Rewarding Learning

Centre Number

Candidate Number

General Certificate of Secondary Education
2023–2024

Double Award Science: Physics

Unit P1

Foundation Tier

[GDW31]

GDW31

FRIDAY 7 JUNE 2024, AFTERNOON

TIME

1 hour.

INSTRUCTIONS TO CANDIDATES

Write your Centre Number and Candidate Number in the spaces provided at the top of this page.
You must answer the questions in the spaces provided.
Do not write outside the boxed area on each page or on blank pages.
Complete in black ink only. **Do not write with a gel pen.**
Answer **all nine** questions.

INFORMATION FOR CANDIDATES

The total mark for this paper is 60.
Figures in brackets printed down the right-hand side of pages indicate the marks awarded to each question or part question.
Quality of written communication will be assessed in Question **8**.

1 Energy can exist in many forms.

(i) In the home, energy changes take place when using electrical equipment.
In the examples below, state the energy forms the devices have been **designed** to produce.

An example has been completed for you.

Example – Electric hob

Electrical to **heat**

Door bell

Electrical to _____

Toaster

Electrical to _____

Television

Electrical to _____ and _____

[4]

(ii) Circle the **three** forms of energy listed in the box below.

power	kinetic	strain
chemical	pressure	weight

[3]

[Turn over

2 This question is about energy resources.

(i) State what is meant by a **non-renewable energy** resource.

_____

_____ [1]

(ii) In the table below, put an **R** beside the energy resources which are renewable and an **N** beside those which are non-renewable.

Energy Resource	**R** (Renewable) or **N** (Non-renewable)
Natural gas	
Tidal	
Wind	
Nuclear	

[4]

(iii) State the name of the energy resource, from the table above, which contributes **most** to global warming.

_____ [1]

(iv) State the name of a renewable energy resource **not** given in the table above.

_____ [1]

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(Questions continue overleaf)

[Turn over

3 An electric heat bulb is designed to keep food warm as shown below.

(a) The electric **heat** bulb produces 160 J of useful heat energy.
The input electrical energy is 200 J.

How much energy is wasted?

Energy wasted = _____ J

In what form is this energy wasted?

_____ [2]

(b) The input electrical energy to a kettle is 1 200 J.

The kettle uses 960 J of this energy to heat water.

Calculate the efficiency of the electric kettle.

You are advised to show your working out.

Efficiency = _____

Complete the table below by placing a tick (✓) beside the correct statement.

Statement	Tick (✓) the correct statement
Efficiency is measured in joules	
Efficiency has no unit	
Efficiency is measured in newtons	

[4]

[Turn over

4 **(a)** A man lifts some weights as shown below.

He lifts 150 N through a vertical height of 2 m.

Calculate the work done in lifting the 150 N.

You are advised to show your working out.

Work done = _____ J [3]

(b) On another occasion the man does 840 J of work to lift some weights.
He takes 0.6 seconds to lift the weights.

Calculate the power produced.

Include the unit in your answer.

You are advised to show your working out.

Power produced = _____ [4]

[Turn over

5 The picture below shows a woman climbing a ladder.

The mass of the woman is 52 kg.

At the position shown, she has 624 J of potential energy.

Use this information to calculate the height, h, she is above the ground.

You are advised to show your working out.

Height, h = _____ m [3]

6 The forces acting on a car travelling in a straight line are shown below.

(a) (i) The mass of the car is 1100 kg.

By first finding the resultant force, calculate the acceleration of the car.

You are advised to show your working out.

Acceleration of car = _____ m/s^2 [4]

