



General Certificate of Secondary Education  
2019–2020

Centre Number

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Candidate Number

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# Double Award Science: Physics

Unit P1

Foundation Tier



[GDW31]

\*GDW31\*

## FRIDAY 8 NOVEMBER 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 **6(a)**.



1 An electric heater is designed to change energy from one form to another.



*Electrical* energy to *heat* energy.

Complete the following to describe the energy change each device is **designed** to bring about.

(i) Loudspeaker



\_\_\_\_\_ energy to \_\_\_\_\_ energy. [2]

(ii) Match



\_\_\_\_\_ energy to \_\_\_\_\_ energy. [2]

(iii) Petrol engine



\_\_\_\_\_ energy to \_\_\_\_\_ energy. [2]



2 (a) (i) Define the term renewable energy.

\_\_\_\_\_

\_\_\_\_\_ [1]

(ii) Give two examples of renewable energy resources.

1. \_\_\_\_\_

2. \_\_\_\_\_ [2]

(b) Coal is an example of a fossil fuel.

(i) Give the name of another fossil fuel.

\_\_\_\_\_ [1]

(ii) State a major way in which coal pollutes the environment.

\_\_\_\_\_ [1]

[Turn over



- 3 (a) What do you understand by the term centre of gravity?

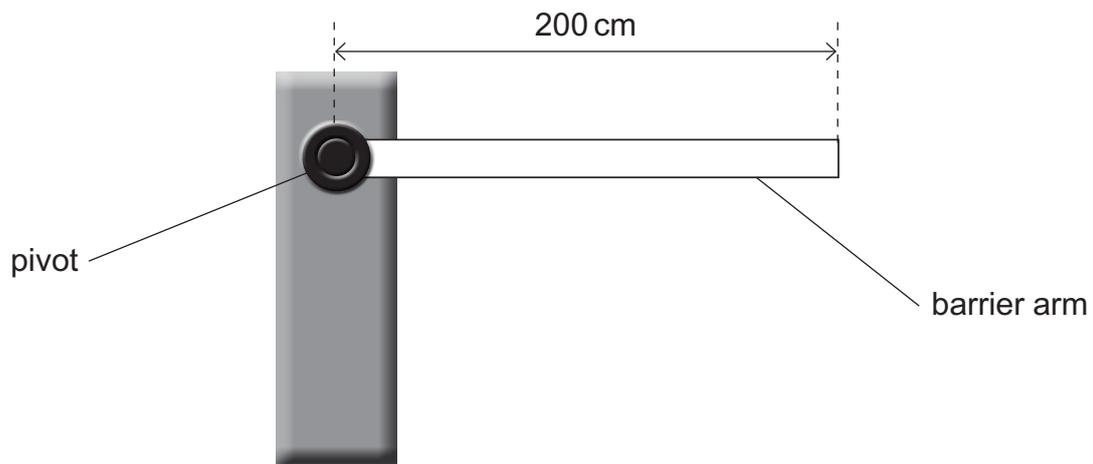
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[2]

- (b) The weight of the uniform barrier arm in the diagram below is 60 N.



Source: Principal Examiner

- (i) Beginning at the correct point, draw an arrow to indicate the direction of the weight of the barrier arm. [2]
- (ii) Calculate the moment, in Ncm, exerted by the weight about the pivot.

**You are advised to show your working out.**

Moment = \_\_\_\_\_ Ncm [3]



4 (a) Consider the quantities in the box below.

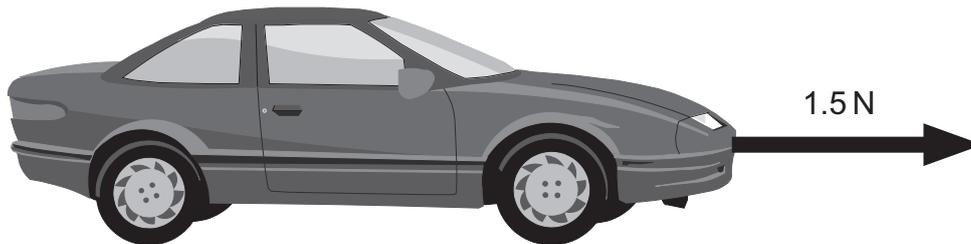
Select two quantities which are related in Newton's second law.

displacement	speed	acceleration	
time	weight	velocity	force

\_\_\_\_\_ and \_\_\_\_\_ [2]

(b) The toy car in the diagram below has a mass of 0.5 kg. If a boy pushes the car with a force of 1.5 N, calculate the acceleration of the car.

