



Additional Assessment Materials  
Summer 2021

Pearson Edexcel GCSE in Physics (1PH0)  
Higher

Resource Set Topic B – Test 1: Energy and  
Forces doing work, Forces, and their effects

Questions

(Public release version)

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## General guidance to Additional Assessment Materials for use in 2021

### Context

- Additional Assessment Materials are being produced for GCSE, AS and A levels (with the exception of Art and Design).
- The Additional Assessment Materials presented in this booklet are an **optional** part of the range of evidence teachers may use when deciding on a candidate's grade.
- 2021 Additional Assessment Materials have been drawn from previous examination materials, namely past papers.
- Additional Assessment Materials have come from past papers both published (those materials available publicly) and unpublished (those currently under padlock to our centres) presented in a different format to allow teachers to adapt them for use with candidate.

### Purpose

- The purpose of this resource to provide qualification-specific sets/groups of questions covering the knowledge, skills and understanding relevant to this Pearson qualification.
- This document should be used in conjunction with the mapping guidance which will map content and/or skills covered within each set of questions.
- These materials are only intended to support the summer 2021 series.

7 (a) Which of these is a non-renewable source of energy?

(1)

- A geothermal
- B natural gas
- C tidal
- D solar

(b) Explain why renewable sources provide an increasing fraction of the electricity supply for many countries.

(2)

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(2)

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(c) Electricity can be generated using a water turbine.

(i) Water gains kinetic energy by falling from the top of a dam.

Calculate the minimum height that 7.0 kg of water must fall to gain 1300 J of kinetic energy.

(3)

minimum height = ..... m

(ii) As water enters the turbine at the bottom of the dam, the kinetic energy of 8.0 kg of moving water is 1100 J.

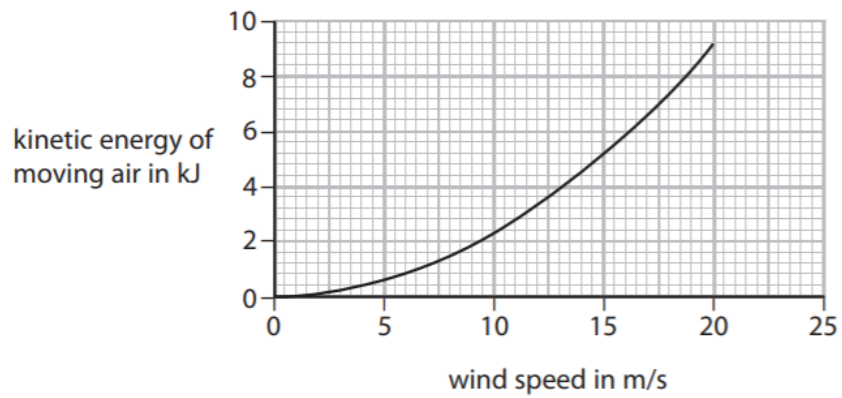
Calculate the speed of the moving water as it enters the turbine.

(3)

speed = ..... m/s

(d) Moving air can be used to generate electricity using a wind turbine.

Figure 8 is a graph of kinetic energy against wind speed for a mass of moving air.



**Figure 8**

Just before the air reaches a wind turbine it has a wind speed of 15 m/s.

When the air has gone through the turbine it has a wind speed of 13 m/s.

As the air moves through the turbine some of its kinetic energy is transferred to the turbine.

