

Please write clearly in block capitals.

Centre number

Candidate number

Surname _____

Forename(s) _____

Candidate signature _____

I declare this is my own work.

INTERNATIONAL GCSE PHYSICS

Paper 2

Time allowed: 1 hour 30 minutes

Materials

For this paper you must have:

- a pencil and 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.
- 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).
- Do all rough work in this book. Cross through any work you do not want to be marked.
- In all calculations, show clearly how you worked out your answer.

Information

- The maximum mark for this paper is 90.
- The marks for questions are shown in brackets.
- You are expected to use a calculator where appropriate.

For Examiner's Use	
Question	Mark
1	
2	
3	
4	
5	
6	
7	
8	
9	
10	
TOTAL	



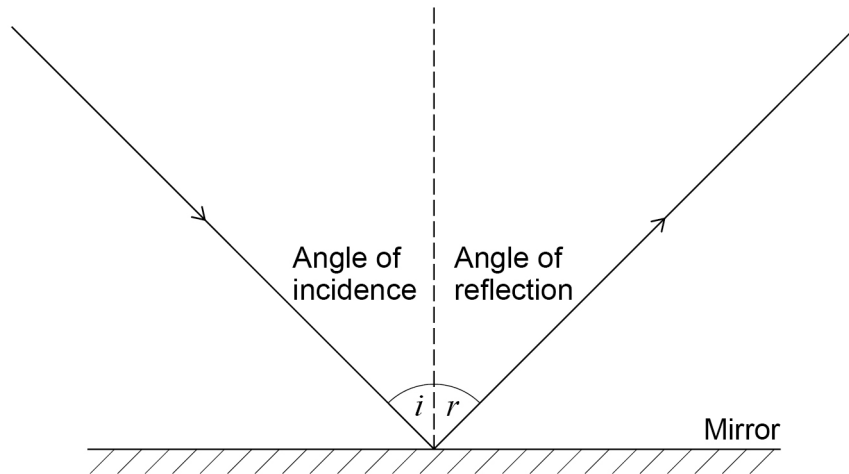
Answer **all** questions in the spaces provided.

0 1

A student investigates the reflection of light from a plane mirror.

Figure 1 shows a light ray being reflected from a plane mirror.

Figure 1



0 1 . 1

What piece of equipment should the student use to measure the angles?

[1 mark]

0 1 . 2

Complete the sentence.

[1 mark]

Choose the answer from the box.

equal to

greater than

less than

The angle of incidence is _____ the angle of reflection.



0 1 . 3 What is the name of the dotted line in **Figure 1**?

Tick (✓) **one** box.

[1 mark]

The normal

The parallel

The perpendicular

The right angle

0 1 . 4 Which range of angle of incidence should the student use in the investigation?

Tick (✓) **one** box.

[1 mark]

0° – 10°

0° – 180°

10° – 80°

10° – 360°

0 1 . 5 How many different angles of incidence should the student use in the investigation?

Tick (✓) **one** box.

[1 mark]

2

8

80

360

Question 1 continues on the next page

Turn over ►



Figure 2 is a picture of a person looking in a plane mirror.

Figure 2



The image in the plane mirror is a virtual image.

0 1 . 6 What is meant by a virtual image?

Tick (✓) **one** box.

[1 mark]

An image that is upside down.

An image that cannot be displayed on a screen.

An image that is smaller than the object.

An image that is not formed by reflection.



0 1 . 7 Which words describe the image in the plane mirror?

Tick (✓) **two** boxes.

[2 marks]

Laterally inverted

Magnified

Real

Refracted

Upright

0 1 . 8 The mirror is described as a plane mirror.

What does the word plane mean, when it is describing a mirror?

[1 mark]

9

Turn over for the next question

Turn over ►



0 2

Krypton-85 is a radioactive isotope that emits beta radiation when it decays.

0 2 . 1

Complete the sentence.

[1 mark]

Choose the answer from the box.

electron**neutron****proton**

A beta particle is a fast-moving _____ emitted from a nucleus.

0 2 . 2

Krypton-85 has a half-life of 11 years.

How many years will it take for the activity of a sample to decrease to $\frac{1}{4}$ of the original level?

