Name: _____

Register No.	Class

‘Perseverance Yields Success’

Ping Yi Secondary School

Preliminary Examination 2021

Secondary 4 Normal Academic

SCIENCE (PHYSICS) 5105/02

Paper 2 **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 name, class and register number in the spaces at the top of this page.
Write in dark blue or black pen.
You may use a 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 EXAMINER’S USE	
Paper 1	**20**
Paper 2 Section A	**14**
Paper 2 Section B	**16**
Total	**50**

Expected Grade	□ **1**	□ **2**	□ **3**	□ **4**	□ **5**
Teacher’s Comment					
Student’s Comment					
Parent’s Comment and Signature					

This document consists of **12** printed pages, including this cover page.

[**Turn over**

Paper 2
Section A (14 marks)
*Answer **all** questions in the spaces provided.*

1 An uncooked meat ball of 55 g is placed into a beaker containing 250 cm^3 of water and the water level rises to 300 cm^3.

Heat is applied to the beaker as shown in Fig. 1.1.

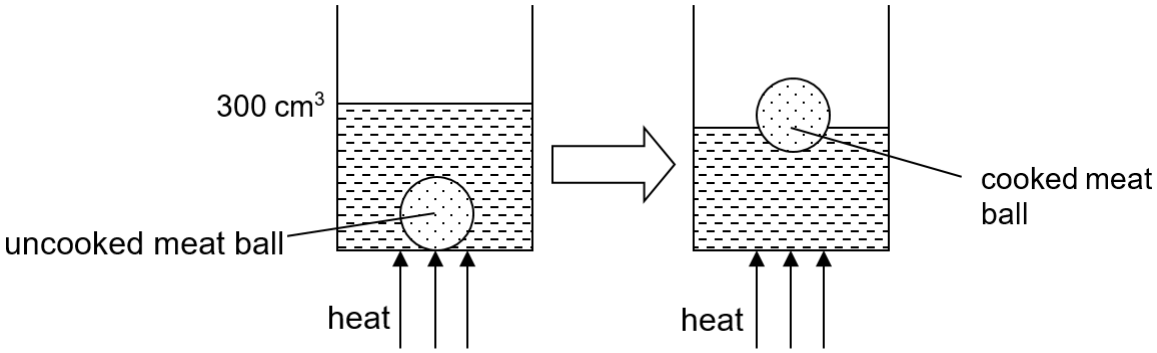


Fig. 1.1

(a) Calculate the density of the uncooked meat ball.

density of uncooked meat ball = …….. g/cm^3 [2]

(b) When the meat ball is cooked, its volume increases by 10 cm^3.

Calculate the density of the cooked meat ball.

density of cooked meat ball = …….. g/cm^3 [1]

(c) Explain the differences that will be observed if the meatball is cooked using pure water with a density of 1.0 g/cm^3.

……

……..…[1]

[**Turn over**

2 Fig. 2.1 shows three different tins.

Each tin is fully filled with hot water at a temperature of 90 °C.

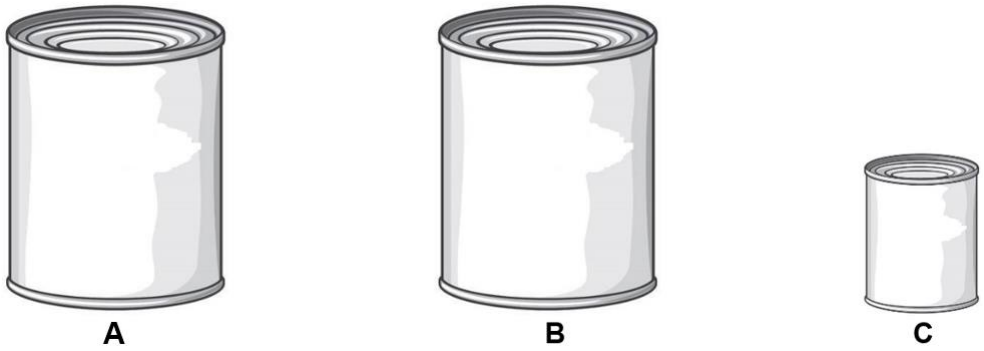


Fig. 2.1

A and **B** are of the same size. **C** is smaller than **A** and **B**.
A has a shiny silver surface.
B and **C** have dark dull surfaces.

