



COMMONWEALTH SECONDARY SCHOOL

PRELIMINARY EXAMINATION 2022

SECONDARY FOUR NORMAL (ACADEMIC)

Name: _____ () Class: _____

SCIENCE (PHYSICS)

Paper 1 Multiple Choice

5105/01

12 Aug 2022 (Fri)

1130 - 1245

Additional Materials: Multiple Choice Answer Sheet

Papers 1 and 2: 1 hour 15 minutes

READ THESE INSTRUCTIONS FIRST

Write in soft pencil.

Do not use staples, paper clips or correction fluid.

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

There are **twenty** questions in 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 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.

Setter: Ms Ye Dan

This document consists of **8** printed pages and **1** blank page.

[Turn over

1 Which quantity is a vector?

- A density
- B distance
- C time
- D weight

2 Two identical balls are released from a building at the same time. One falls from the fifth storey while the other falls from the third storey.

Which of the following quantities is the same for both balls?

- A acceleration
- B final velocity
- C time of travel
- D speed at the second storey

3 A parachutist of weight 600 N falls towards the ground at a constant velocity of 4.0 m/s.

What is the resultant force acting on the parachutist?

- | | | | |
|---|-------|---|-------|
| A | 0 N | B | 60 N |
| C | 240 N | D | 600 N |

4 A robotic rover has a weight of 1860 N. The Earth's gravitational field strength is 10.0 N/kg.

When it lands on the Mars, it experiences the Mars's gravitational field strength of 3.72 N/kg.

What is the weight of the rover on the Mars?

- | | | | |
|---|--------|---|--------|
| A | 5.00 N | B | 69.2 N |
| C | 50.0 N | D | 692 N |

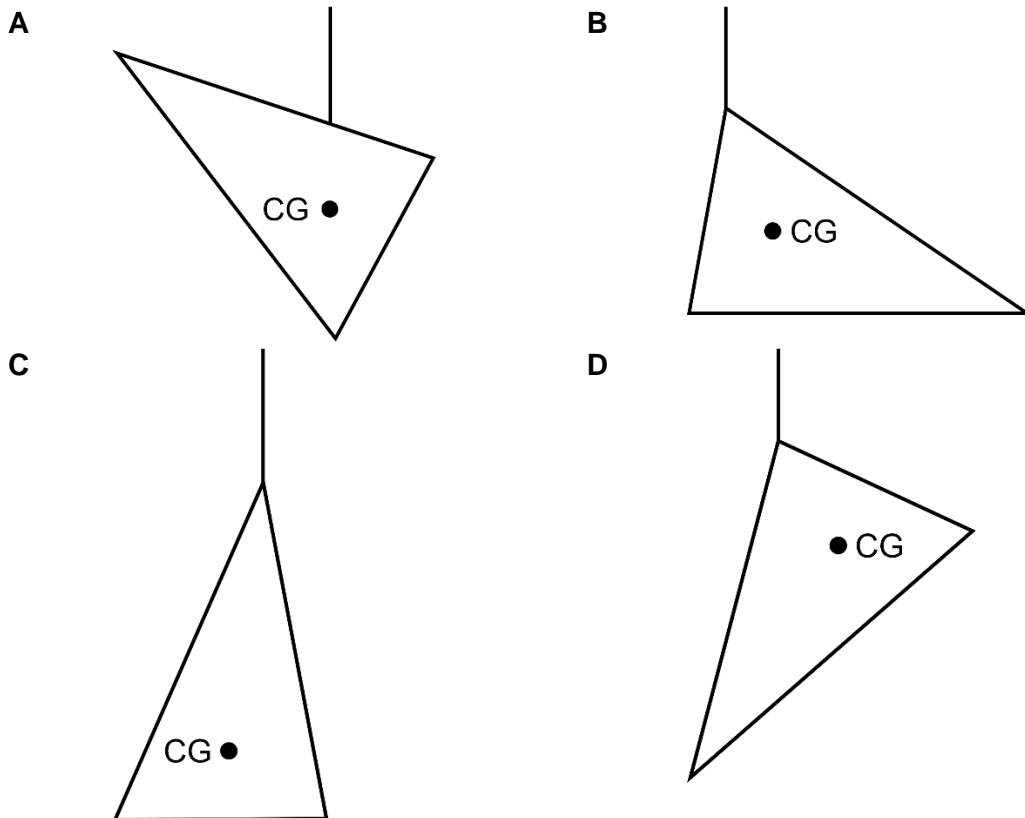
- 5 A student is standing in a stationary train. The train suddenly starts to move in the direction the student is facing.

Which of the following correctly describes and explains what happens to the student?

