



Rewarding Learning

General Certificate of Secondary Education
2022–2023

Centre Number

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Candidate Number

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Double Award Science: Physics

Unit P1

Foundation Tier



[GDW31]

GDW31

WEDNESDAY 23 NOVEMBER 2022, 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**.



1 Energy can be changed from one form to another.

Complete the boxes below to show the **main** energy change that takes place.
An example has been completed for you.

Example: A microphone



© Getty Images

sound
energy



electrical
energy

An electric fan



© Getty Images

energy



energy

A burning gas stove



© Getty Images

energy



energy

A solar cell



© Getty Images

energy



energy

[6]



2 This question is about energy resources.

(i) What is a renewable energy resource?

[1]

(ii) Energy resources can be renewable or non-renewable.

wind	tidal	coal	nuclear
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Place each of these energy resources in the correct column below.

[4]

Renewable	Non-renewable

(iii) Energy resources can affect the environment.

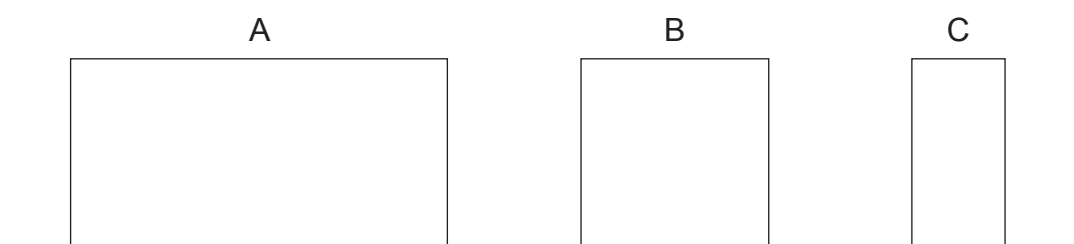
Which one of the four energy resources given above can cause acid rain?

[1]

[Turn over



- 3 (a) Three uniform objects are placed on a level surface as shown below.



Place a cross (X) in the position of the centre of gravity of object A.

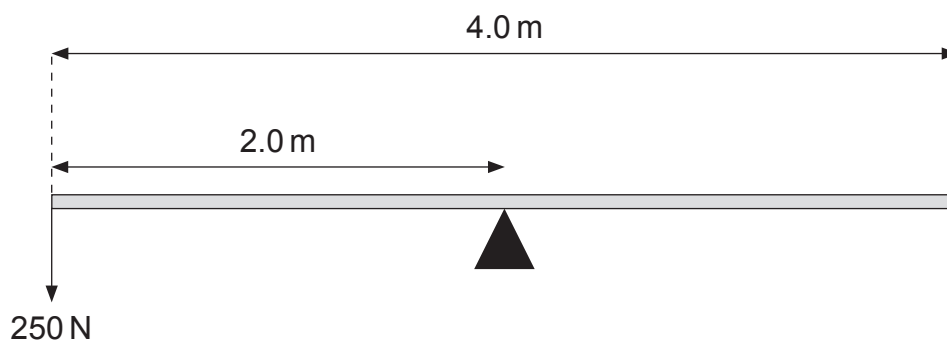
Which object, A, B or C, is the **least** stable?

Object _____

Give a reason for your answer.

_____ [3]

- (b) A force acts on a see-saw as shown below.



Calculate the moment created by the 250 N force.

You are advised to show your working out.

Moment = _____ Nm [3]



- 4 (a) A shopping trolley is pushed at a constant speed. The forces acting on the trolley are shown below.



What is the name of force Y that opposes the motion of the trolley?

If force X is positive, then how would force Y be best described?

Tick (✓) the correct box.

positive

☐

negative

☐

neutral

☐

[2]

- (b) Another shopping trolley, of mass 22 kg, is used to carry a load of 15 kg. It is pushed so that it accelerates at 2 m/s^2 .

Calculate the resultant force acting on the trolley and its load.

You are advised to show your working out.

Resultant force = _____ N [4]

[Turn over]



- 5 (i) A metal statue has a mass of 351 000 kg and a volume of 45 m³.



© Getty Images

Calculate the density of the metal statue and give the unit.

Do not change any units.

You are advised to show your working out.

Density = _____ [4]



- (ii) The statue shown was made by pouring liquid metal into a mould and allowing it to harden and become solid metal.

