

Please write clearly in block capitals.

Centre number

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Candidate number

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Surname

Forename(s)

Candidate signature

I declare this is my own work.

GCSE PHYSICS

H

Higher Tier Paper 1

Tuesday 2 June 2026

Morning

Time allowed: 1 hour 45 minutes

Materials

For this paper you must have:

- a ruler
- a scientific calculator
- the Physics Equations Sheet (enclosed).

Instructions

- Use black ink or black ball-point pen. Pencil should only be used for drawing.
- Fill in the boxes at the top of this page.
- Answer **all** questions in the spaces provided.
- Do not write outside the box around each page or on blank pages.
- Do all rough work in this book. Cross through any work you do not want to be marked.
- If you need extra space for your answer(s), use the lined pages at the end of this book. Write the question number against your answer(s).
- In all calculations, show clearly how you work out your answer.

Information

- The maximum mark for this paper is 100.
- The marks for questions are shown in brackets.
- You are expected to use a calculator where appropriate.
- You are reminded of the need for good English and clear presentation in your answers.

For Examiner's Use

Question	Mark
1	
2	
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8463/1H

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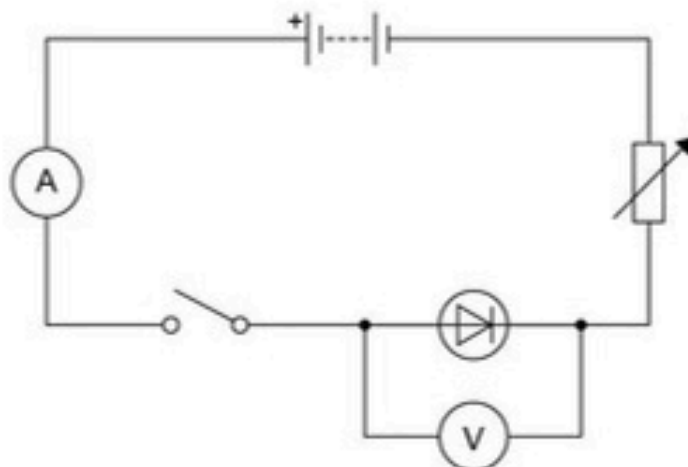
Answer **all** questions in the spaces provided.

0 1

A student investigated how the current in a diode varies with the potential difference across the diode.

Figure 1 shows the circuit used.

Figure 1



0 1

1

Complete the sentences.

[2 marks]

In the circuit, the diode and the variable resistor are connected in _____.

In the circuit, the diode and the voltmeter are connected in _____.