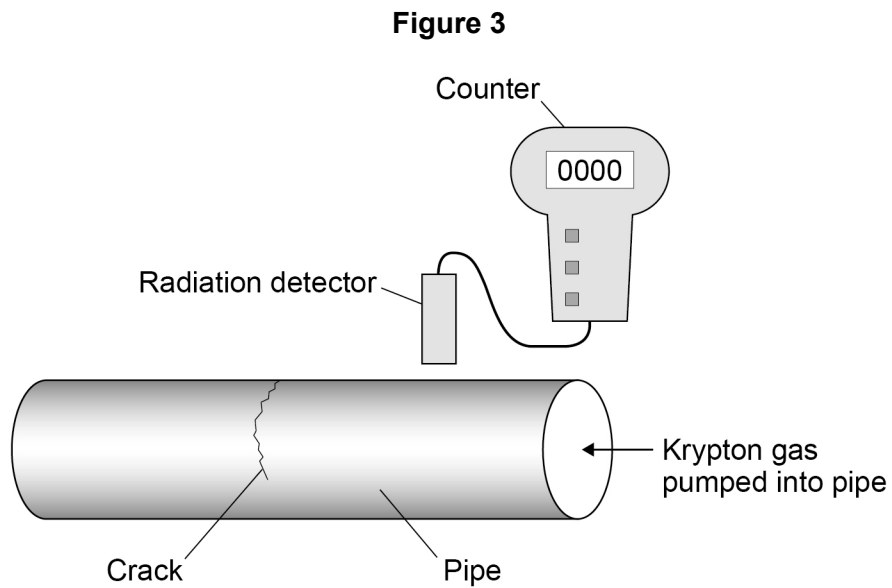
[1 mark]

_____ years



0 2 . 3 Krypton-85 is a radioactive gas.

Figure 3 shows krypton-85 gas being used to find small cracks in a metal pipe.



The detector is slowly moved along the pipe.

The reading on the counter suddenly increases when the detector is close to the crack.

Explain why.

[2 marks]

0 2 . 4 Explain why radioactive gases may be more hazardous to people than radioactive solids or liquids.

[2 marks]

Turn over ►



0 3**Figure 4** shows a drag racing car.

Drag racing cars are designed to drive short distances as quickly as possible.

Figure 4**0 3 . 1**

The car is powered by an engine that burns fuel.

Describe the energy transfers as the car accelerates.

[3 marks]



The maximum momentum of the car is 180 000 kg m/s.

0 3 . 2 Calculate the maximum velocity of the car.

mass of car = 1200 kg

Use the Physics Equations Sheet.

[3 marks]

Maximum velocity = _____ m/s

0 3 . 3 At the end of a race the car decelerates from its maximum velocity to a stop in 6.0 seconds.

Calculate the average force acting on the car during this deceleration.

Use the Physics Equations Sheet.

[2 marks]

Average force = _____ N

8

Turn over ►



0 4

Figure 5 shows a cup of hot coffee. The temperature of the coffee is decreasing.

Figure 5

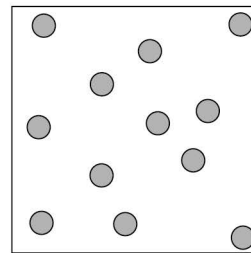
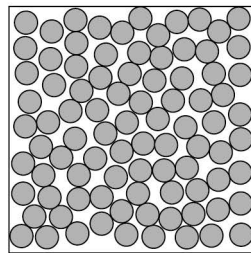
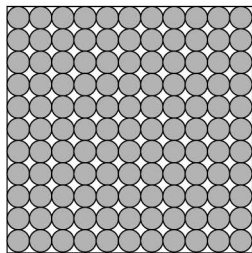


0 4 . 1

Which diagram shows the arrangement of particles in the coffee?

Tick (✓) **one** box.

[1 mark]





0 4 . 2 What is the main way that energy is transferred through the coffee?

Tick (✓) **one** box.

[1 mark]

Conduction

Convection

Insulation

Radiation

0 4 . 3 The coffee loses energy from its surface to the air.

Which of these processes causes energy loss from the surface of the coffee?

Tick (✓) **one** box.

[1 mark]

Condensation

Evaporation

Fusion

Freezing

0 4 . 4 The coffee needs to cool before it can be drunk.

Give **two** factors that affect the time it takes for the coffee to cool.

[2 marks]

1 _____

2 _____

Question 4 continues on the next page

Turn over ►



0 4 . 5 The cup in **Figure 5** contains 0.15 kg of coffee.

specific heat capacity of coffee = 4000 J/kg °C

Calculate the energy transferred from the coffee when it cools by 20 °C.

Use the Physics Equations Sheet.

[2 marks]

Energy transferred = _____ J

0 4 . 6 Explain what happens to the density of the coffee near the surface as it cools.