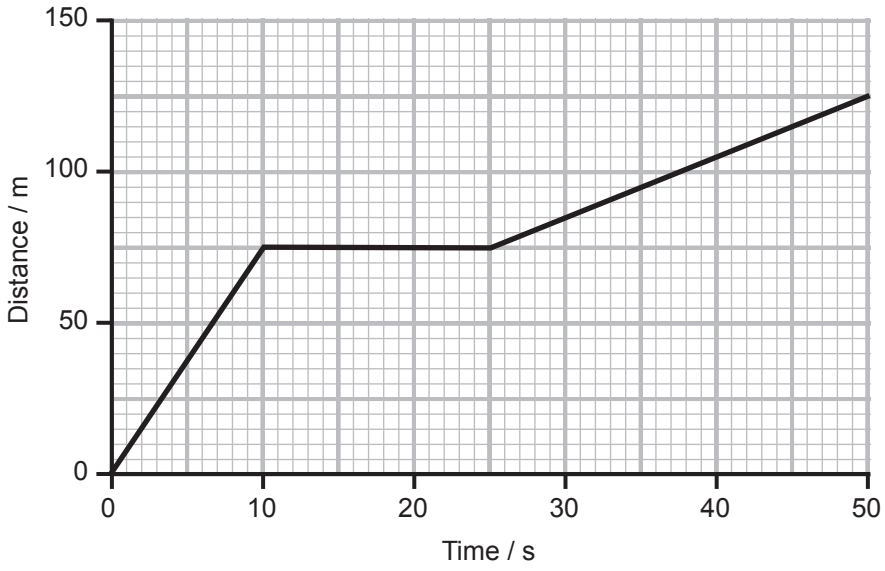
(ii) Later in the journey, the forces acting on the car are **balanced**.

What is the acceleration of the car at this time?

Acceleration of car = _____ m/s^2 [1]

[Turn over

(b) The graph of distance against time for part of a car journey is shown below.



(i) Describe the motion of the car during the time period 25 to 50 seconds.

_____ [1]

(ii) During which time period is the car travelling the fastest?

_____ to _____ s [1]

(iii) Describe the motion of the car during the time period 10 to 25 seconds.

_____

What is the distance travelled during the time period 10 to 25 seconds?

_____ m [2]

(c) The mass of a car tyre is 8200 g.

Calculate the weight of the tyre.

You are advised to show your working out.

Weight of tyre = _____ N [3]

[Turn over

7 This question is about the dangers of radioactivity.

(i) Some radioactive emissions cause ionisation.

What is meant by the term ionisation?

_____

_____

Why might ionisation of living cells be dangerous?

_____ [3]

(ii) Name the two types of radioactive emissions that can pass through the skin.

1. _____

2. _____ [2]

8 Atoms are made of protons, neutrons and electrons.

For each of these particles, state:

- their location within the atom;
- their relative charge.

In this question you will be assessed on your written communication skills including the use of specialist scientific terms.

Protons: _____

_____

_____

Neutrons: _____

_____

_____

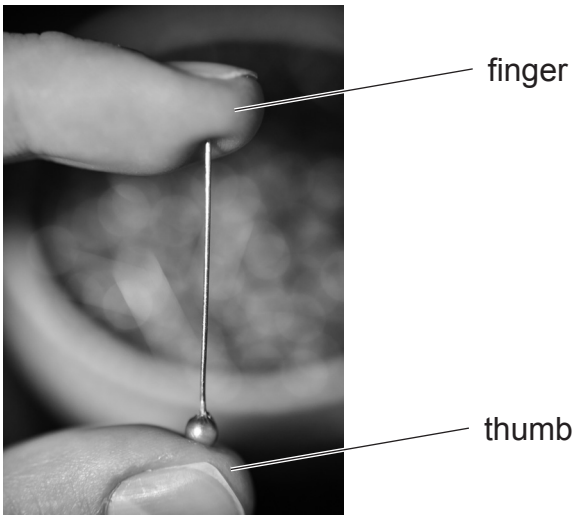
Electrons: _____

_____

_____ [6]

[Turn over

9 A person holds a pin **at rest** between their finger and thumb as shown below.



(i) Is the size of the force exerted by the finger greater, smaller or equal to the force exerted by the thumb?

_____ [1]

(ii) Is the pressure exerted on the finger greater, smaller or equal to the pressure exerted on the thumb?

The pressure is: _____

Explain your answer:

_____

_____ [2]

(iii) The area of the pin in contact with the finger is 0.01 cm^2 and the force is 2 N.

Calculate the pressure exerted by the pin on the finger.

Include the unit in your answer.

Do not change any units.

You are advised to show your working out.

Pressure = _____ [4]

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For Examiner's use only	
Question Number	**Marks**
1	
2	
3	
4	
5	
6	
7	
8	
9	
Total Marks	

Examiner Number

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