Question 1 continues on the next page

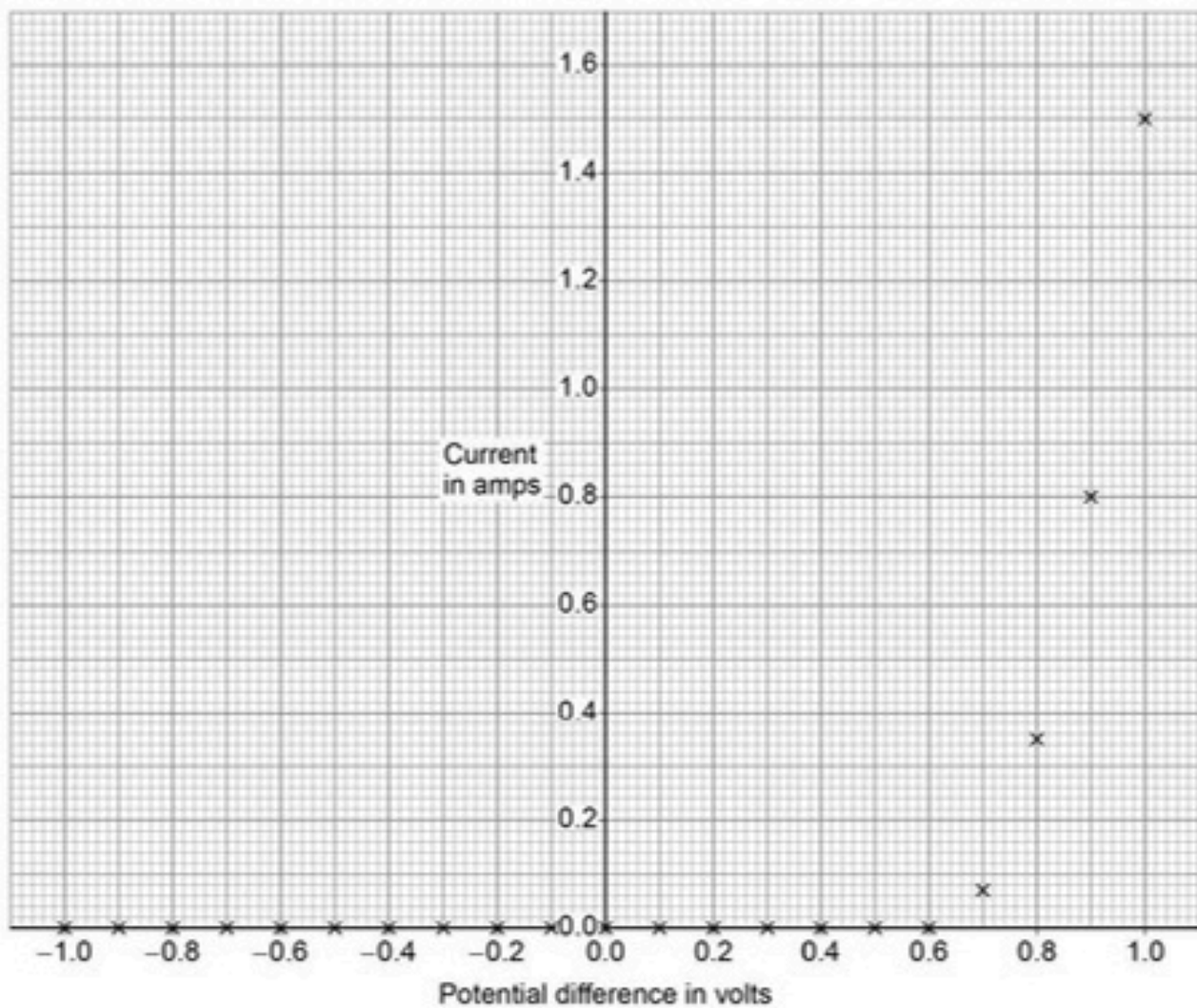
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Figure 2 shows the results.

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Figure 2



0 1 2 Draw a line of best fit on Figure 2.

[1 mark]



0 1 . 5 It is **not** safe to use a potential difference greater than +1.0 V across the diode.

Suggest **one** reason why.

[1 mark]

12



0 2

A student investigated the change of state of water from a liquid to a gas.

0 2 . 1

Which of the following properties of a substance stays the same when a change of state takes place?

[1 mark]

Tick (✓) **one** box.

density

☐

mass

☐

volume

☐

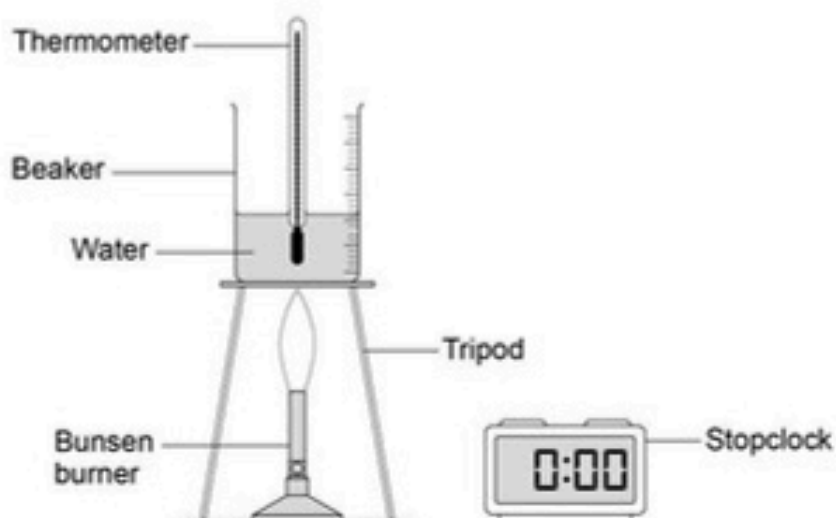
Question 2 continues on the next page

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Figure 3 shows the apparatus used.

