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WOODGROVE SECONDARY SCHOOL

COMMUNITY OF FUTURE-READY LEARNERS AND THOUGHTFUL LEADERS

N LEVEL PRELIMINARY EXAMINATION 2022

LEVEL & STREAM	: Secondary 4 Normal (Academic)
SUBJECT (CODE)	: Science (Physics) (5105)
PAPER NO	: 2
DATE (DAY)	: 16 August 2022 (Tuesday)
DURATION	: 1 hr 15 mins (Paper 1 & Paper 2)

READ THESE INSTRUCTIONS FIRST

Write your class, index number and name on the work you hand in. Write in dark blue or black pen.

You may use an HB pencil for any diagrams, graphs, tables or rough working. 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 Examiner's Use		
		Section Marks		
		Α	/14	
		В	/16	
Student's Signature	Parent's Signature	T ()	10.0	
Date	Date	I otal	/30	

This document consists of **10** printed pages including this cover page. Setter : Mr Phillip Tan

Section A

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

1 The list below shows four units used to measure physical quantities.

ohm kilogram newton joule per column

Complete the table below to show the correct unit used to measure the physical quantity.

quantity	unit
mass	
resistance	
weight	
electromotive force	

[2]

2 The diagram below represents a wave.

Point C represents the crest of the wave. The distance between point C and P is 45 cm.



- (a) Mark and label, with the letter T, one of the troughs of the above wave. [1]
- (b) Calculate the wavelength of the above wave.

(c) The period of the wave is given as 10 seconds.

Calculate the frequency of the wave.

frequency of wave = Hz [1]

(d) Calculate speed of the wave.

Write down the unit for your answer.

speed of wave =

unit [2]

3 The diagram below shows how a metal rod and a small rock can be used to lift a stone. A minimum force is applied at point A to lift the rock.



4 The diagram below shows the circuit that consist of a 5Ω resistor and a lamp connected to a power supply of 10 V. When the switch is closed, the lamp lights up.



- (a) Draw an arrow on the diagram above that indicates the direction of conventional current flow passing through the lamp. [1]
- (b) Calculate the current flowing through the resistor.

current = A [2]

(c) The effective resistance of the whole circuit is 4 Ω . Calculate the resistance of the lamp.

resistance of lamp = Ω [2]

- End of Section A -Section B

Answer any two questions in the spaces provided.

5 A car accelerates uniformly from rest and travel along a straight road. The table below shows the speed of the car at every 5 seconds interval.

time (s)	0	5	10	15	20	25	30	35	40
speed	0	10	20	30	40	40	40	20	0
(m/s)									

(a) Using the above data, plot a graph on the grid to show how the speed of the car varies with time. Draw straight lines to complete your speed – time graph and mark each point with a cross (x),

[2]



(ii) Describe the motion of the car from time 20 s to time 30 s. [1] (iii) Calculate the total distance travelled by the car in the first 40 s.

		distance travelled = m	[2]
(c)	At tin	ne 30 s, brakes was applied until the car comes to a stop.	
	(i)	If the braking force is the same, state one other factor that will affect the time needed for the car to come to a stop.	
			[4]
	(ii)	Explain your answer in (c)(i).	[']
			[1]

6 The diagram shows an electric hotplate used to heat up water in a metal pot.



(b) (i) The electric hotplate has a power of 1.56 kW. It is connected to a 240 V supply. Calculate the current flowing through the electric hotplate.

current = A [1]

(ii) Given the choice of a 2A, 6A, 8A and 12A fuses, state which fuse should be used in the electric hotplate. Explain your choice of fuse.

.....[1]

(iii) The cost of electricity is charged at \$0.25 per kWh used. Calculate the cost of using the hotplate for 40 minutes.

7 (a) (i) State what is meant by *stability* of an object.

(ii) What is the state of equilibrium of a basketball at rest on a flat surface?

7 (b) A basketball of mass 0.6 kg is dropped vertically down from the edge of a platform of 10 m tall. The basketball hit the ground and bounce back to a height of 7m before dropping down again.



(i) Calculate the gravitational potential energy of the basketball just before the drop. Use g = 10 N/kg in your calculations.

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gravitational potential energy = J [2]

(ii) How much kinetic energy does the basketball has just before it hits the ground for the first time.

kinetic energy = J [1]

(iii) Calculate the velocity of the basketball just as it hits the ground for the first time.

velocity of basketball = m / s [2]

(iv) Explain why the basketball is only able to reach a maximum height of 7m after the first bounce.

.....[1]

- End of Paper -