

## Paya Lebar Methodist Girls' School (Secondary) Preliminary Examination 2022 Secondary 4 Normal Academic

CANDIDATE NAME

CLASS

INDEX NUMBER

## \_\_\_\_\_

5105/01

SCIENCE (Physics)

Paper 1 Physics (Multiple Choice)

(Taken together with Paper 2)

1 hour 15 minutes

3 August 2022

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, and class index number on the separate Answer Sheet in the spaces provided.

There are **twenty** questions in this paper. Answer all questions.

For each question, four possible answers (A, B, C, and D) are given.

Choose the **one** you consider correct and record your choice in **soft pencil** on the separate Answer Sheet.

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 and 45 minutes on Paper 2.

You may proceed to 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.

## Multiple-Choice Questions (20 marks)

For each question, record your choice on the separate Answer Sheet.

**1** A stopwatch is used to time a race. The diagrams below show the stopwatch at the start and at the end of the race.



2 The distance-time graph shows the distance travelled by a moving car.



Which feature of the graph gives the speed of the car?

- A The area between the graph and the distance axis.
- **B** The area between the graph and the time axis.
- **C** The difference between the starting and finishing distances.
- **D** The gradient of the graph.

A resultant force of 10 N accelerates an object at 5 m/s<sup>2</sup>.
Which resultant force would accelerate the object at 0.5 m/s<sup>2</sup>?

**A** 1 N **B** 2 N **C** 5 N **D** 50 N

A rocket has a mass of 16 000 kg.
When it is on the Moon it experiences the Moon's gravitational field strength of 1.60 N/kg.

What is the weight of the rocket on the Moon?

**A** 1000 N **B** 2560 N **C** 10 000 N **D** 25 600 N

5 A hollow rectangular metal block has the dimensions shown.



The hole at its side goes all the way through the block. The density of the metal is  $10 \text{ g/cm}^3$ .

What is the mass of the block?

**A** 14 g **B** 400 g **C** 1400 g **D** 2000 g

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Two forces F of equal magnitude act on each of the four planks.

Which plank will rotate about its pivot?



7 A mass hangs on a string at Point P.

It starts swinging from position 1 to the furthest position on the opposite side, position 2.

It then oscillates several times with decreasing amplitude before ending at position 3.



At which position does the mass have the most kinetic energy?

- A The first time at position 3
- B The last time at position 3
- **C** At position 1
- **D** At position 2
- **8** Which quantity is calculated by multiplying the magnitude of a force by the distance moved in the direction of the force?
  - A acceleration
  - **B** power
  - **C** pressure
  - **D** work
- **9** When a liquid evaporates, the total internal energy and temperature of the leftover liquid changes.

What is the effect of evaporation on the total internal energy and temperature of the leftover liquid?

	Total Internal Energy	Temperature
Α	Decreases	Increases
В	Decreases	Decreases
С	Increases	Increases
D	Increases	Decreases

**10** In a cooling experiment, a thermometer is placed in a test tube of hot liquid. The temperature of the liquid is recorded every half minute. The table below shows the results.

Time / min	Temp / °C	Time / min	Temp / °C
0	95	3.0	52
0.5	86	3.5	50
1.0	67	4.0	48
1.5	55	4.5	42
2.0	55	5	36
2.5	55	5.5	30

What is the freezing point of the substance?

**A** 95 °C **B** 55 °C **C** 52 °C **D** 30 °C

**11** A crucible is often used to heat up small volumes of liquids.



Why is the base of the crucible often painted black in colour?

- A Black is a good conductor of heat.
- **B** Black is a good radiator of heat.
- **C** Black is a good absorber of heat.
- **D** Black is a good absorber and radiator of heat.

- 12 Radiation is emitted from \_\_\_\_\_
  - A solids only
  - B solids and liquids
  - **C** solids and gases
  - D solids, liquids and gases
- **13** The diagram shows the side view of a water wave.

Which letter represents the amplitude of the water wave?



14 Which row describes properties of electromagnetic waves?

	Travel through	Travel through air	
	vacuum		
Α	Yes	Yes	
В	Yes	No	
С	No	Yes	
D	No	No	

**15** A 2.0 m long wire with diameter 1.0 mm has a resistance of 2.0  $\Omega$ .

What is the resistance of the same type of wire which is twice as long and twice the diameter?

<b>A</b> 1.0 Ω <b>B</b> 2.0 Ω	<b>C</b> 4.0 Ω	<b>D</b> 8.0 Ω
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**16** The graph below shows the results of an experiment to determine the resistance of a wire.



What is the resistance of the wire?

- A0.2 ΩB4.0 ΩC5.0 ΩD80.0 Ω
- 17 What is the effective resistance of the resistors between point X and Y?



**18** A television set is rated at 600 W and 240 V.

If it was switched on continuously for 10 hours, how many kilowatt-hours of electrical energy would be used?

- **A** (0.6 x 10) kWh
- **B** (600 x 10 x 60) kWh
- **C** (600 x 10 x 240) kWh
- **D** (0.6 x 10 x 60 x 240) kWh

**19** The diagram shows a circuit.



The switch is closed.

Which statement describes the movement of the electrons in the wire?

- **A** The electrons are stationary.
- **B** The electrons flow from X to Y.
- **C** The electrons flow from Y to X.
- **D** The electrons oscillate between X and Y.
- **20** The diagrams below show the inside of a plug.

Which of the following is correctly wired?



-- End of Paper 1 --