Figure 3



This is the method used.

1. Pour some water into the beaker.
2. Record the volume of water in the beaker.
3. Heat the water using a Bunsen burner until the water begins to boil.
4. Continue to boil the water for 10 minutes and record the new volume after 10 minutes.
5. Calculate the change in volume of the water.



- 0 2 . 2** The student used the change in volume to determine the change in mass of the water.
The change in mass of the water was 0.020 kg.
The energy needed to turn 0.020 kg of liquid water into steam at 100 °C is 46 000 J.
Calculate the specific latent heat of vaporisation of water.
Use the Physics Equations Sheet.

[3 marks]

Specific latent heat = _____ J/kg

Question 2 continues on the next page**Turn over ►**

Use the Physics Equations Sheet to answer Questions 02.3 and 02.4.

0 2 . 3 Write down the equation which links energy transferred (E), power (P) and time (t).

[1 mark]

0 2 . 4 The power output of the Bunsen burner was 115 W.

Calculate the time taken for the Bunsen burner to transfer 46 000 J of energy.

[3 marks]

Time = _____ seconds



- 0 2 . 5 The student calculated that more than 0.020 kg of water should have changed to a gas in 10 minutes.

Why was the mass of water that changed to a gas less than the student expected?

[2 marks]

Tick (✓) **two** boxes.

The beaker of water was not insulated.

☐

The Bunsen burner transferred more energy to the water than expected.

☐

The power output of the Bunsen burner was greater than 115 W.

☐

The reaction time of the student affected the results.

☐

Thermal energy was transferred to the surroundings.

☐

10

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0 3

In 1979, an accident in a nuclear power station in the USA caused the release of two different radioactive isotopes.

Table 2 shows information about the two isotopes.

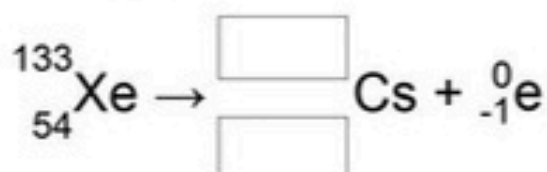
Table 2

Isotope	Radiation emitted	Half-life
Xenon-133	Beta	5 days
Krypton-85	Beta	11 years

0 3 . 1

Complete the nuclear equation for the radioactive decay of xenon-133.

[2 marks]



0 3 . 2

Calculate the percentage of xenon-133 that will remain after 15 days.

Use Table 2.

[3 marks]

Percentage remaining = _____ %



0 3 . 3 The level of risk caused by each radioactive isotope changed after the isotopes were released.

The mass of each isotope released was the same.

Initially, the xenon-133 caused a greater level of risk than the krypton-85.

After some time, the krypton-85 caused a greater level of risk than the xenon-133.

Explain these changes to the levels of risk from the radioactive isotopes.

Use **Table 2**.

[3 marks]

Question 3 continues on the next page

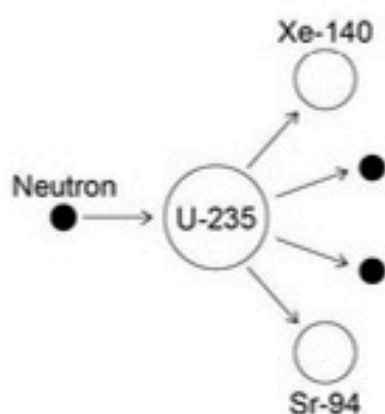


Nuclear fission reactions release energy in nuclear power stations.

- 0 3 . 4 In nuclear fission, a neutron is absorbed by a uranium-235 (U-235) nucleus which splits in two and releases two neutrons.

Figure 4 shows a nuclear fission reaction.

Figure 4



Complete Figure 4 to show how nuclear fission can lead to a chain reaction.

[2 marks]

- 0 3 . 5 Nuclear fission reactions in nuclear power stations are carefully controlled.

Give **one** consequence of not controlling nuclear fission reactions.

[1 mark]



0 4

Figure 5 shows a child sliding down a plastic slide.

Figure 5



0 4 . 1

As the child slides, the child becomes negatively charged.