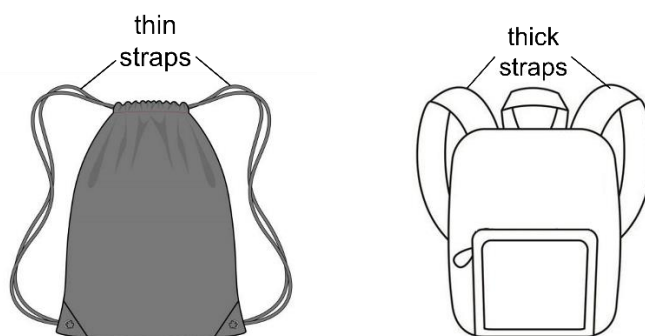
- A The student will tend to fall forward, due to his weight.
- B The student will tend to fall backward, due to his mass.
- C The student will tend to fall backward, due to his weight.
- D The student will tend to fall forward, due to his mass.

- 6 A piece of card has its centre of gravity at point **CG**.

Which diagram shows the piece of card at equilibrium when suspended by a thread?



- 7 A student has two bags. One has thin straps and the other has thick straps.



To carry the same load of his belongings, which bag provides more comfort to his shoulder?

	bag strap	reason
A	thick	more force on his shoulder
B	thick	less pressure on his shoulder
C	thin	more force on this shoulder
D	thin	less pressure on his shoulder

- 8 A runner runs uphill as she speeds up.

Which type of energy decreases as she runs?

- A** chemical potential energy
- B** elastic potential energy
- C** gravitational potential energy
- D** kinetic energy

- 9 Some water is heated up in a sealed container.

What happens to the water molecules when the water is heated?

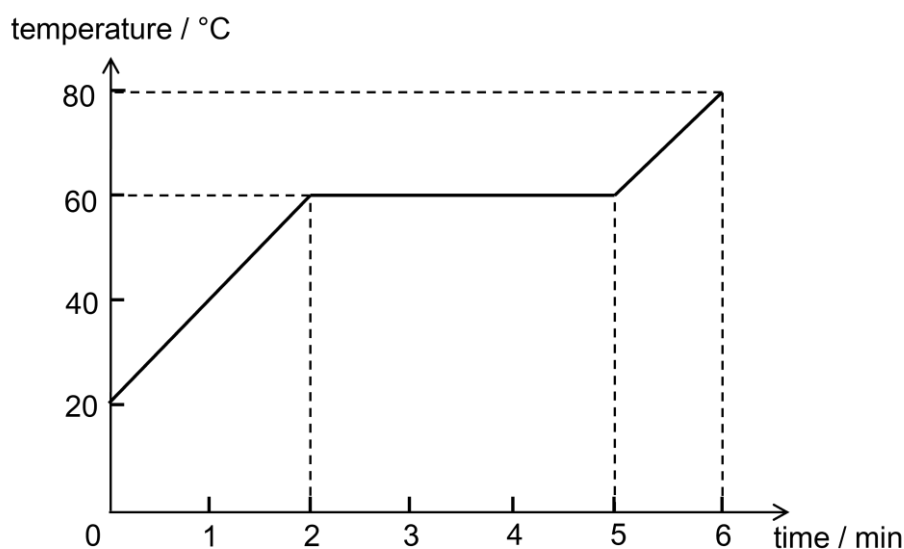
- A** The number of molecules increases.
- B** The molecules get bigger.
- C** The molecules move about faster.
- D** The molecules vibrate less.

- 10** A marble bench and a wooden bench have been kept in an air-conditioned room at 23 °C. When a student touches the benches, the marble bench feels colder than the wooden bench.

Which of the following is the most likely reason to cause this sensation?

- A** Marble can transfer more coldness than wood.
- B** Marble is a better conductor of heat than wood.
- C** Wood is a poorer insulator of heat than marble.
- D** The marble bench has a lower temperature than the wooden bench.

- 11** A sample of solid at a temperature of 20°C is heated up.
The graph shows the temperature against time as the sample is heated.



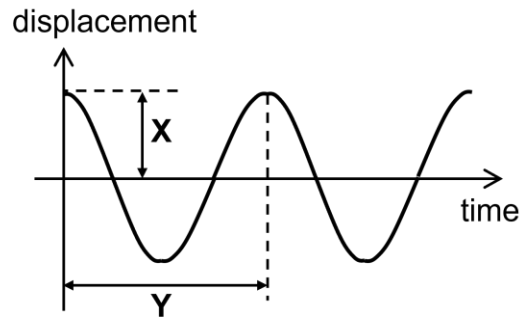
How long does the change of state take?

- A** 1 min
 - B** 2 min
 - C** 3 min
 - D** 5 min
- 12** Some statements about boiling and evaporation from a liquid are shown.
- Boiling forms bubbles as liquid turns to gas.
 - Boiling occurs throughout the liquid.
 - Evaporation occurs only at room temperature.
 - Evaporation requires an external thermal energy source.
 - The rate of evaporation is affected by the exposed surface area.