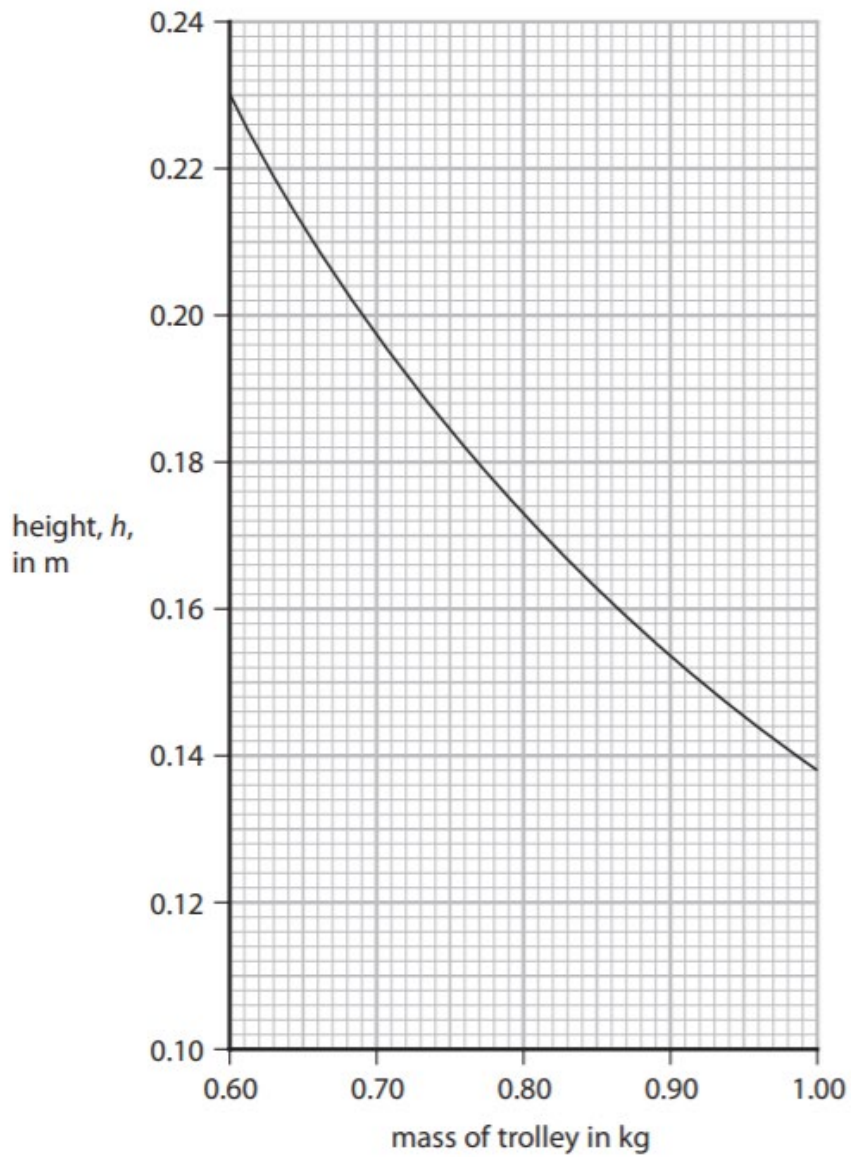
Use the graph to determine the percentage of the kinetic energy transferred to the turbine from the air.

(3)

percentage of kinetic energy transferred from the air = ..... %



(b) Figure 6 is a graph of the student's results.



**Figure 6**

The student states that the energy transferred by the spring is the same each time it is used.

Use data from any two points on the graph in Figure 6 to support this statement.

(3)

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(c) Describe how the student could extend the investigation to determine the average speed of the trolley as it rolls back down the track.

(3)

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- 2 A student lifts a toy car from a bench and places the toy car at the top of a slope as shown in Figure 2.

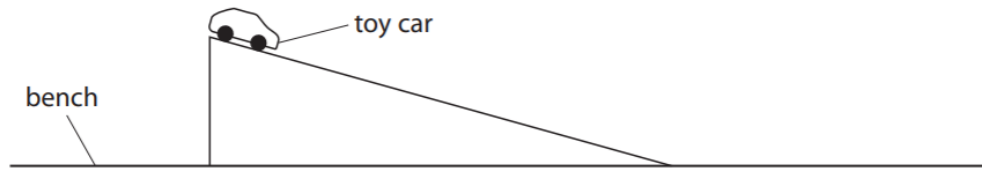


Figure 2

- (a) Describe an energy transfer that occurs when the student lifts the toy car from the bench and places the toy car at the top of the slope.

(2)

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- (b) The student lets the toy car roll down the slope.

