



General Certificate of Secondary Education
2023–2024

Centre Number

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Candidate Number

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Double Award Science: Physics

Unit P1
Foundation Tier



[GDW31]

GDW31

WEDNESDAY 15 NOVEMBER 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**.



1 Energy can be changed from one form to another.

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

Example: A speaker playing music



electrical
energy



sound
energy

A working microphone

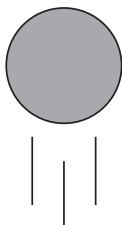


energy



energy

A ball **rising** vertically



energy



energy

A battery giving energy to a device



energy



energy

[6]



2 Energy resources can be renewable or non-renewable.

- (i) State what is meant by a **renewable energy** resource and give an example.

Example _____ [2]

- (ii) State what is meant by a **non-renewable energy** resource and give an example.

Example _____ [2]

- (iii) The table below gives some ways in which energy resources can have an environmental effect.

Place a tick (✓) to show which type of energy resource is **most likely** to cause each environmental effect.

Place one tick (✓) per row.

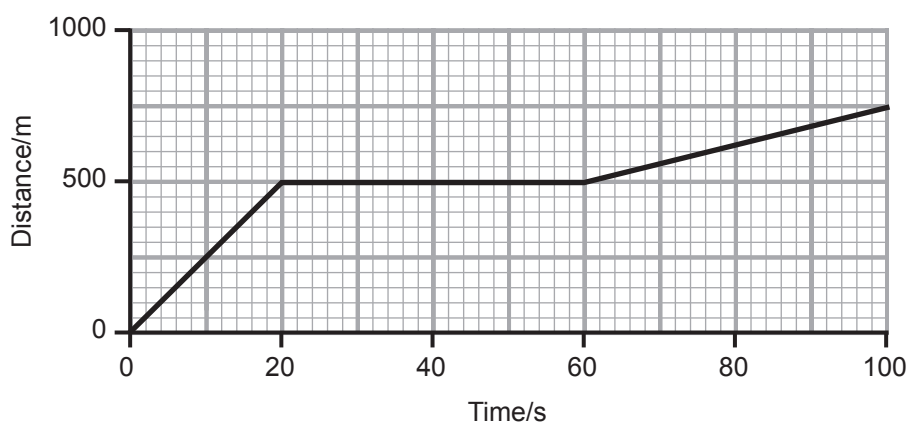
Environmental effect	Renewable	Non-renewable
Radioactive pollution		
Acid rain		
Global warming		

[3]

[Turn over



- 3 The graph of distance against time for part of a train journey is shown below.



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

From _____ to _____ s

Describe the motion of the train during the time period 20 to 60 seconds.

How far does the train travel during the time period 0 to 50 seconds?

_____ m [3]

- (ii) Use values from the graph to calculate the average speed of the train during the time period 0 to 20 seconds.

You are advised to show your working out.

Average speed = _____ m/s [3]



- 4 (a) Complete the following statement of Hooke's law.

The _____ of a spring is directly
proportional to the _____, provided that
the _____ of proportionality is not exceeded. [3]

- (b) A spring has an unstretched length of 2 cm, as shown in Diagram 1.

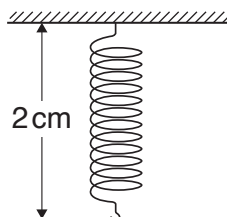


Diagram 1

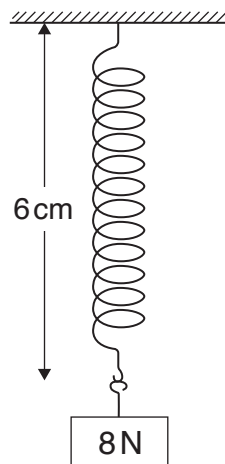


Diagram 2

When a force of 8 N is applied to the spring, its length increases to 6 cm as shown in Diagram 2.

Use the information given to calculate the spring constant of the spring.

You are advised to show your working out.

Spring constant = _____ N/cm [4]

[Turn over]



- 5 Camels have feet that cover a large area so that they do not sink into soft sand.



A camel has 4 feet and **each one** covers an area of 250 cm^2 .

The camel has a weight of 8000 N and is standing on all four feet.