[2 marks]

9



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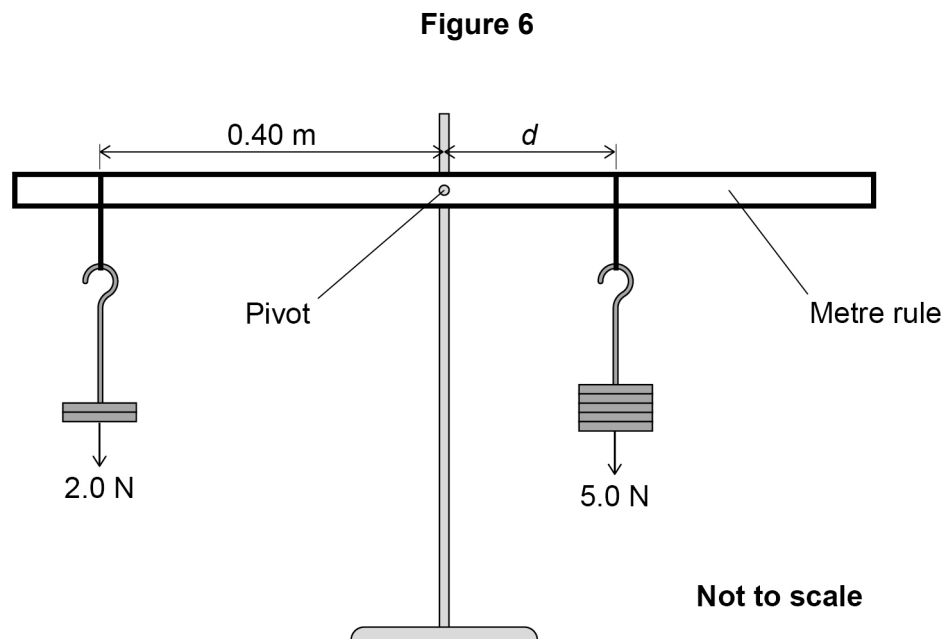
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0 5

A student investigated moments.

Figure 6 shows the equipment used.



The metre rule is balanced.

0 5 . 1

Determine the distance d in **Figure 6**.

Use the Physics Equations Sheet.

[3 marks]

Distance = _____ m



0 5 . 2

Give **two** changes that would cause the metre rule to become unbalanced.

[2 marks]

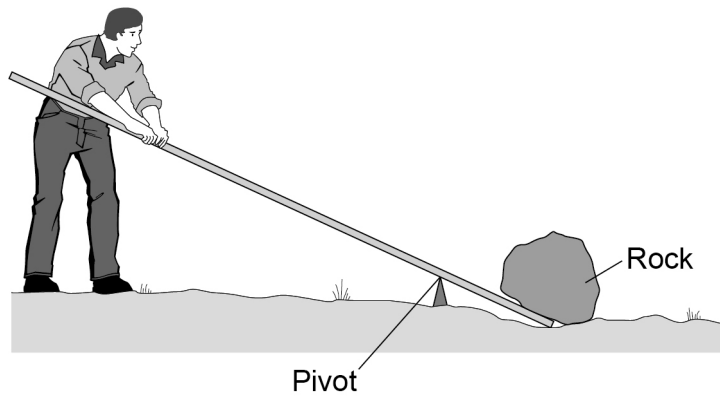
1 _____

2 _____

0 5 . 3

Figure 7 shows a man using a lever to move a heavy rock.

Figure 7



Explain how the lever is used as a force multiplier to move the heavy rock.

[3 marks]

8

Turn over ►



0 6

Figure 8 shows a smart watch that has a rechargeable battery.

Figure 8



The fully charged battery stores 2160 C of charge.

0 6 . 1

Calculate the maximum energy the battery in the watch can transfer.

potential difference of the battery = 4.0 V

Use the Physics Equations Sheet.

[3 marks]

Maximum energy transfer = _____ J



0 6 . 2 The minimum current from the battery in the watch is 5.0×10^{-3} A.

Calculate the maximum time the watch can be used before it needs recharging.

Give your answer in hours.

Use the Physics Equations Sheet.

[4 marks]

Time = _____ hours

0 6 . 3 Give **two** reasons why the time the watch can be used before it needs recharging is not always the same.

[2 marks]

1 _____

2 _____

9

Turn over for the next question

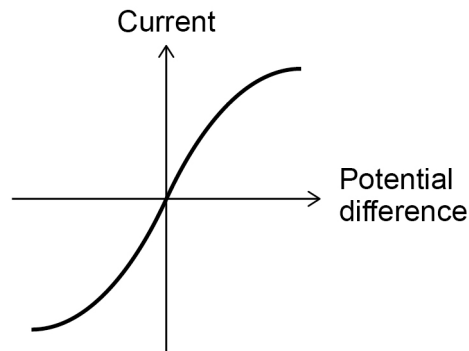
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0 7 . 2

Explain **one** safety precaution the student should use in the investigation.**[2 marks]**

0 7 . 3

Figure 10 shows a graph of current against potential difference for the heating element.**Figure 10**Explain the shape of the graph in **Figure 10**.**[3 marks]**

11

Turn over ►

0 8

In 2015 the island of El Hierro became the first island to generate 100% of its electricity using renewable resources.

