

SERANGOON GARDEN SECONDARY SCHOOL PRELIMINARY EXAMINATION

CANDIDATE NAME		
CLASS	INDEX NUMBER	

SCIENCE(PHYSICS)

Secondary 4 Normal(Academic)

5105/01 5 August 2022 Papers 1 and 2: 1 hour 15 minutes 1100 - 1215

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, class register number and class on the Answer Sheet in the spaces provided unless this has been done for you.

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 paper.

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

For Examine	r's Use
	20

This question paper consists of <u>10</u> printed pages and <u>2</u> blank pages.

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1 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 direction but no size.
- **C** It has a direction and a size.
- **D** It is a force of attraction.
- **2** A pair of Vernier callipers is used to measure the diameter of three identical ball bearings as shown.



What is the diameter of one ball bearing?

Α	0.39 cm	В	0.52 cm	С	1.16 cm	D	1.56 cm
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3 Which distance-time graph represents an object moving at constant speed?



4 A car of mass 1200 kg is travelling along a horizontal road.



5 The stability of a bus is tested by tilting it on a ramp. The diagram shows a bus that is **just** about to fall over.

Where is its centre of gravity?



6 Which row describes the forces between the molecules and the motion of the molecules in a gas?

	forces between	motion of molecules
	molecules	
Α	strong	move freely
В	strong	vibrate only
С	weak	move freely
D	weak	vibrate only

7 Air is contained in a metal cylinder by a piston which is free to move.



When the metal cylinder is heated, the piston moves towards the right.

What happens to the air molecules when the metal cylinder is heated?

- **A** The number of air molecules increases.
- **B** The air molecules get bigger.
- **C** The air molecules move about faster.
- **D** The air molecules start moving in the same direction.

8 Some ice is slowly heated and its temperature is measured. A graph is plotted to show how the temperature of the ice changes time.



Which row describes what happens to the thermal energy and to the temperature in section X?

	thermal energy	temperature of ice
Α	gained by ice	rises
В	gained by ice	stays the same
С	not gained by ice	rises
D	not gained by ice	stays the same

9 The melting point of a substance is –78 °C and its boiling point is 23 °C.

Which row gives the correct state of matter of the substance at the given temperatures?

	state at 0 °C	state at 100 °C
Α	solid	liquid
В	solid	gas
С	liquid	solid
D	liquid	gas

10 A liquid at room temperature is put on a metal surface which is also at room temperature. A student blows gently across the liquid and the temperature of the liquid decreases.

What causes the liquid to become cooler?

- A Bubbles of water vapour form in the liquid and go into the air.
- **B** The moving air reduces the kinetic energy of all the particles in the liquid.
- **C** Thermal energy flows from the liquid into the metal.
- **D** The more energetic particles in the liquid escape into the air.

11 A wave has the appearance shown.



How do the properties of the wave change as the distance from the origin increases?

	amplitude	wavelength
Α	decreases	increases
В	decreases	stays the same
С	increases	increases
D	increases	stays the same

12 A series of circular wavefronts are created in a ripple tank as shown.



The distance from **X** to **Y** is 1.6 cm.

What is the wavelength of the waves created?

A 0.53 cm B 0.8 cm C 1.6	5 cm D 3.2 cm
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13 Which diagram shows the order of the waves in the electromagnetic spectrum?



14 Which row shows the properties of radio waves?

	type of wave	comparison of speed in a vacuum
Α	longitudinal	travels at the same speed as light
в	longitudinal	travels slower than light
С	transverse	travels at the same speed as light
D	transverse	travels slower than light

15 A student wants to determine the speed of the sound. He stands 400 m away from a wall, and plays a sound using a loudspeaker. He hears the echo 2.5 s later.



A 160 m/s **B** 320 m/s **C** 1000 m/s **D** 2000 m/s

16 An electric circuit contains a resistor in series with a battery.



What are the directions of the conventional current flow and electron flow through the resistor?

	conventional current	electron flow
Α	X to Y	X to Y
В	X to Y	Y to X
С	Y to X	X to Y
D	Y to X	Y to X

17 The diagram shows a 6.0 V battery connected in series with two identical resistors and a light bulb.



The potential difference across one of the identical resistors is found to be 1.0 V.

What is the potential difference across the light bulb?

- **A** 1.0 V **B** 2.0 V **C** 4.0 V **D** 6.0 V
- **18** A cell is connected to a parallel combination of a 2.0 Ω resistor and a 4.0 Ω resistor. The current in the 4.0 Ω resistor is 1.0 A.



What is the current in the 2.0 Ω resistor?

A 0.5 A **B** 1.0 A **C** 1.5 A **D** 2.0 A

19 A simple wiring diagram for an electric cooker is shown.



Why is there a wire connecting the metal case of the cooker to earth?

- A It improves the efficiency of the cooker.
- **B** It prevents the metal case from becoming too hot when the cooker is left on.
- **C** It reduces the risk of an electric shock if the live wire touches the metal case.
- **D** The electric cooker will not switch on without it.
- 20 In which circuit is the fuse connected in the correct position?



END OF PAPER

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