Explain why.

[3 marks]

Question 4 continues on the next page

Turn over ►



Use the Physics Equations Sheet to answer Questions 04.2 and 04.3.

0 4 . 2 Which equation links charge flow (Q), energy (E) and potential difference (V)?

[1 mark]

Tick (✓) **one** box.

$$Q = E \times V$$

☐

$$Q = \frac{E}{V}$$

☐

$$Q = \frac{V}{E}$$

☐

$$Q = E^2 \times V$$

☐

0 4 . 3 At the bottom of the slide, the child touched a metal pole.

The potential difference between the child and the metal pole was 35 kV.

There was a charge flow from the child to the metal pole.

The charge flow transferred 0.21 J of energy.

Calculate the charge flow.

[3 marks]

Charge flow = _____ C



0 4 . 4

There would **not** have been a charge flow if the slide had been made from metal instead of plastic.

Explain why.

[2 marks]

9

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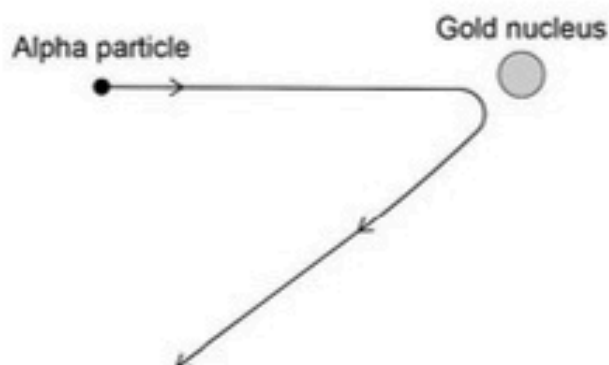
0 5

In 1911, a scientist called Ernest Rutherford developed an experiment that led to the nuclear model of the atom.

In the experiment, alpha particles were directed at a sheet of gold foil.

Figure 6 shows the path of an alpha particle passing close to a gold nucleus.

Figure 6



0 5

1

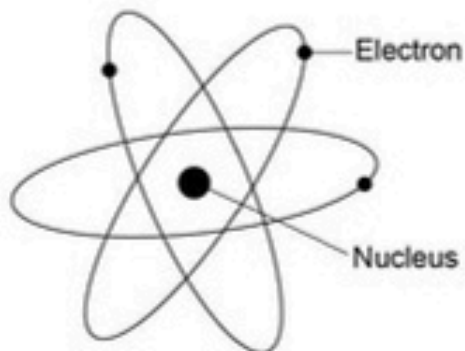
Explain where on **Figure 6** the alpha particle experiences the greatest electric force.

[3 marks]



0 5 . 2 Figure 7 shows the nuclear model of the atom developed by Rutherford.

Figure 7



Describe the features of the nuclear model of the atom developed by Rutherford.

[4 marks]

Question 5 continues on the next page

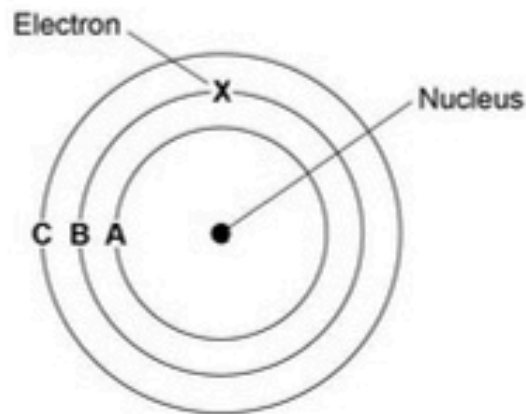
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0 5 . 3 Niels Bohr adapted the nuclear model of the atom.

Figure 8 shows the energy levels in the Bohr model.

Figure 8



The electron in **Figure 8** has absorbed electromagnetic radiation and moved to energy level **B**.

Explain what happens when the electron then emits electromagnetic radiation.