Figure 11 shows how electricity is generated in a renewable way on the island.

Figure 11

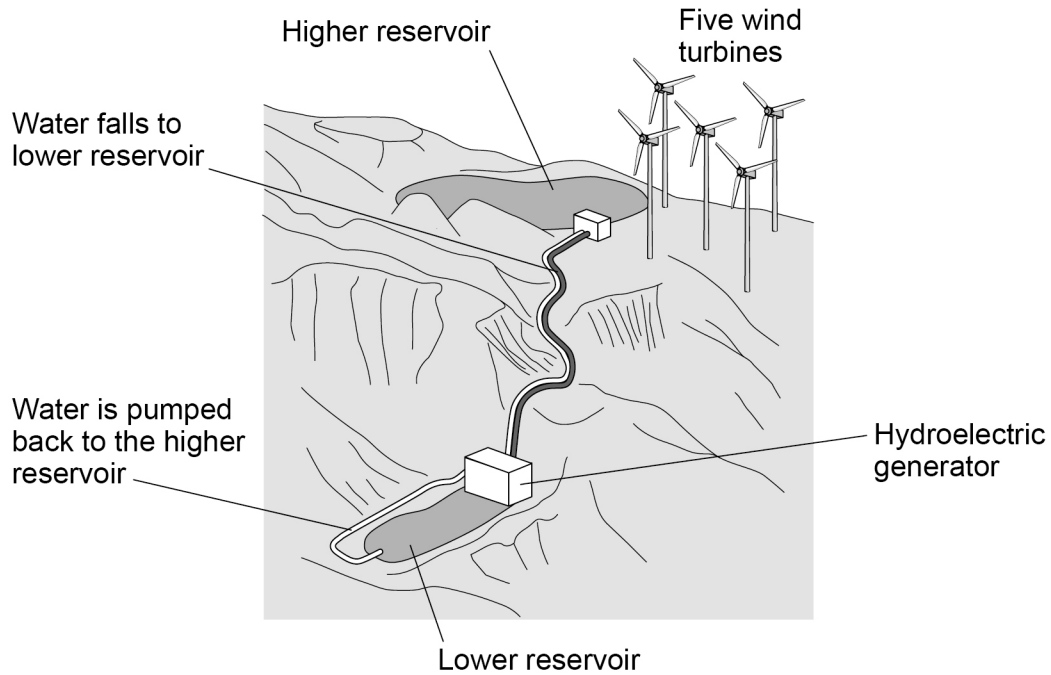


Table 1 gives some information about the generation of electricity on El Hierro.

Table 1

Maximum total power output of the 5 wind turbines	Maximum power output of the hydroelectric generator	Maximum demand for electrical power of the island
11.4 MW	11.5 MW	12.4 MW



0 8 . 1 Each of the 5 wind turbines is identical. The wind turbines are 60% efficient.

Determine the power input to one of the wind turbines.

Use the Physics Equations Sheet.

[4 marks]

Power input = _____ W

0 8 . 2 Suggest why water is pumped up to the higher reservoir at night.

[3 marks]

0 8 . 3 Explain why El Hierro also has diesel generators that can generate electricity.

[2 marks]

9

Turn over ►



0 9

All stars go through a life cycle.

0 9 . 1At the start of their life cycle, stars consist mainly of which **two** elements?**[2 marks]**

1 _____

2 _____

0 9 . 2

Give the name of the process by which heavier elements are formed in the core of a star.

[1 mark]

0 9 . 3

Different stars have different life cycles.

What property of a star determines its life cycle?

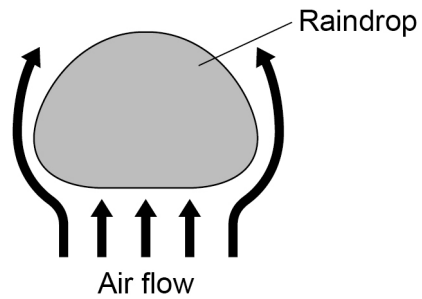
[1 mark]



1 0

Figure 12 shows a raindrop falling through the air.

Figure 12



Air resistance acts on the raindrop. The raindrop is falling at a constant speed.

1 0 . 1

Explain why the forces acting on the raindrop do **not** cause it to accelerate.

[2 marks]



1 0 . 2

Work is done by air resistance on the raindrop when it falls at constant speed.

When the raindrop falls 150 m the work done is 0.0441 J.

gravitational field strength = 9.8 N/kg

Calculate the mass of the raindrop.

Use the Physics Equations Sheet.

[6 marks]

Mass = _____ kg

1 0 . 3

Raindrops have different masses.

Explain why the mass of a raindrop affects the terminal velocity of the raindrop.

[3 marks]

11

END OF QUESTIONS



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