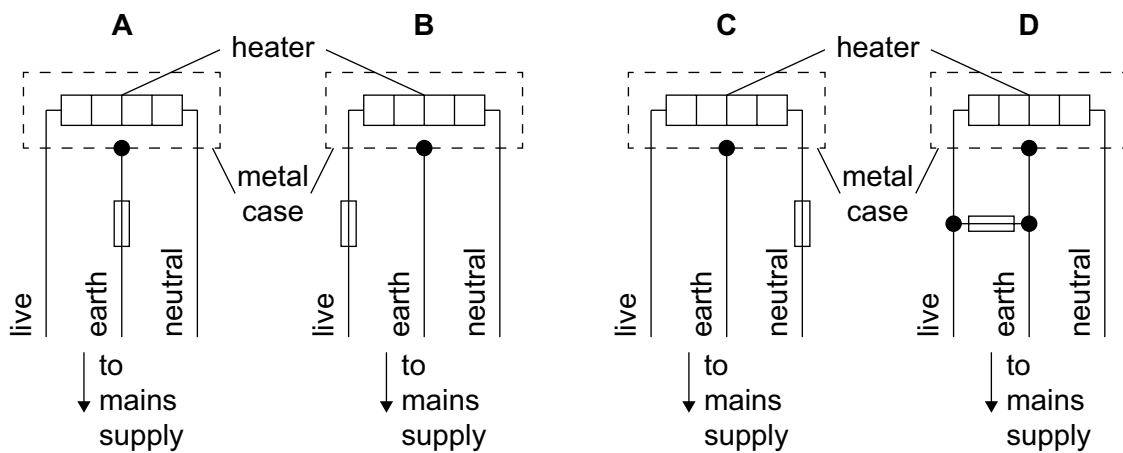
- 14 The diagram shows an electric circuit. Initially all the lamps in the circuit are lit. One of the lamps in the circuit breaks and all the other lamps stop working. Which lamp breaks?



- 15 Which graph shows how the current in a resistor of constant resistance changes when the potential difference (p.d.) across it is varied?



- 16 In which circuit is the fuse connected in the correct position?



17 An electric drill is powered by the mains supply.

Why is the switch of the electric drill connected in the live wire?

- A The live wire becomes a second earth wire when the switch is open.
- B The live wire is the only wire that carries an electric current.
- C The live wire is the wire that is in contact with the metal casing.
- D The live wire is the wire which is connected to the mains voltage.

18 Electricity costs 20 cents per kWh.

How much does it cost to use a 0.60 kW electric iron for 30 minutes?

- A 6 cents B 18 cents C 360 cents D 1000 cents

19 X and Y are different isotopes of the same element.

Which statement is correct?

- A X has a different number of electrons in its nucleus from Y.
- B X has the same number of neutrons in its nucleus as Y.
- C X has the same number of nucleons in its nucleus as Y.
- D X has the same number of protons in its nucleus as Y.

20 What is the order of the ionising effects of α -radiation, β -radiation and γ -radiation?

	most ionising \rightarrow least ionising
A	$\alpha \rightarrow \beta \rightarrow \gamma$
B	$\alpha \rightarrow \gamma \rightarrow \beta$
C	$\beta \rightarrow \gamma \rightarrow \alpha$
D	$\gamma \rightarrow \beta \rightarrow \alpha$

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