

PATHLIGHT SCHOOL END OF YEAR EXAMINATION SECONDARY 4 NORMAL (ACADEMIC)

SCIENCE (PHYSICS)

Paper 1 Multiple Choice

August 2022 Papers 1 and 2: 1 hour 15 minutes

5105/01

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.

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 8 printed pages.

- 1 Which statement about scalar quantities and vector quantities is correct?
 - A Scalars have direction only.
 - **B** Scalars have magnitude only.
 - **C** Vectors have direction only.
 - **D** Vectors have magnitude only.
- 2 Vernier calipers are used to measure the inner diameter and outer diameter of a pipe.

A cross section of the pipe and the two vernier caliper readings are shown.



3 A high jumper jumps over a bar during practice.

On a second occasion, he jumps higher.

What remains constant on both occasions?

- A his acceleration in the air
- B his maximum gravitational potential energy
- **C** his maximum kinetic energy
- D his speed right after he lift off the ground

4 A motorboat travels forward on water.

All the horizontal forces that act on the motorboat are shown.



The motorboat is slowing down.

What is the value of the frictional force?

- A smaller than 2500 N
- B between 1500 N to 2500 N
- **C** 2500 N
- D larger than 2500 N
- 5 A body is moving at constant velocity.

Why must a force be applied to change its motion?

- **A** The body has energy.
- **B** The body has inertia.
- **C** The body has weight.
- **D** The body is moving.
- 6 A container has a capacity of 1500 cm^3 .

When it is empty, it has a mass of 80 g.

It is filled with a liquid of density 0.9 g/cm³ until it is full.

What is the mass of the container when filled?

A 1	l.35 g	В	50 g	С	1350 g	D	1430 g
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- 4
- 7 A uniform plank, XY, measures 1.0 m in length.

The plank weighs 20 N.

It rests on a pivot 0.25 m from X.

It is balanced by a downward force F at X and an upward force of 4 N at Y.



8 A box of 15 N is moved up a ramp.



What is the work done against gravity as the box is moved to the top of the ramp?

Α	0 J	В	45 J	С	60 J	D	75 J
				-			

9 A car accelerates to the top of a hill.

Which type of energy decreases as the car moves up the hill?

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

10 Air molecules are trapped inside a container of fixed volume.

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

- **A** The number increases.
- B They get bigger.
- **C** They move about faster.
- D They space farther apart.
- 11 The diagram below shows a double-glazed window installed in homes.



Which of the following explains how double-glazed windows improve the heat insulation of houses?

- A The air trapped between the two sheets of glass is a poor conductor of heat.
- **B** The gap between the two sheets of glass does not conduct heat.
- **C** The gap between the two sheets of glass prevents heat lost by radiation.
- **D** The gap between the two sheets of glass promotes heat transfer by convection.
- **12** An ice cube is taken from the freezer and placed in a cup of water.

Which statement is correct when the ice is melting?

- **A** The internal energy of the ice decreases.
- **B** The internal energy of the water decreases.
- **C** The temperature of the ice increases.
- **D** The temperature of the water increases.

13 Where and at which temperature does evaporation of a liquid occur?

	position	temperature		
Α	surface	a fixed point		
В	surface	any		
С	within the liquid	a fixed point		
D	within the liquid	any		

14 The diagram below shows a transverse wave moving past a small boat on a lake.



How will the boat move?

- A forward and backward
- B towards the left
- **C** towards the right
- D upward and downward
- 15 Four identical sets of waves were recorded within 1 second.







wave 3



Which of the following is correct?

	loudest	lowest pitch
Α	wave 2	wave 3
В	wave 3	wave 1
С	wave 4	wave 3
D	wave 4	wave 4

- 16 Which statement correctly defines current?
 - A the amount of electric charge flowing
 - **B** the amount of electrical energy flowing
 - **C** the rate of flow of electric charge
 - **D** the rate of flow of electrical energy
- 17 A cell is connected in series with an ammeter and a lamp.

The current is 1 A.



In which of the following circuits, using identical cells, resistors and ammeters, will the current be 2 A?



18 Some students set up the circuit shown below to investigate how a variable resistor can affect an electrical circuit.



How will the readings on the meters be affected if the resistance of the variable resistor is increased?

	ammeter reading	voltmeter reading		
Α	decrease	decrease		
В	decrease	increase		
С	increase	decrease		
D	increase	increase		

19 The lighting circuit of a house is connected to the 240 V mains supply through a 13 A fuse.

A number of lamps, each rated at 60 W, are available.

What is the maximum number of lamps that can be used in the circuit?

A 4 **B** 5 **C** 18 **D** 52

20 A mains electrical circuit uses insulated copper cable.

The cable overheats.

Which change prevents the cable from overheating?

- A use thicker copper cable
- **B** use thicker insulation
- **C** use thinner copper cable
- **D** use thinner insulation