Rewarding Learning

Centre Number

Candidate Number

General Certificate of Secondary Education
2018–2019

Double Award Science
Physics

Unit P1

Foundation Tier

[GDW31] *GDW31*

FRIDAY 1 MARCH 2019, 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 **8**.

12278

1 Many devices change energy from one form to another.

Complete the boxes below to show the main energy change which each device is **designed** to bring about. An example has been completed for you.

Battery

© Getty Images

chemical energy	→	electrical energy

(a) (i) Electric hob

© tuncsel / iStock / Thinkstock

_____ energy	→	_____ energy

[2]

(ii) Candle

© Borys Petrushenko / iStock / Thinkstock

_____ energy	→	_____ energy

[2]

A catapult fires a stone upwards.

© goodapp / iStock / Thinkstock

(b) Complete the sentence below to show the main energy change.

As the stone travels **upwards** its _____ energy

changes to _____ energy. [2]

[Turn over

2 Energy resources can be described as renewable or non-renewable.

(i) Explain what is meant by the term renewable energy resource.

_____

_____ [1]

(ii) Explain what is meant by the term non-renewable energy resource.

_____

_____ [1]

Some energy resources are given below.

wind	**geothermal**	**coal**	**tidal**

(iii) Complete the table below using the energy resources given in the box above.

Renewable	Non-renewable

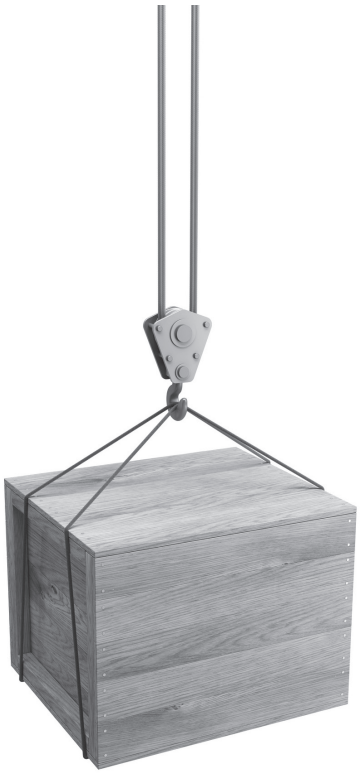
[4]

(iv) Give a renewable energy resource and a non-renewable energy resource not given in the box.

Renewable energy resource _____

Non-renewable energy resource _____ [2]

3 A force of 150 N is used to lift a box vertically by 12 m.



(i) Calculate the work done in lifting the box.

You are advised to show your working out.

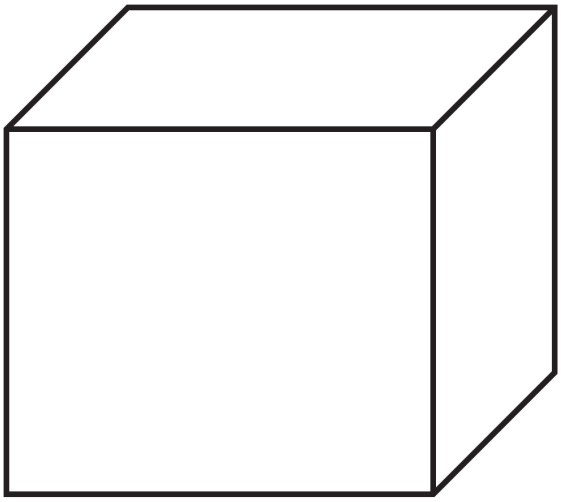
Work = _____ J [3]

(ii) What is the increase in potential energy of the box when it has been lifted by 12 m?

Increase in potential energy = _____ J [1]

[Turn over

4 A student is trying to find the density of a block of material.



(a) Which of the following measuring instruments should the student use to find the density of the block?

Tick (✓) the correct boxes.

thermometer	☐
electronic balance	☐
ruler	☐
stopwatch	☐

[2]

(b) A solid cube of an unknown material has sides of **equal length** 2.0 cm and a mass of 76 g.

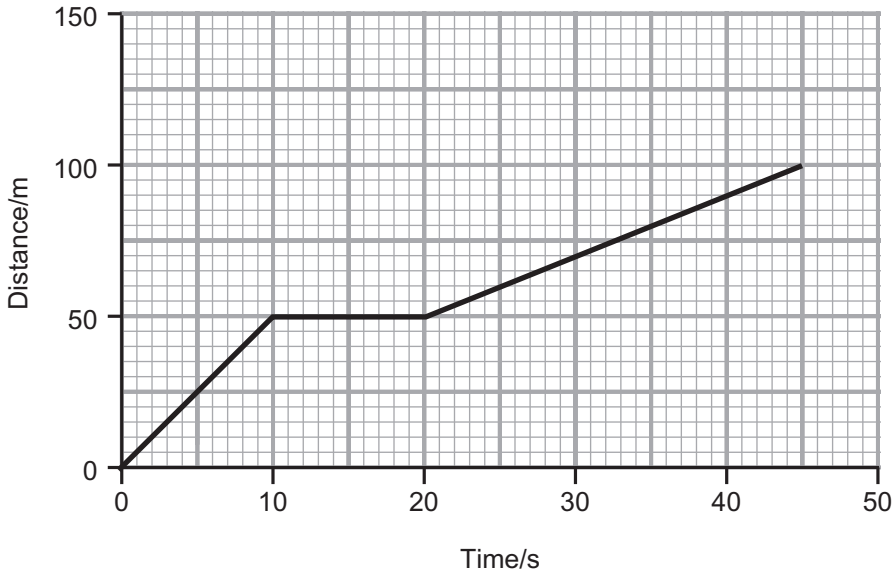
Calculate the density of the material.