**You are advised to show your working out.**



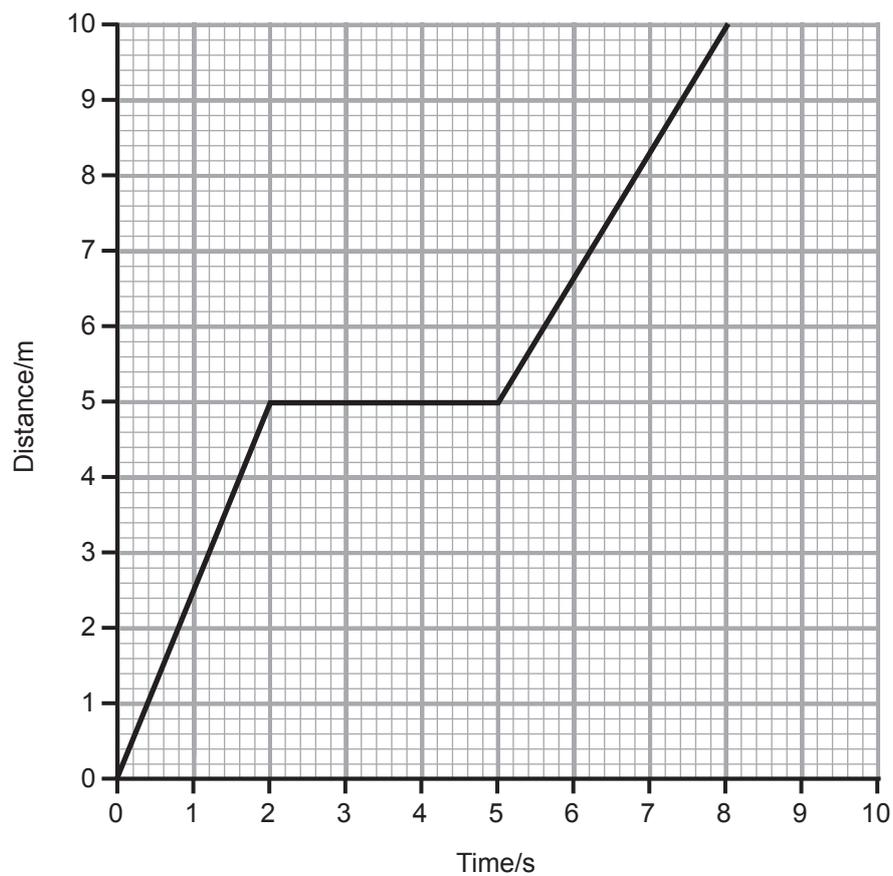
Source: Principal Examiner

Acceleration = \_\_\_\_\_ m/s<sup>2</sup> [3]

[Turn over



5 (a) The graph below shows the motion of a cyclist.



Use the graph to find the following:

(i) the distance travelled by the cyclist in the first 2 s of the motion;

Distance = \_\_\_\_\_ m [1]

(ii) the speed of the cyclist between 2 s and 5 s;

Speed = \_\_\_\_\_ m/s [1]

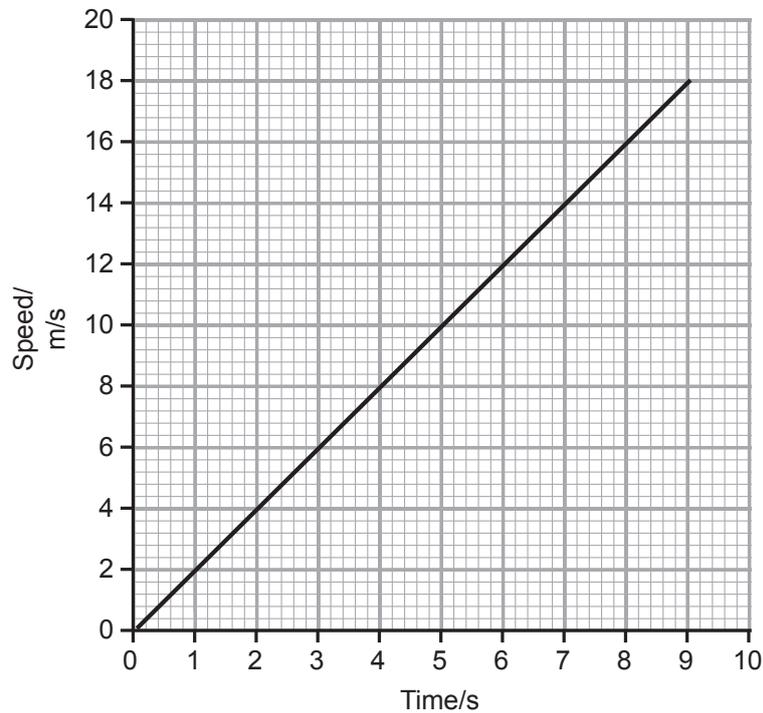


(iii) the average speed of the cyclist over the whole journey.

