Rewarding Learning

Centre Number

Candidate Number

General Certificate of Secondary Education
2022–2023

Double Award Science: Physics

Unit P1

Foundation Tier

[GDW31]

GDW31

THURSDAY 25 MAY 2023, MORNING

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

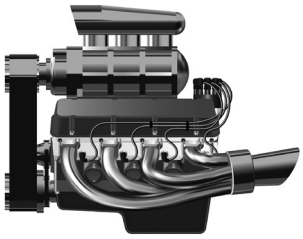
The total mark for this paper is 60.
Figures in brackets printed down the right-hand side of pages indicate the marks awarded to each question or part question.
Quality of written communication will be assessed in Question **6**.

14009

1 Energy can be changed from one form to another.

Complete the boxes to show the **useful** energy change that is happening in each of the cases below.
An example has been completed for you.

Example: A petrol engine



chemical energy	→	*kinetic* energy

A light bulb

energy	→	energy

A microphone

energy	→	energy

Rubbing your hands together to keep warm.

energy	→	energy

[6]

2 This question is about energy resources.

(i) What is a **non-renewable** energy resource?

_____

_____ [1]

(ii) The names of some energy resources are given in the box below.

natural gas	tidal	wind
nuclear	hydroelectricity	coal

Energy resources can be renewable or non-renewable.

Place each of the energy resources above into the correct column in the table.

Renewable	Non-renewable

[6]

[Turn over

3 A swimmer is taking part in a race.

(i) The swimmer begins the final stage of the race moving at a speed of 1.1 m/s. She finishes the race at a speed of 1.7 m/s.

Calculate the average speed of the swimmer during this final stage of the race.

You are advised to show your working out.

Average speed = _____ m/s [3]

(ii) The time taken for the swimmer to change her speed from 1.1 m/s to 1.7 m/s is 3 seconds.

Calculate the rate of change of speed of the swimmer during this time.

You are advised to show your working out.

Rate of change of speed = _____ m/s^2 [3]

[Turn over

4 **(a)** Below are some statements about mass and weight.

Write **true** or **false** beside each statement as appropriate.

Mass is a force. _____

Weight is measured in newtons. _____

Mass is defined as the amount of matter in an object. _____ [3]

(b) A metal cube has a mass of 36 g and a volume of 4.5 cm^3.

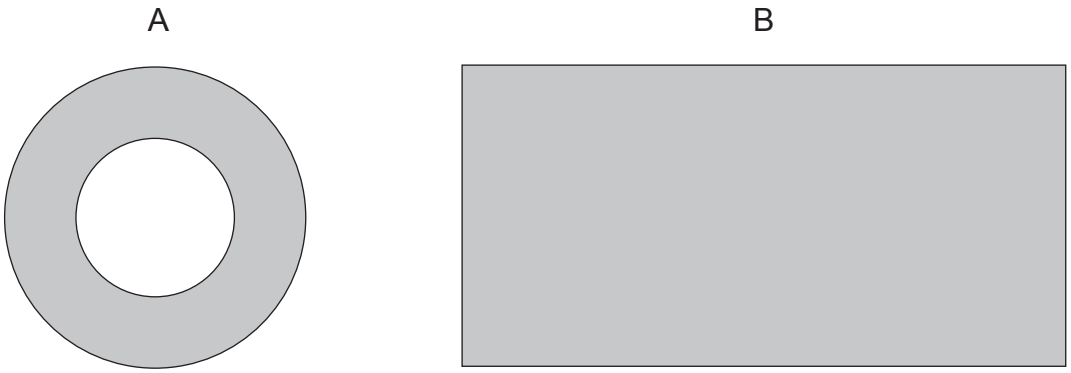
Calculate the density of the cube and give the unit.

Do not change any units.

You are advised to show your working out.

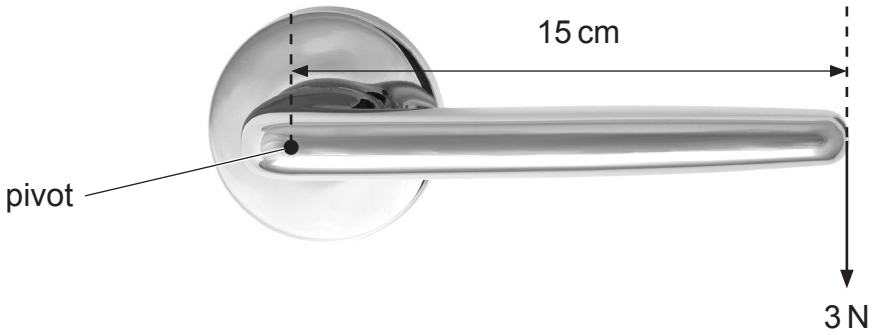
Density = _____ [4]

5 **(a)** Two objects are shown below.



Place a cross (✗) in the position of the centre of gravity of each object. [2]

(b) A 3 N force is applied to a door handle as shown below.



Calculate the moment produced by the 3 N force.

You are advised to show your working out.