[2 marks]



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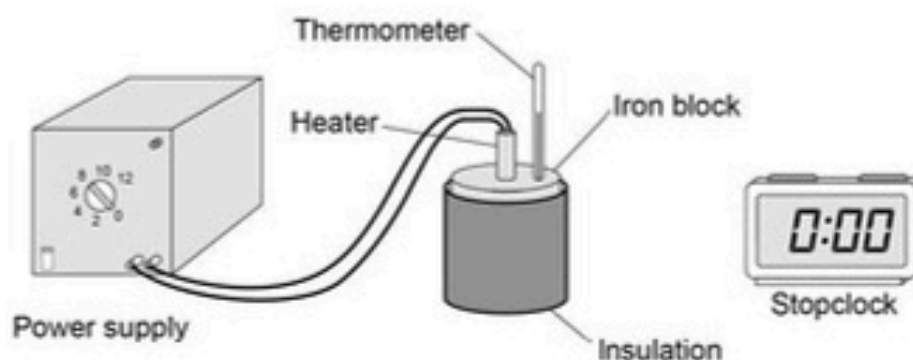


0 6

A student investigated the heating of an iron block.

Figure 9 shows the apparatus used.

Figure 9



This is the method used.

1. Turn the power supply on.
2. Wait until the temperature of the thermometer starts to increase and then start the stopclock.
3. Record the temperature on the thermometer every 30 seconds.
4. Turn the power supply off when the temperature has increased by a large amount.

0 6 . 1

The power output of the power supply was 60 W for the whole of the investigation.

What type of variable was the power output of the power supply?

[1 mark]



0 6 . 2

The heater and thermometer were in different holes in the block .

When the heater was switched on there was a delay before the temperature on the thermometer started to increase.

Suggest why.

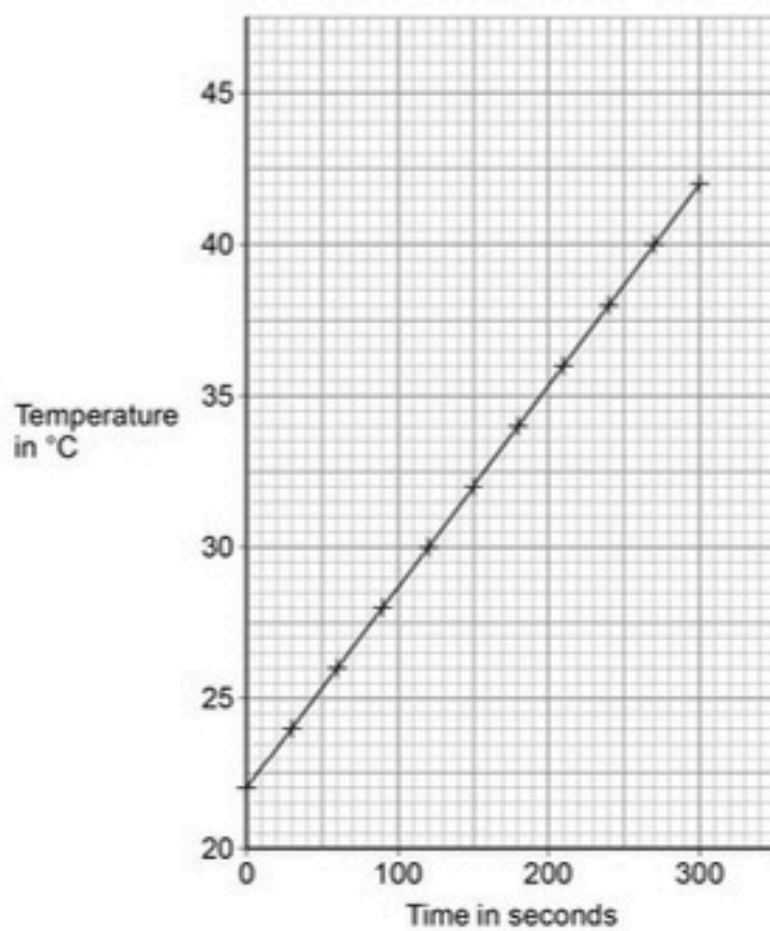
[1 mark]

Question 6 continues on the next page



Figure 10 shows the results.

Figure 10



- 0 6 . 3** A thermal energy of 14.4 kJ was transferred to the iron block between 0 s and 300 s.
The mass of the iron block was 1.5 kg.

Determine the specific heat capacity of iron using the student's results.

Use the Physics Equations Sheet.

Give the unit.

