

FUCHUN SECONDARY SCHOOL PRELIMINARY EXAMINATION 2022 SECONDARY FOUR NORMAL (ACADEMIC)

CANDIDATE NAME		CLASS	
CENTRE NUMBER	S	INDEX NUMBER	

SCIENCE

Paper 2 Physics

5105/02

01 August 2022

Papers 1 and 2: 1 hour 15 minutes

Candidates answer on the Question Paper.

No Additional Materials are required.

READ THESE INSTRUCTIONS FIRST

Write your Centre number, index number, name and class 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 as 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.

For Exam	iner's Use
Section A	/14
Section B	/16
TOTAL	/30

Setter: Mr LH Liang

This document consists of 12 printed pages and no blank page.

Section A Answer all the questions in the spaces provided.

1 The table gives details of some units of energy.

Complete the table by filling in the blank spaces.

unit	symbol	multiple of the SI unit (J)
joule	J	1
kilojoule	kJ	
gigajoule		1 000 000 000
	mJ	0.001

2 The diagram below shows the location of the centre of gravity of a man when he assumes different positions 1, 2 and 3.



(a) Which of positions, 1, 2 or 3, is the most stable?

position [1]

[2]

(b) Explain your answer to (a).

.....[1]



As he travels along, the pedal moves through a circle of radius 8 cm.

For a pedal in the position shown, the line of action of force F, is 5.0 cm from the pivot.

(a) Calculate the moment of force, *F*, about the pivot, at that instant.

moment = Ncm [1]

(b) The pedal moves from position A to position B as shown in the figure.Explain why the force applied at A will have a different effect from the same force applied at B.

.....[1]

A vibrating bar is positioned so that it touches the surface of the water in a ripple tank.The lines on the diagram represents troughs of the wave produced.



- (b) Calculate the wavelength produced by the vibrating bar.

wavelength = cm [1]

(c) The wave took 6 seconds to travel from position **T** to **Z**.

Calculate the period of the wave.

period =s [1]

5 A student carries out an experiment to study the relationship between the potential difference across a lamp and the current flowing through the lamp.

The student uses the circuit shown.



The potential difference across the lamp is varied using the rheostat, and the values for current and potential difference are shown in the table.

V / V	0.0	1.0	2.0	3.0	4.0	5.0
I/A	0.00	0.30	0.50	0.62	0.70	0.74

(a) Plot a graph of these results marking each point with a cross (x).





(b) State the value of current when the potential difference is 1.5 V

current = A [1]

[2]



6

Section B

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

6 (a) Sailors use echo sounding equipment to measure the depth of water beneath their ships.



The ship emits a pulse of sound waves, and after 0.5 seconds, the ship receives an echo of the sound pulse from the sea bed.

The speed of sound in sea water is 1500 m/s.

Calculate the distance the ship is above the sea bed.

distance above the sea bed = m [2]

(b) State two differences to the echo as the ship moves over the sea cliff.

(c) Two climbers climb up a cliff as shown. Both climbers start from the same starting point and climb up the same height.

The cliff is 50 m high.



Climber A has a mass of 50 kg and Climber B has a mass of 60 kg.

Both climbers climb to the top of the cliff.

(i) Which climber, **A** or **B**, has done more work?

	climber .	 [1]
Explain your answer.		
		 [1]

(ii) Calculate the gravitational potential energy of climber **A** when he reaches the top of the cliff.

[g = 10 N/kg]

gravitational potential energy = J [2]

7 (a) Two forces, 20 N and 15 N, act on a 2 kg box along a smooth surface as shown.



- (i) State the magnitude and direction of the resultant force acting on the box.
 - magnitude = N [1]

direction[1]

(ii) Calculate the acceleration of the box.

acceleration = $\dots m/s^2$ [2]

(b) The diagram shows two similar flasks. One has a dull black surface and the other has a shiny silver surface. The flasks are filled with equal volumes of water. A lid, with thermometer, is placed on each flask. The flasks are placed the same distance from an electric heater. The initial temperature of the water in each can is the same.



(iii) State one difference between boiling and evaporation.

8 The power cable is to be connected to the heating element of an electric water heater. The three wires of the power cable and the internal circuit of the water heater are shown below. The heater is rated '240 V, 1000 W'.



current = A [2]

(d) The electric water heater is switched on for 3 hours.

How much does it cost if 1 kWh of electricity costs 26 cents?

cost = cents [2]

End of Paper