

LUI

School code

School name

Given name/s

Family name

Attach your
barcode ID label here

Book of books used

External assessment

Question and response book

Physics

Paper 1

Time allowed

- Perusal time — 10 minutes
- Working time — 90 minutes

General instructions

- Answer all questions in this question and response book.
- QCAA-approved calculator permitted.
- QCAA formula and data book provided.
- Planning paper will not be marked.

Section 1 (20 marks)

- 20 multiple choice questions

Section 2 (24 marks)

- 8 short response questions





DO NOT WRITE ON THIS PAGE

THIS PAGE WILL NOT BE MARKED



Section 1

Instructions

- Choose the best answer for Questions 1–20.
- This section has 20 questions and is worth 20 marks.
- Use a 2B pencil to fill in the A, B, C or D answer bubble completely.
- If you change your mind or make a mistake, use an eraser to remove your response and fill in the new answer bubble completely.

	A	B	C	D
Example:	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

	A	B	C	D
1.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
2.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
3.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
4.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
5.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
6.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
7.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
8.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
9.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
10.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
11.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
12.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
13.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
14.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
15.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
16.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
17.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
18.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
19.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
20.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

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Section 2

Instructions

- Write using black or blue pen.
 - If you need more space for a response, use the additional pages at the back of this book.
 - On the additional pages, write the question number you are responding to.
 - Cancel any incorrect response by ruling a single diagonal line through your work.
 - Write the page number of your alternative/additional response, i.e. See page ...
 - If you do not do this, your original response will be marked.
 - This section has eight questions and is worth 24 marks.
-

QUESTION 21 (3 marks)

An object that is 7.12×10^6 m from the centre of the Earth experiences a gravitational force of 2.84 kN. Calculate the mass of the object.

Mass = _____ kg (to the nearest whole number)

QUESTION 22 (1 mark)

List the six types of leptons.

1. _____
2. _____
3. _____
4. _____
5. _____
6. _____

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QUESTION 23 (2 marks)

Twin astronauts conduct an experiment where one travels with a velocity close to the speed of light to a distant planet, while the other stays on Earth. Each twin expects the other to be a different age by the time the first twin reaches and remains on the distant planet.

Use the theory of special relativity to explain why the twins will no longer be the same age, and draw a conclusion about which twin will be younger.

QUESTION 24 (4 marks)

A spaceship travelled from Planet A to Planet B at a speed of $0.90c$. An observer that was stationary relative to both planets measured the time taken for the trip to be 4.0 years.

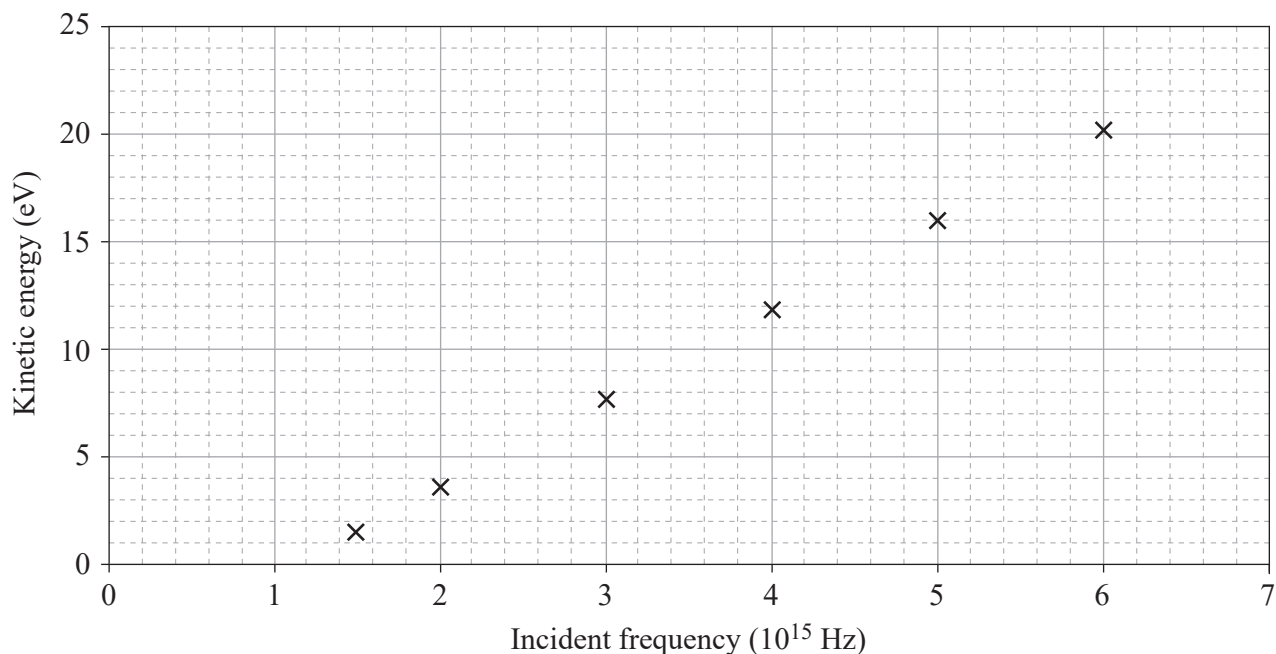
Calculate the time taken for the trip as measured by an observer on the spaceship.

Time = _____ years (to 1 decimal place)

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QUESTION 26 (3 marks)

A photoelectric effect experiment was conducted by shining different frequencies of light on a plate made of an unknown metal. The graph shows the kinetic energies of ejected photoelectrons with respect to the frequency of incident light.



The table shows the work functions of various metals.

Metal	Work function (eV)
potassium	2.30
copper	4.70
osmium	5.93

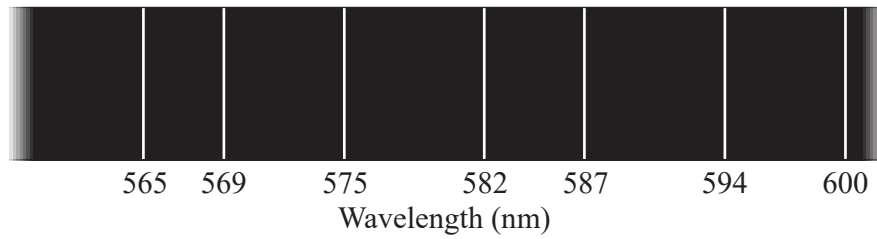
Determine which metal is most likely to have ejected the photoelectrons in this experiment.

Metal = _____

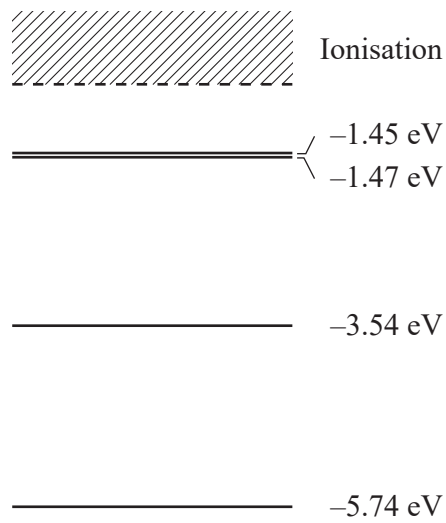
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QUESTION 27 (4 marks)

The diagram shows a small section of the emission spectrum for a mixture of gases.



The diagram shows the atomic energy level diagram for a gas known as Element A.



Determine whether it is possible that Element A is one of the gases in the mixture.

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