[5 marks]

Specific heat capacity = _____ Unit _____

- 0 6 . 4** The student carried out the same experiment using an aluminium block of mass 1.5 kg.

The thermal energy transferred to the aluminium block each second was the same.

The specific heat capacity of aluminium is 2 times greater than the specific heat capacity of iron.

Draw a line on **Figure 10** to predict the results with the aluminium block.

[2 marks]

9

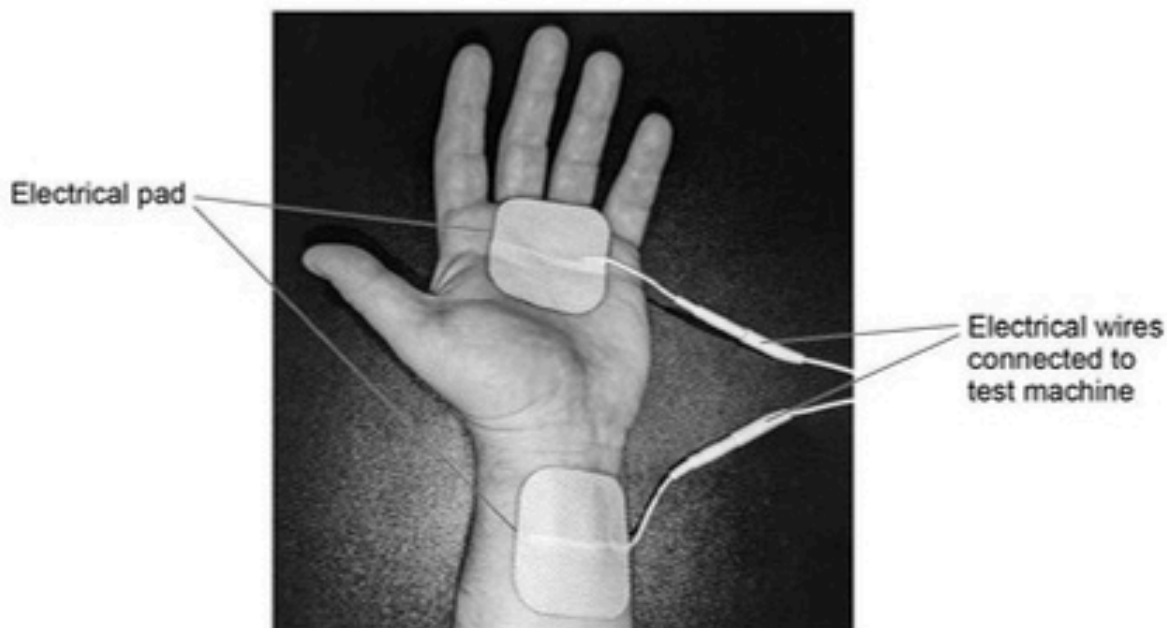


07

A nerve conduction test is used by a doctor to investigate the human nervous system.
The test uses electrical pads.

Figure 11 shows a nerve conduction test taking place.

Figure 11



07.1

There is a potential difference of 120 V between the electrical pads.

The current between the pads is 6.0 mA.

Calculate the resistance of the body tissue between the electrical pads.

Use the Physics Equations Sheet.

[4 marks]

Resistance = _____ Ω



0 7 . 2 The doctor changes the settings on the nerve conduction machine.

A charge of 2.8×10^{-6} C flows through the body tissue between the electrical pads in a time of 250 μ s.

Calculate the current.

Use the Physics Equations Sheet.

[4 marks]

Current = _____ A

0 7 . 3 To avoid an electric shock, the doctor does not touch the electrical pads while the nerve conduction test takes place.

Explain why touching the electrical pads would give the doctor an electric shock.