How many of these statements are correct?

- A** 1
- B** 2
- C** 3
- D** 4

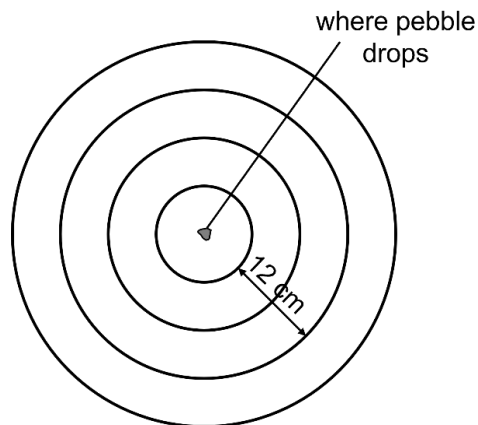
- 13 A wave is represented in a displacement-time graph.



Which row correctly identifies **X** and **Y**?

	X	Y
A	amplitude	wavelength
B	amplitude	period
C	frequency	period
D	frequency	wavelength

- 14 A pebble falls into a pond and produces water waves in the form of circular ripples. The circle lines are lines joining crests of adjacent waves.



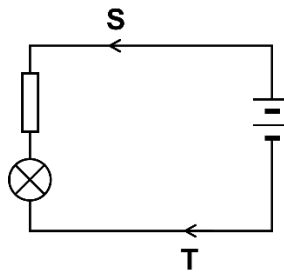
What is the wavelength of the water wave?

- | | | | |
|----------|-------|----------|-------|
| A | 3 cm | B | 6 cm |
| C | 12 cm | D | 24 cm |

- 15 Which row shows parts of the electromagnetic spectrum in the order of increasing frequency?

	increasing frequency →		
A	X-rays	radio waves	visible light
B	X-rays	visible light	radio waves
C	radio waves	X-rays	visible light
D	radio waves	visible light	X-rays

- 16 The arrows **S** and **T** show two directions in a circuit.



What are the directions of conventional current and electron flow in this circuit?

	conventional current	electron flow
A	S	S
B	T	S
C	S	T
D	T	T

- 17 A laptop computer is turned on for 2 hours. A current of 2 A goes through it.

What is the amount of charge passing through the laptop in the 2 hours?

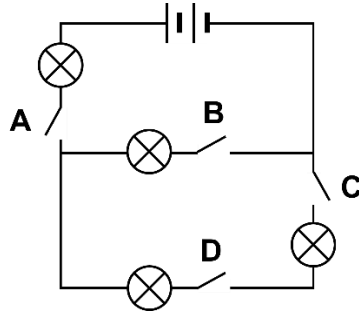
- | | |
|-----------------|------------------|
| A 4 C | B 3600 C |
| C 7200 C | D 14400 C |

- 18 Four lamps and four switches are connected to a DC power source as shown in the circuit diagram.

When all the switches are closed, all the lamps are lit.

When one of the switches is then opened, only **one** lamp goes out.

Which switch is opened?



- 19 A 1500 W air conditioner is turned on for a longer period of time in a month. This results in an increase of \$72.00 in the electricity bill. There is no change in the usage of other electrical appliances.

Given that the cost of electricity is \$0.30 per kWh, how much longer is the air-conditioner turned on in the month?

- | | |
|------------|------------|
| A 0.16 hrs | B 6.25 hrs |
| C 160 hrs | D 240 hrs |

- 20 An electrical hair dryer is double-insulated.

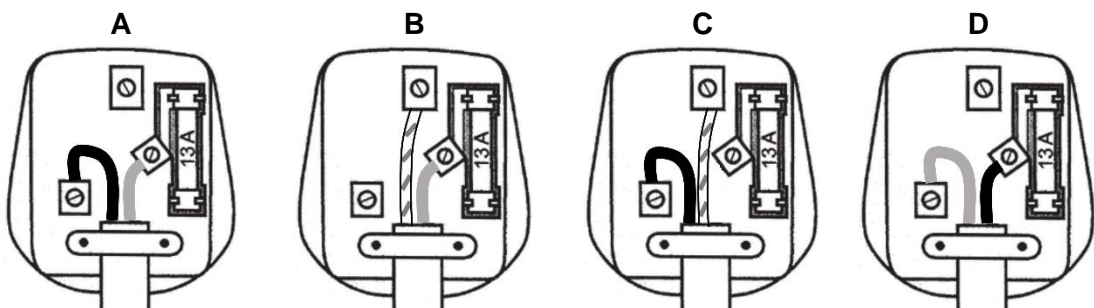
Which diagram shows the correctly wired mains plug for use with the hair dryer?

Key:

■ brown wire

■ blue wire

▨ yellow and green wire



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