(a) Identify the two tins you would use to investigate how the rate of radiation depends on its volume.

Tin ……. and

Tin ……. [1]

(b) Identify the tin that radiates heat at the lowest rate. Explain your answer.

……..……

……

……..…[2]

[**Turn over**

3 Fig. 3.1 shows how the temperature of a pure substance changes with time when it is heated at a constant rate.

At point **E**, all of the substance has changed to vapour.

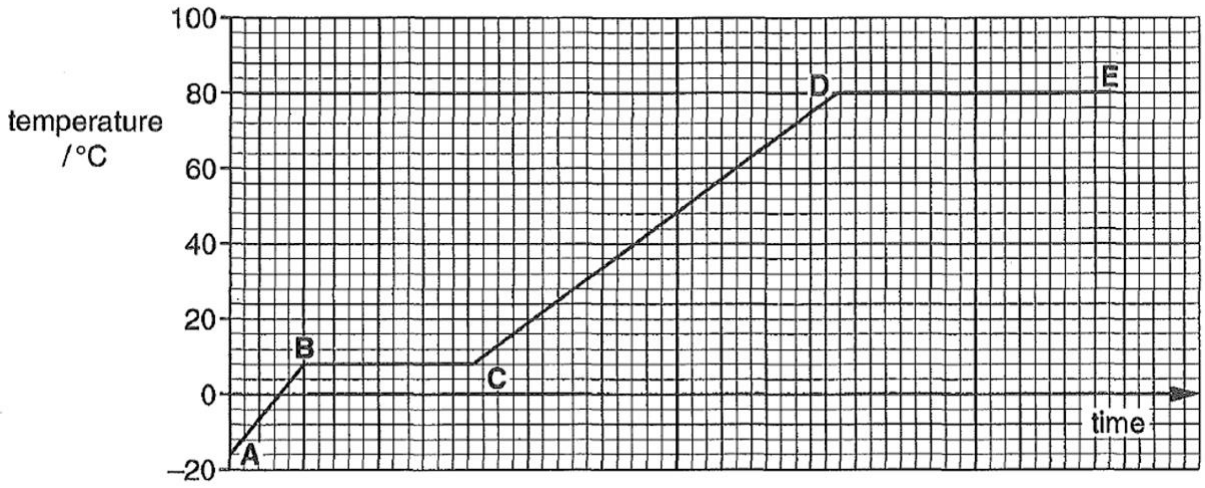


Fig. 3.1

(a) State the change of state between points **B** and **C**.

……[1]

(b) The movement and arrangement of the molecules depend on the states of the substances.

(i) Describe the state of the substance and movement of the molecules of the substance at point **A**.

State: ……

Movement: ……

……[1]

(ii) Describe the state of the substance and arrangement of the molecules of the substance at 60 °C.

State: ……

Arragnement: ……

……[1]

[**Turn over**

4 Fig. 4.1 shows the inside of a three-pin plug.

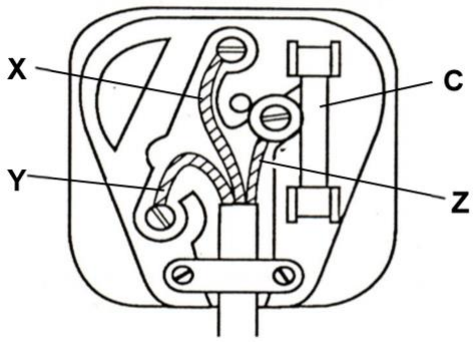


Fig. 4.1

(a) Name the wires and state the colours of the wires. [2]

wire	name	colour
X		
Y		
Z		

(b) Name the electrical component C and states how it works.