[2 marks]

10

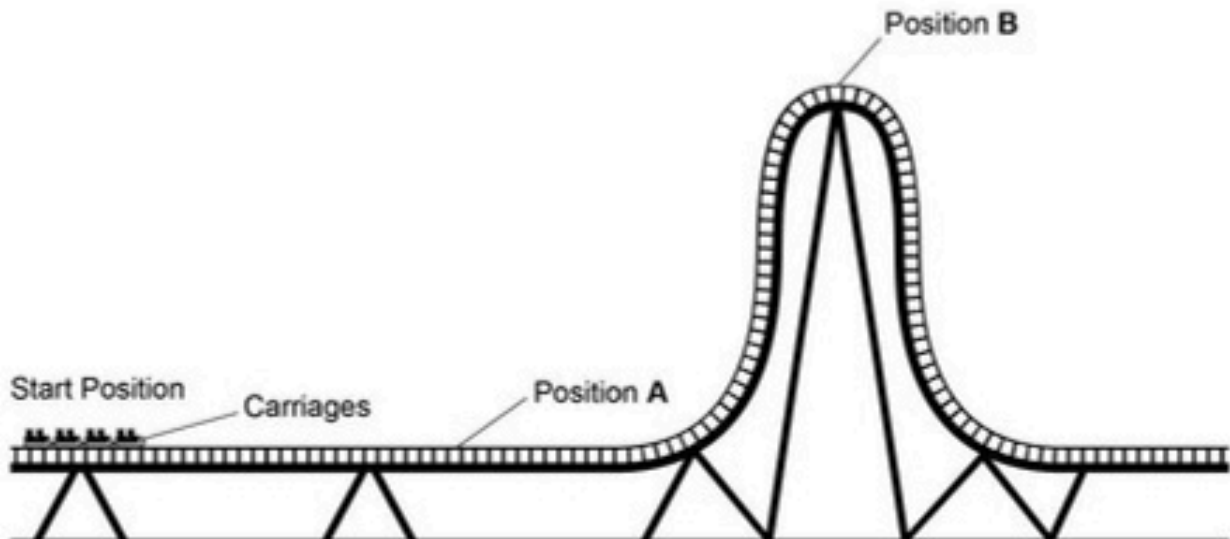
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0 8

Figure 12 shows a roller coaster ride.

Figure 12



From the start position, the carriages are accelerated to position A.

The carriages then move up and over the hill.

0 8 . 1

Describe how the energy stores of the carriages change as the carriages move from position A to position B.

[2 marks]



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To move up the hill to position **B**, the carriages need a minimum speed after accelerating from the start position.

The carriages and passengers have a total mass of 35 000 kg.

Position **B** is 65 m higher than position **A**.

gravitational field strength = 9.8 N/kg

Calculate the minimum speed needed.

Use the Physics Equations Sheet.

Give your answer to **2** significant figures.

[6 marks]

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Minimum speed (2 significant figures) = _____ m/s

Question 8 continues on the next page

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0 8 . 3

Sometimes, the carriages do not have enough speed to reach position **B**, so they roll back down to position **A**.

When the carriages roll back down, brakes are used to decrease the speed.

Describe the changes to the energy stores of the system as the speed of the carriages decreases.

[2 marks]

10

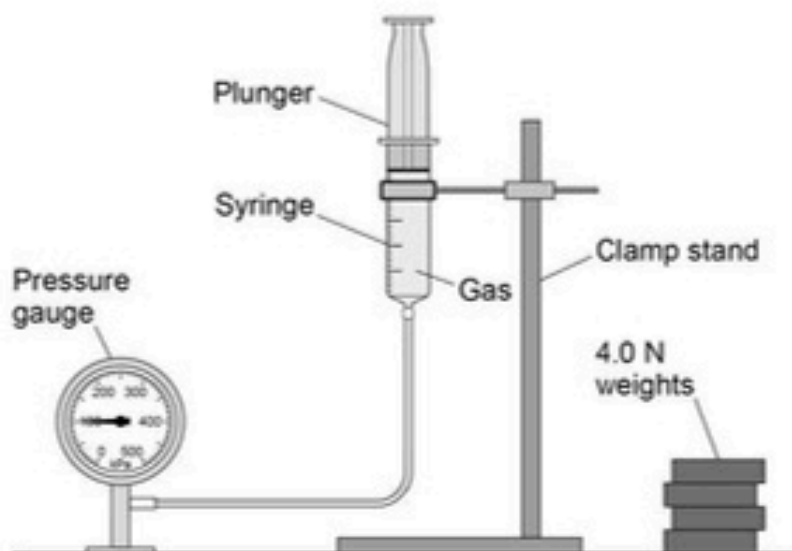


0 9

A student investigated the relationship between the pressure in a gas and the volume of the gas at constant temperature.