Calculate the pressure exerted by the camel on the ground.

You are advised to show clearly your working out.

Do not change any units.

Pressure = _____ N/cm^2 [4]



- 6** This question is about the densities of solids, liquids and gases and the distances between the particles in each state of matter.

Which state of matter generally has the lowest, intermediate (middle) and highest density?

Describe the average distance between the particles in each state.

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

Lowest density

State of matter with lowest density:

Average distance between the particles (smallest, intermediate or largest):

Intermediate density

State of matter with intermediate density:

Average distance between the particles (smallest, intermediate or largest):

Highest density

State of matter with highest density:

Average distance between the particles (smallest, intermediate or largest):

[6]

[Turn over



- 7 (a) An object is travelling at a constant speed in a straight line.
The forward force acting on the object is 55 N.

What is the size of the backward force acting on the object?

Backward force = _____ N

The forward force on the object remains at 55 N and the backward force changes to 40 N.

What is the size of the resultant force acting on the object?

Resultant force = _____ N [2]



(b) A van is driven in a straight line along a road.



The van and its contents have a mass of 2300 kg.
There is a resultant force of 4830 N acting on the van.

Calculate the acceleration of the van.

Include the unit in your answer.

You are advised to show your working out.

Acceleration = _____ [4]

[Turn over]



- 8 (a) An object of mass 1 kg is placed on a table.

What is the name given to the force due to the pull of gravity on the object?

What is the size of this force acting on the 1 kg object?

Force = _____ N [2]

- (b) (i) A pram is pushed along a path.



The pram is pushed with a constant force of 40 N and 1200 J of work is done.

Calculate the distance moved by the pram.

You are advised to show your working out.

Distance = _____ m [3]



(ii) 1200 J of work is done in pushing the pram for one minute.

Calculate the power produced during this time.

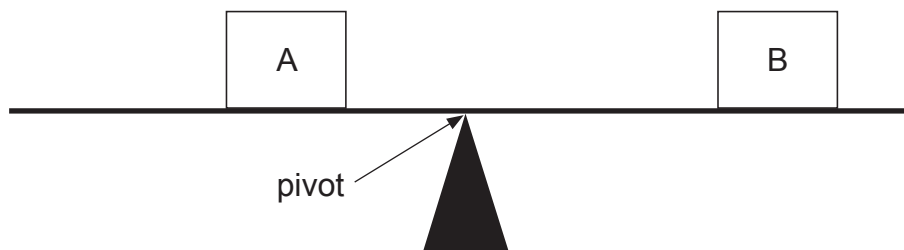
Include the unit in your answer.

You are advised to show your working out.

Power = _____ [5]



- 9 (a) A uniform metre rule with boxes A and B is balanced at its midpoint as shown below.



- (i) Which box, A or B, has the greater mass?

The moment produced by box A is 12 Ncm.

What is the size and direction of the moment produced by box B?

Size = _____ Ncm

Direction = _____ [3]

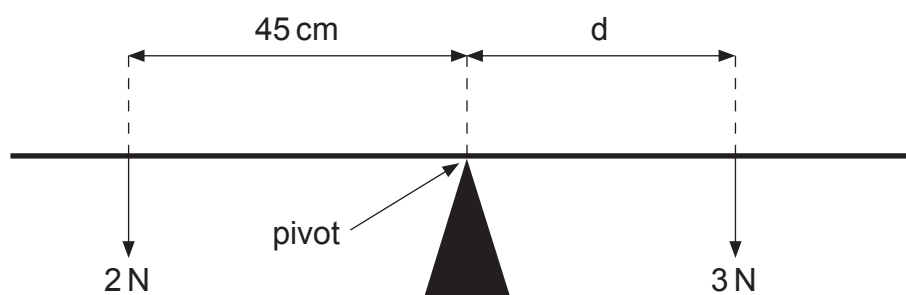
- (ii) Box A is moved closer to the pivot.

In which direction should box B be moved so that the metre rule remains balanced?

_____ [1]



(b) Another uniform metre rule is balanced at its midpoint as shown below.



Use the Principle of Moments to calculate the distance, d , between the 3 N force and the pivot.

You are advised to show your working out.

Distance, d = _____ cm [4]

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Examiner Number

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