……

……

……[2]

[**Turn over**

Paper 2
Section B (16 marks)
*Answer any **two** questions from this section in the spaces provided.*

5 The graph in Fig.5.1 shows the speed of a lift moving from the ground floor to the 15th floor of a building.

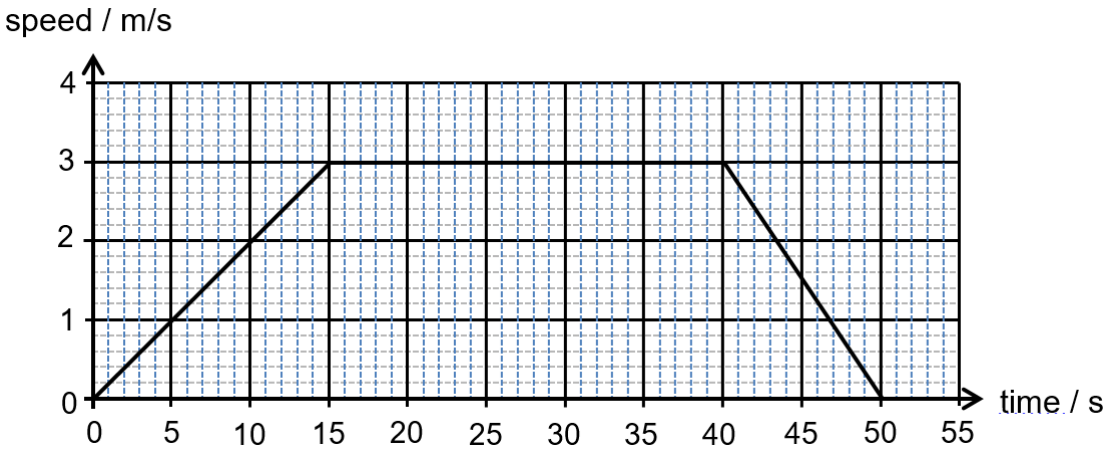


Fig. 5.1

(a) Describe what is happening to the speed of the lift for the time interval of t = 0 s to t =10 s.

……..…[1]

(b) How long is the lift moving with zero acceleration?

……..…[1]

(c) Calculate the acceleration of the lift for the first 15 s.

acceleration = …….. m/s^2 [2]

(d) Calculate the total distance travelled by the lift from the ground floor to the 15th floor.

total distance= ……..m [2]

[**Turn over**

(e) A person who weighs 600 N gets into the lift.
Calculate the work done by the lift to carry him from the ground to the 15th floor.

work done= ……..J [2]

[**Turn over**

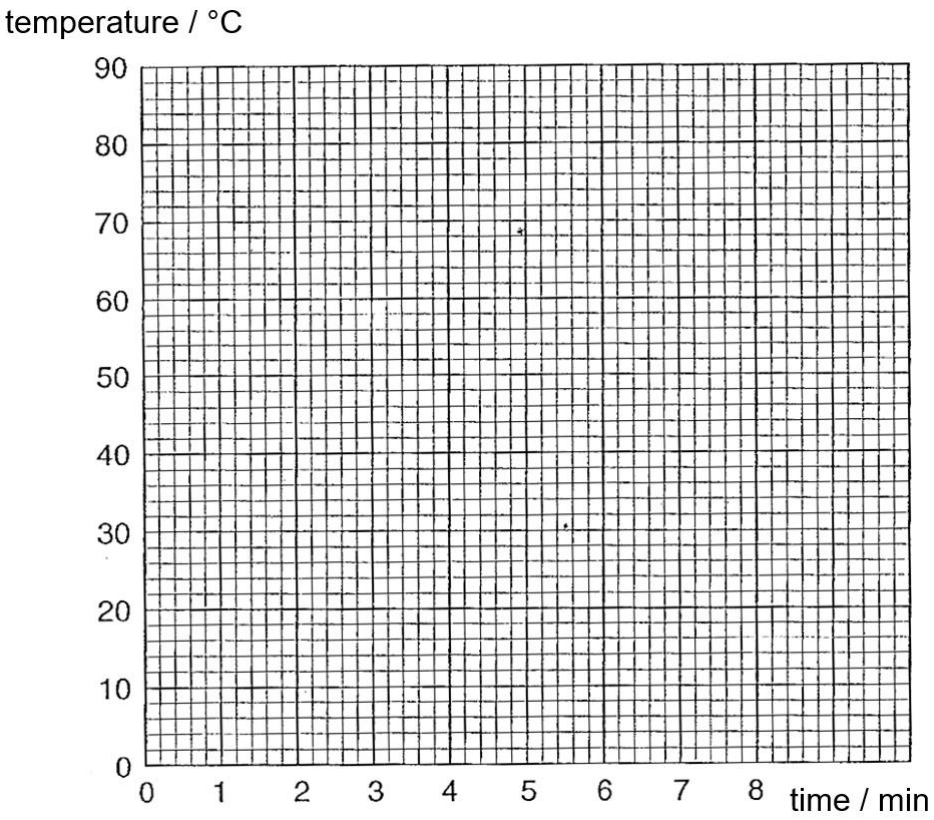
6 A boy conducted an experiment to investigate the temperature change of a liquid when it is heated.

