

ORCHID PARK SECONDARY SCHOOL Preliminary Examination 2022

CANDIDATE NAME

CLASS

INDEX NUMBER

Paper 2 Physics

SCIENCE

Secondary 4 Normal (Academic)

Setter: Ms Isa Tan

Additional Materials: Nil

READ THESE INSTRUCTIONS FIRST

Write your name and index number on all the work you hand in. Write in dark blue or black pen on both sides of the paper. You may use an HB pencil for any diagrams or graphs. Do not use staples, paper clips, glue or correction fluid.

Answer all questions in Section A and any two questions in Section B. The use of an approved scientific calculator is expected, where appropriate. In calculations, you should show all the steps in your working, giving your answer at each stage.

You are advised to spend no longer than 30 minutes on Paper 1. You may proceed to answer Paper 2 as soon you have completed Paper 1.

At the end of the examination, hand in your answers to Paper 1 and Paper 2 separately.

The number of marks is given in brackets [] at the end of each question or part question.

This document consists of **11** printed pages.

[Turn over

5105/02

11 August 2022

Paper 1 and 2: 1 h 15 min

Section A (14 marks)

Answer **all** the questions in the spaces provided.

1 A racing yacht is moving at a constant speed on smooth water.

The diagram shows the direction of the four forces acting on the yacht.



(a) Name force X and force Y.

force X:
[1]

(b) What can you conclude about the size of the thrust and force X when the yacht is moving at constant speed?

2 Two blocks, X and Y, are resting on a table. The dimensions of the blocks are shown in centimeters, cm.

Each block has a mass of 50 g.



(a) Name the apparatus used to measure the mass of the block.

......[1]

density = g / cm^3 [1]

3 There are two types of waves, transverse and longitudinal. Give an example (a) of each type. transverse: longitudinal: [1] (b) The diagram represents a wave. It is drawn to scale. displacement distance Measure the wavelength of the wave. (i) wavelength = cm [1] (ii) Measure the amplitude of the wave. amplitude = cm [1] Describe how sound produced by the prong of a tuning fork travels through (c) air to reach the ear of a listener.[2]

3

4 (a) The water in a swimming pool is heated by solar panels. Two views of a solar panel are shown.



(i) Suggest the colour the absorbing surface should be painted.

Explain your answer.

......[1]

(ii) Explain why the water pipe is bent into the shape shown.

.....

-[1]
- (b) The diagram shows part of a hotel room. Air in the room is heated by the radiator.



Describe how this heated air eventually warms up the rest of the room.

.....[2]

Section B (16 marks)

Answer any two questions from this section in the spaces provided.

5 The graphs show how the speed of a ball changes as it falls to the Earth and to the Moon respectively. The difference in the shapes of the two graphs is due to air resistance on the Earth.



(d) Calculate the distance travelled by the ball falling to the Moon during the first 4 seconds.

distance = m [2]

(e) Describe the energy change of the ball as it is falling to Earth during the first 2 seconds.

.....[1]

6 Mr Chan moves a rock onto the back of a lorry, using a wheelbarrow and ramp.

The diagram shows where he places the rock in the wheelbarrow and where he applies effort to the handle of the wheelbarrow.

7



(c) Calculate the work done against gravity in moving the wheelbarrow and rock onto the back of the lorry.

work done = J [2]

(d) Calculate the total mass of the rock and wheelbarrow.

Use g = 10 N / kg.

mass =kg [1]

(e) Mr Chan pushes the wheelbarrow and rock up the ramp, with a speed of 3 m / s.

Calculate the kinetic energy of the wheelbarrow and rock as they are pushed up the ramp.

kinetic energy =J [1]

7 (a) A man set up an experiment to find the resistance of an unknown resistor.

The circuit used is shown.



The rheostat was adjusted several times and current and voltage readings were taken. The results obtained are shown in the table.

voltage / V
1.6
3.2
4.8
6.4
8.0
9.6



[2]

(ii) Use one row of data from the table to calculate the resistance of the unknown resistor.

resistance = $\dots \Omega$ [2]

(b) The man used similar apparatus to carry out two further experiments. In the circuit, the unknown resistance was replaced by wires of the same material but of varying lengths and thickness.

The first experiment was to find a relationship between the length of a wire and its resistance.

The second experiment was to find a relationship between the thickness of a wire and its resistance.

The following table was drawn.

Place a \checkmark in the boxes to show which wire has a high resistance and which has a low resistance for each experiment.

	property of wire	high resistance	low resistance
first experiment	long piece of wire		
	short piece of wire		
second experiment	thin wire		
	thick wire		

[2]

(c) The man bought an electric iron. When he plugged it into the mains, it did not work. On removing the back of the plug, it looked like this.



State any two mistakes made by the person who wired this plug.

1.	
2.	 [2]

END OF PAPER 2