Figure 13 shows the apparatus used.

Figure 13



This is the method used.

1. Record the initial volume of gas in the syringe and the reading on the pressure gauge.
2. Place a 4.0 N weight on the plunger.
3. Record the new volume and the new pressure of the gas.
4. Repeat steps 2 and 3 until a weight of 16.0 N is on the plunger.

0 9

1

Falling weights are a hazard in the investigation.

Give **one** risk and the corresponding precaution in the investigation.

[2 marks]

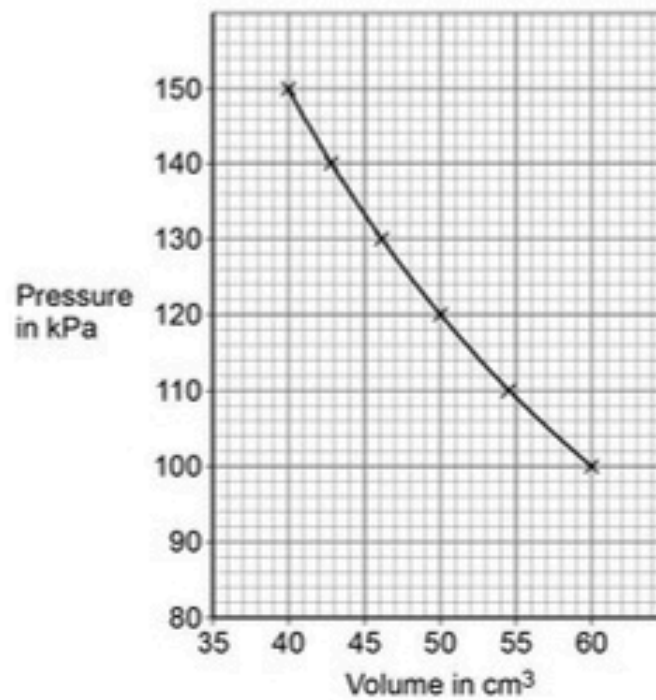
Risk _____

Precaution _____



Figure 14 shows the results.

Figure 14



0 9 . 2 The student concluded:

'The pressure in the gas was inversely proportional to the volume of the gas.'

Explain how the results in **Figure 14** show that the student was correct.

You should include calculations.

[3 marks]

0 9 . 3

The pressure in a fixed mass of gas increases as the volume of gas decreases at constant temperature.

Explain why.

[4 marks]

9

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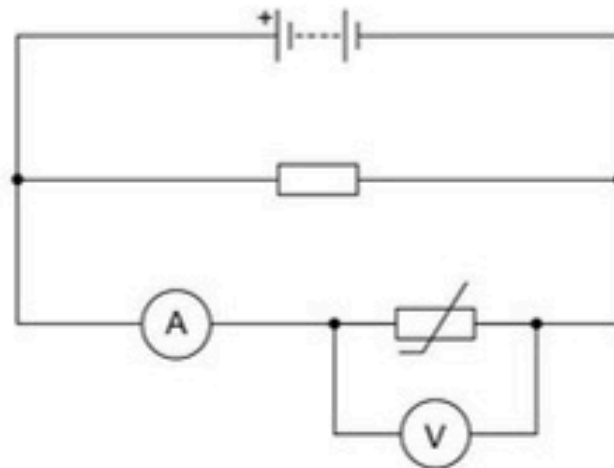


1 0

A student built a circuit.

Figure 15 shows the circuit diagram for the circuit.

Figure 15



1 0

1

The potential difference across the resistor is 1.5 V.

The power output of the resistor is 0.18 W.

Calculate the resistance of the resistor.

Use the Physics Equations Sheet.

[5 marks]

Resistance = _____ Ω 

1 0 . 2 At room temperature, the thermistor and the resistor have the same resistance.

Explain how the current in the battery compares with the current in the resistor at room temperature.

[2 marks]

1 0 . 3 The temperature of the thermistor is increased.

Explain how the ammeter reading and the voltmeter reading are affected by the increase in temperature.

[4 marks]

Ammeter reading _____

Voltmeter reading _____

11

END OF QUESTIONS



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