**You are advised to show your working out.**

Average speed = \_\_\_\_\_ m/s [3]

(b) Below is the speed–time graph for another cyclist.



Use the graph to calculate the cyclist's rate of change of speed.

**You are advised to show your working out.**

Rate of change of speed = \_\_\_\_\_ m/s<sup>2</sup> [3]

**[Turn over**



6 (a) You are asked to write an account of radioactivity.

Give the names of the three types of radiation which may be emitted and in each case describe what the radiation consists of.

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

Radiation 1 \_\_\_\_\_

Consists of \_\_\_\_\_

\_\_\_\_\_

Radiation 2 \_\_\_\_\_

Consists of \_\_\_\_\_

\_\_\_\_\_

Radiation 3 \_\_\_\_\_

Consists of \_\_\_\_\_

\_\_\_\_\_ [6]



- (b) The half-life of a particular radioisotope is 2 days.  
The original sample contains 120 g of the radioisotope.  
What **fraction** of the radioisotope will remain after 6 days?

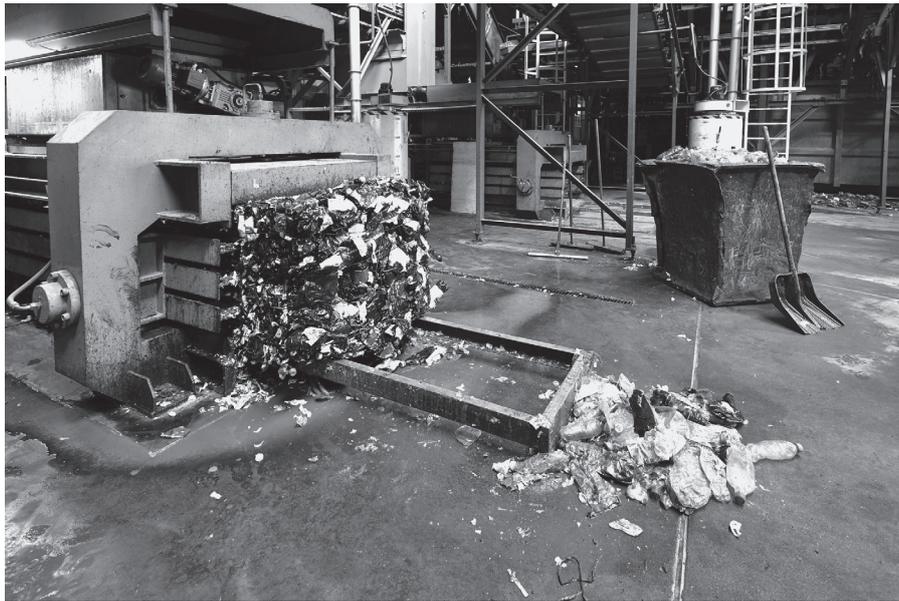
**You are advised to show your working out.**

Fraction = \_\_\_\_\_ [3]

[Turn over



7 (a) A hydraulic press is used to crush various items in a recycling plant.



A force of 3000 N causes the hydraulic press to exert a pressure of 2000 Pa. Calculate the area of the press and include the unit.

**You are advised to show your working out.**

Area = \_\_\_\_\_ [4]



(b) Farm vehicles are designed so that they do not sink into soft ground. Which of the following design features would help to ensure this?

Tick (✓) two boxes.

Keep the weight small

Keep the weight large

Keep the area of tyres small

Keep the area of tyres large

Keep the centre of gravity low

Keep the centre of gravity high

[2]

[Turn over



- 8 (i) A workman carries a bag of stones of weight 22 N to the top of a staircase of height 350 cm.

Calculate the work done on the stones.

**You are advised to show your working out.**

Work done = \_\_\_\_\_ J [4]

- (ii) On another occasion 480 J of work was done on a different bag of stones. It took one minute to do this work. Calculate the power produced in lifting the stones. Remember to include the unit.

**You are advised to show your working out.**

Power = \_\_\_\_\_ [5]



- 9 (a) The mass of a piece of jewellery is 420 g and its density is  $10.5 \text{ g/cm}^3$ . The jewellery is totally immersed in a measuring cylinder containing  $45 \text{ cm}^3$  of water. Calculate the new reading on the measuring cylinder.

You are advised to show your working out.

New reading = \_\_\_\_\_  $\text{cm}^3$  [4]

- (b) Water, oxygen and gold have different densities. Write the materials in the boxes below in order of increasing density.

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Increasing density

[1]

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**THIS IS THE END OF THE QUESTION PAPER**

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Question Number	Marks
1	
2	
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8	
9	
<b>Total Marks</b>	

Examiner Number

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