Describe how the student could find, by experiment, the speed of the toy car at the bottom of the slope.

(4)

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- (c) The student needs to develop the experiment to determine the loss in potential energy and the gain in kinetic energy as the toy car is rolling down the slope.

State the other measurements the student must make.

(2)

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- (d) When the toy car rolls down the slope, some energy is transferred to the surroundings as thermal energy.

State how the student could calculate the amount of energy transferred to the surroundings.

(1)

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- 8 (a) A kettle is used to heat water.

Figure 11 shows a graph of temperature against time for the water in the kettle.

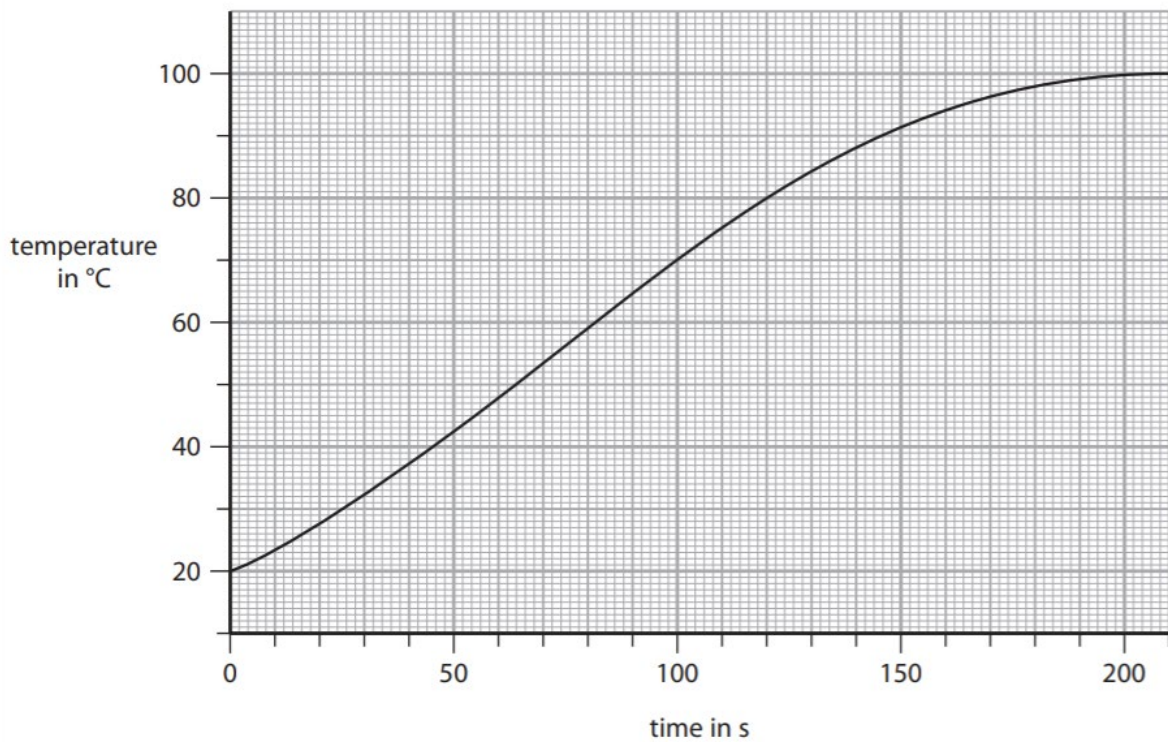


Figure 11

Calculate the rate of increase in temperature at a time of 150 s, by drawing a tangent to the curve in Figure 11 at a time of 150 s.

(3)

..... °C/s

- (b) The kettle has an efficiency of 91% in supplying energy to the water.  
The thermal energy of the water increases by  $3.3 \times 10^5$  J in 200 s.

Calculate the total amount of energy supplied to the kettle in the 200 s.

Use the equation

$$\text{efficiency} = \frac{\text{(useful energy transferred by the device)}}{\text{(total energy supplied to the device)}}$$

(2)

total amount of energy supplied = ..... J

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**TOTAL FOR PAPER IS 36 MARKS**