You are advised to show your working out.

Density = _____ g/cm^3 [4]

[Turn over

5 The graph of distance against time for part of a car journey is shown below.



(i) During which time period is the car stopped?

_____ s to _____ s [1]

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

_____ s to _____ s [1]

(iii) How far has the car travelled after 15 seconds?

_____ m [1]

(iv) What is the total distance travelled by the car after 45 seconds?

_____ m [1]

(v) Use values from the graph to calculate the average speed of the car over the first 10 seconds.
Remember to include the unit.

You are advised to show your working out.

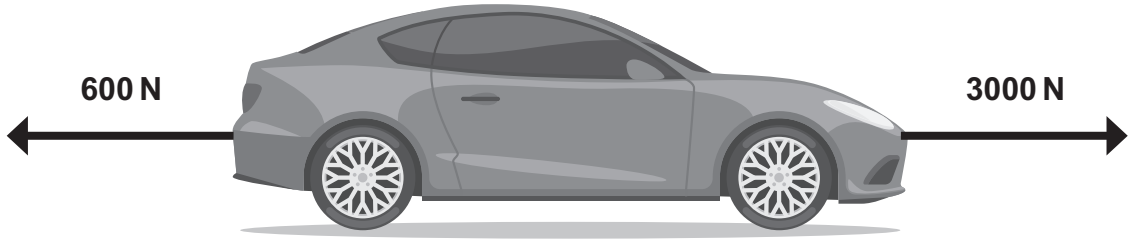
Average speed = _____ [4]

[Turn over

6 **(a)** What does a resultant force always cause?

_____ [1]

(b) **(i)** The forces acting on a car travelling in a straight line are shown below.



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The combined mass of the car and its driver is 1200 kg.
Calculate the car's acceleration.

You are advised to show your working out.

Acceleration = _____ m/s^2 [4]

(ii) Later in the car's journey, the forces acting on it are balanced.
What is the car's acceleration at this point?

Acceleration = _____ m/s^2 [1]

7 Atoms are made up of protons, neutrons and electrons.

(a) Complete the table below to show the relative charge of the particles in an atom.

Particle	Relative charge
Proton	
Neutron	
Electron	

[3]

(b) The nucleus of an atom can be described using the notation

$$ {}^{A}_{Z}X $$

Which letter, A, X or Z, represents a value that is different for a pair of isotopes?

_____ [1]

(c) The nucleus of an atom of lead can be described using the notation

$$ {}^{207}_{82}Pb $$

Complete the table below to show how many of each particle there is **in the nucleus** of an atom of lead.

Particle	Number of particles in the nucleus
Proton	
Neutron	
Electron	

[3]

[Turn over

8 Write an account of background radioactivity and the precautions taken when working with radioactive sources.

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

Your account should include:

What background radioactivity is.

Two **major** sources of background radioactivity.

How background radioactivity is taken into account.

Two precautions.

[6]

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(Questions continue overleaf)

9 A sofa of weight 720 N exerts a pressure on the floor.

(i) Calculate the mass of the sofa.

You are advised to show your working out.

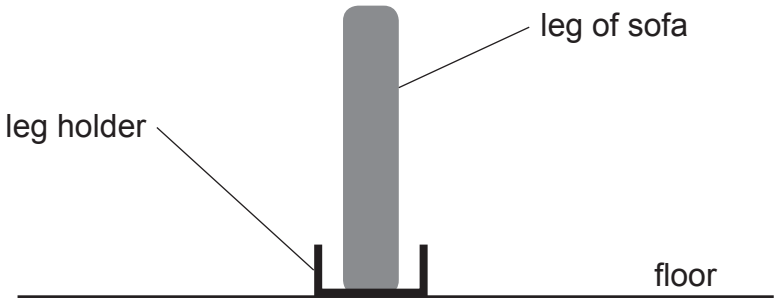
Mass = _____ kg [2]

(ii) Each of the sofa's 4 legs has an area of 6 cm^2.
Calculate the total pressure the sofa exerts on the floor.
Remember to include the unit.
Do not change any units.

You are advised to show your working out.

Pressure = _____ [5]

(iii) The legs of the sofa are placed in leg holders that are designed to prevent the floor being damaged.



Explain how the leg holders help to reduce any damage to the floor.

_____

_____

_____ [2]

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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