Complete the sections below by putting a tick (✓) in the correct box.

The density of liquid metal is generally:

greater than the density of solid metal;

☐

less than the density of solid metal;

☐

the same as the density of solid metal.

☐

This is because the distances between the particles in the liquid metal are generally:

greater than the distances between particles in solid metal;

☐

less than the distances between particles in solid metal;

☐

the same as the distances between particles in solid metal.

☐

[2]

[Turn over]



- 6 The following question is about the harm that radioactive emissions can cause.

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

Radioactive emissions can be dangerous because of a process called ionisation.

What is ionisation?

What harm can ionisation cause to the human body?

What is background radiation?

State one type of human behaviour that adds **significantly** to background radiation.

Some homes have to be well ventilated because of the presence of a particular radioactive gas. Name this gas.

[6]





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(Questions continue overleaf)

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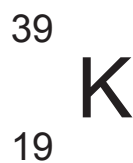
[Turn over



16GDW3109

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

(a) A potassium **atom** is described below.



Complete the table below to show the number of each particle in the potassium **atom**.

Particle	Number
Proton	
Neutron	
Electron	

What is the overall charge on the potassium **atom**?

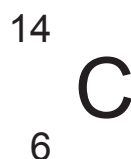
_____ [4]



(b) (i) Explain, in terms of particles, what an isotope is.

[2]

An isotope of carbon is described below.



(ii) What is the atomic number and the mass number of this isotope?

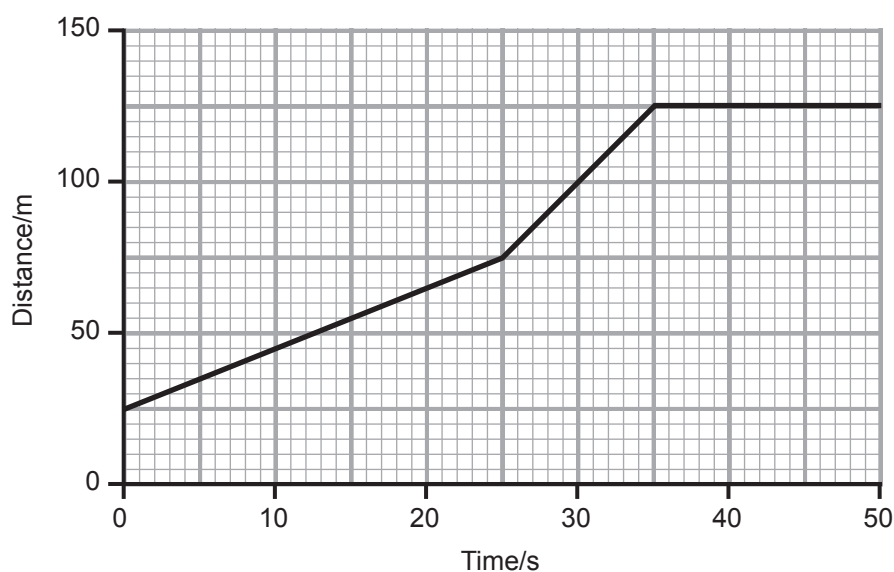
Atomic number = _____

Mass number = _____ [2]

[Turn over



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



- (i) During which time period is the bike travelling the fastest?
Give a reason for your answer.

_____ to _____ s

Reason _____

Describe the motion of the bike during the time period 35 to 50 seconds.

How far has the bike travelled during the time period 0 to 30 seconds?

_____ m [4]



- (ii) Use values from the graph to calculate the speed of the bike during the first 25 seconds.

You are advised to show your working out.

Speed = _____ m/s [4]



- 9 (a) This question is about the efficiency of a light bulb.



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The light bulb uses 600 J of electrical energy.
450 J of energy are wasted.

Calculate the efficiency of the light bulb.

You are advised to show your working out.

Efficiency = _____ [4]



(b) A drawer can be opened to a maximum distance of 60 cm.

To open the drawer fully, 0.72 J of work is done.

Calculate the force used to open the drawer fully.

You are advised to show your working out.

Force = _____ N [4]

THIS IS THE END OF THE QUESTION PAPER



DO NOT WRITE ON THIS PAGE

For Examiner's
use only

Question Number	Marks
1	
2	
3	
4	
5	
6	
7	
8	
9	

Total Marks	
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Examiner Number

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