The results of his experiment were recorded in Fig. 6.1.

time / min	temperature / °C
0	30
1	38
2	46
3	54
4	62
5	70
6	75
7	78
8	78
9	78

Fig. 6.1

(a) Plot a graph of temperature against time below. [2]



[**Turn over**

(b) **(i)** At what time does the liquid start to boil?

……[1]

(ii) During boiling, heating still continues.

Explain why the temperature does not rise during boiling.

……

……[1]

(c) Fig. 6.2 shows a circuit connected using two resistors and a 3 V battery.

The reading on voltmeter V_2 shows 2 V.

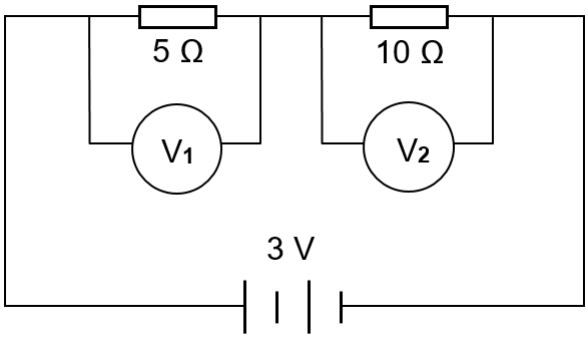


Fig. 6.2

(i) What is the reading on voltmeter V_1?

V_1 = ……..V [1]

(ii) Calculate the combined resistance of the resistors.

resistance= ……..Ω [1]

(iii) Calculate the current in the circuit.

current= ……..A [1]

[**Turn over**

(iv) If the 5 Ω resistor is replaced by a 10 Ω resistor, what readings do you expect to observe on the voltmeters?

V_1 = ……..

V_2 = …….. [1]

7 **(a)** Fig. 7.1 shows the graph of the variation of the displacement of a wave with distance along the wave at a particular time.

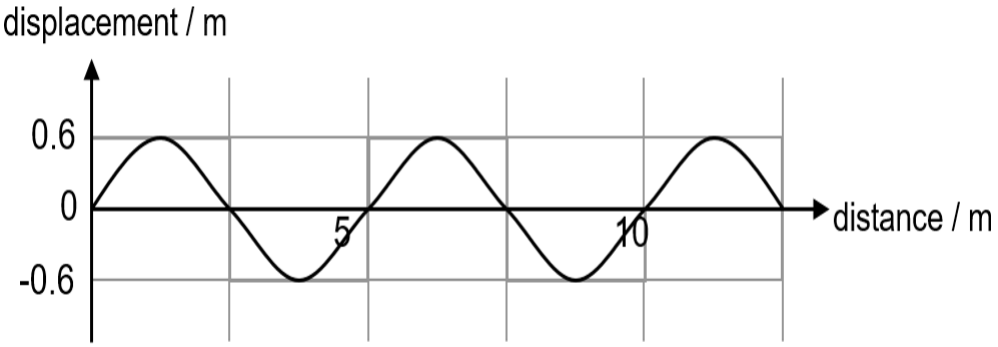


Fig. 7.1

(i) State the amplitude of the wave.

……[1]

(ii) State the wavelength for the wave.

……[1]

(b) Fig. 7.2 shows the electromagnetic spectrum with some missing components.

radio waves	microwaves	P	light	Q	X-rays	gamma rays

(i) Identify components P and Q.

P is ……

Q is …… [1]

(ii) State one property of electromagnetic wave.

……[1]

(c) A dolphin emits an ultrasonic sound wave at 33 kHz and it receives an echo 0.1 seconds later.

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

(i) Calculate the distance of the dolphin from the object producing the echo.

distance= ……..m [2]

(ii) Calculate the wavelength of the sound emitted.

wavelength= ……..m [2]

END OF PAPER