## 'Perseverance Yields Success'



Preliminary Examination 2021

## Secondary 4 Normal Academic SCIENCE (PHYSICS) Paper 1 Multiple Choice

5105/01 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, class and register number in the spaces at the top of this page.

There are **twenty** questions in this section. 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 Multiple Choice 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 6 printed pages, including this cover page.

Choose the most suitable answer and shade your answer in the OAS provided.

- 1 Which of the following is equivalent to 3 MV?
  - **A** 0.003 V
  - **B** 0.03 V
  - **C** 3 000 V
  - **D** 3 000 000 V
- 2 The graph shows how the speed of a car changes with time.



What is the distance travelled by the car when it is moving at constant speed?

- **A** 10 m **B** 100 m **C** 200 m **D** 400 m
- **3** A submarine of mass 1000 kg dives in water with a uniform speed of 3 m/s.

What is the resultant force exerted on the submarine as it dives?

- **A** 0 N **B** 500 N
- **C** 1 000 N
- **D** 2000 N
- D 2000 N
- 4 A waiter quickly pulls a cloth from under a dish on a table.

The dish resists the change in the state of rest and stays on the table.

What is this resistance to any change of motion known as?

A balance B force C inertia D weight

5 A beaker of mass 200 g contains  $120 \text{ cm}^3$  of a liquid.

The total mass of the container and the liquid is 280 g.

What is the density of the liquid?

**A** 0.67 g/cm<sup>3</sup> **B** 1.5 g/cm<sup>3</sup> **C** 1.7 g/cm<sup>3</sup> **D** 2.3 g/cm<sup>3</sup>

6 A uniform rod is pivoted at its mid-point.

Two weights of 12 N and 8 N are added to the rod as shown in the diagram.



Another vertical force is applied at point E to balance the rod.

magnitudedirectionA2.0 NdownwardsB2.0 NupwardsC4.0 NdownwardsD4.0 Nupwards

What is the magnitude and direction of this force?

7 Three containers X, Y and Z are filled with the same amount of liquid.



Which of the following correctly shows the stability of the containers in increasing order?

	least stable	$\rightarrow$	most stable
Α	Р	Q	R
В	Р	R	Q
С	Q	R	Р
D	R	Ρ	Q

[Turn over

8 A woman stands on the ground.

Which action will increase the pressure that the woman exerts on the ground?

- A The woman slowly bends her knees.
- **B** The woman slowly lies down on the ground.
- **C** The woman slowly raises her arms.
- **D** The woman slowly raises one foot off the ground.
- **9** A crane lifts a weight of 1000 N through a height of 10 m in 20 s.

What is the power of the crane?

- **A** 50 W
- **B** 100 W
- **C** 500 W
- **D** 200 000 W
- **10** A liquid is heated.

Which statement is incorrect?

- A The molecules gain more energy.
- B The molecules move further apart.
- **C** The molecules move at a greater speed.
- **D** The molecules expand.
- **11** Four identical cans are filled with equal volume of water.

The texture and colour of the outer surfaces of the cans are different.

Which thermometer will show the highest temperature if the cans are placed under the sun for some time?



**12** When a liquid evaporates, its molecules escape from its surface.

What happens to the average kinetic energy of the molecules remaining in the liquid and the reason for it?

	average kinetic energy of the	reason
	molecules remaining in the liquid	
Α	increases	the less energetic molecules escape
В	decreases	the less energetic molecules escape
С	increases	the more energetic molecules escape
D	decreases	the more energetic molecules escape

**13** Which of the following gives an example of a transverse wave and a longitudinal wave?

	transverse wave	longitudinal wave	
Α	light	water ripples	
В	sound	water ripples	
С	light	sound	
D	water ripples	light	

14 Which row describes properties of electromagnetic waves?

	ls it a transverse wave?	Does it travel through a vacuum?	Does it travel through air?
Α	no	yes	no
В	no	no	yes
С	yes	no	no
D	yes	yes	yes

**15** The diagram shows how displacement varies with time as a wave passes a fixed point.



What is the frequency of this wave?

<b>A</b> 0.2 Hz <b>B</b> 0.4 Hz <b>C</b> 2.0 Hz <b>D</b> 2.5
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- 16 A circuit breaker is a type of
  - A ammeter.
  - **B** battery.
  - **C** resistor.
  - **D** switch.
- **17** There is 15 C of charge passing through a point in a circuit in 3 s.

What is the current flowing through the circuit?

- **A** 0.2 A **B** 5 A **C** 45 A **D** 75 A
- **18** Two resistors are connected in parallel as shown below.



What is the effective resistance of the circuit?

- **A** 5 Ω **B** 6 Ω **C** 8 Ω **D** 10 Ω
- **19** An electric kettle has a rating of 240 V, 1200 W. The kettle is turned on for 50 mins. Calculate the amount of energy consumed, in kWh, by the kettle.
  - A 0.5 kWh B 1.0 kWh C 60 kWh D 100 kWh
- **20** The diagram shows a three-pin plug.



Which of the following statements is not correct?

- A The brown wire should be connected to S.
- **B** The brown wire should be connected to T.
- **C** The fuse rating is 13 A.
- **D** Wire connected to R is to prevent electric shocks.

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