Moment = _____ N cm [3]

[Turn over

6 Atoms are made of protons, neutrons and electrons.

For each of these particles, state:

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

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

Proton: _____

_____

_____

Neutron: _____

_____

_____

Electron: _____

_____

_____ [6]

7 This question is about nuclear fission.

(i) Name a suitable fuel for nuclear fission.

_____ [1]

(ii) State fully what must happen first for a nucleus to undergo fission.

_____

_____ [2]

(iii) Nuclear fission releases energy. State **two** other things that are produced by a nuclear fission reaction.

_____

_____ [2]

(iv) A nuclear fission reaction can cause many further fissions to happen.
What is the name given to this process?

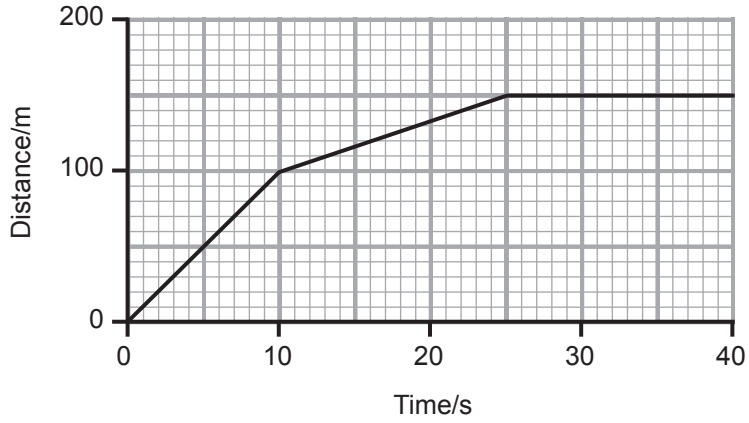
_____ [1]

(v) A major incident at a nuclear power plant could cause huge economic, health and environmental damage.
Name a country in which such an incident has occurred.

_____ [1]

[Turn over

8 The graph of distance against time for part of a motorbike journey is shown below.



(i) During which time period is the motorbike travelling the fastest?

From _____ to _____ s

Give a reason for your answer.

_____

Describe the motion of the motorbike from 25 to 40 seconds.

_____ [3]

(ii) Use values from the graph to calculate the average speed of the motorbike during the time period from 10 to 25 seconds.

Give your answer to one decimal place.

You are advised to show your working out.

Average speed = _____ m/s [5]

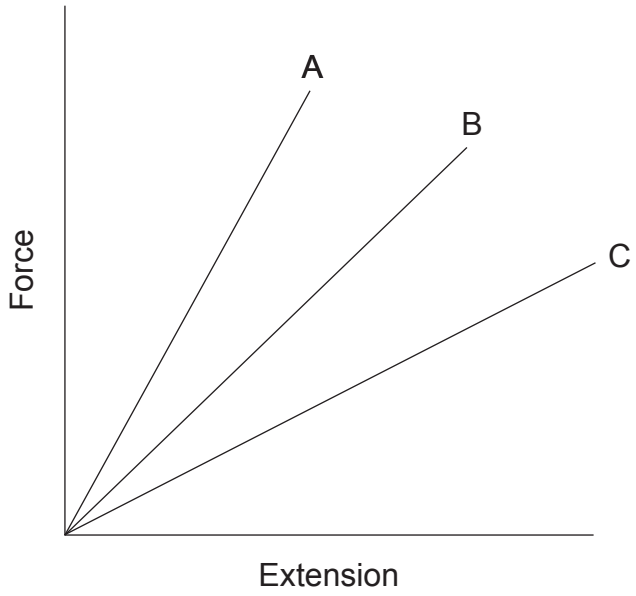
[Turn over

9 **(a)** Hooke's Law states the relationship between the force applied and the extension of a spring, provided that a certain point is not exceeded.

What is the name of this point?

_____ [1]

(b) A graph of force against extension for three different springs is shown below.



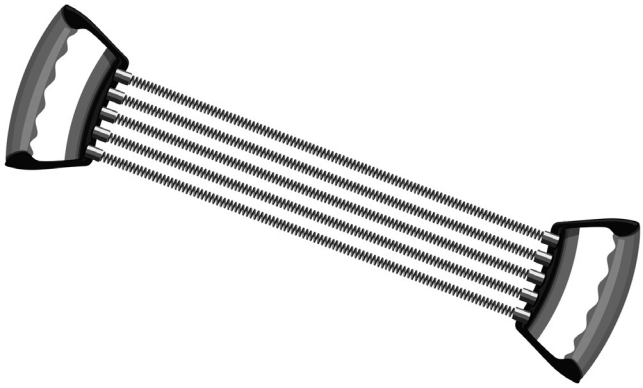
State which spring you would expect to have the **smallest** spring constant and give a reason for your choice.

Spring _____

Reason _____

_____ [2]

(c) A piece of gym equipment has five identical springs.



Each spring has an unstretched length of 50 cm.

A stretching force of 60 N is applied and this force is **shared equally** by all five springs.

Each spring extends to a length of 58 cm.

Calculate the spring constant of **one** of the springs and give its unit.

Do not change any units.

You are advised to show your working out.

Spring constant = _____ [5]

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1	
2	
3	
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Total Marks	

Examiner Number

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