Pearson Edexcel

Additional Assessment Materials Summer 2021

Pearson Edexcel GCSE in Physics (1PH0) Foundation

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

Questions

(Public release version)

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Additional Assessment Materials, Summer 2021

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- Additional Assessment Materials have come from past papers both published (those materials available publicly) and unpublished (those currently under padlock to our centres) presented in a different format to allow teachers to adapt them for use with candidate.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.

4 (a) Figure 6 shows a spinning flywheel.

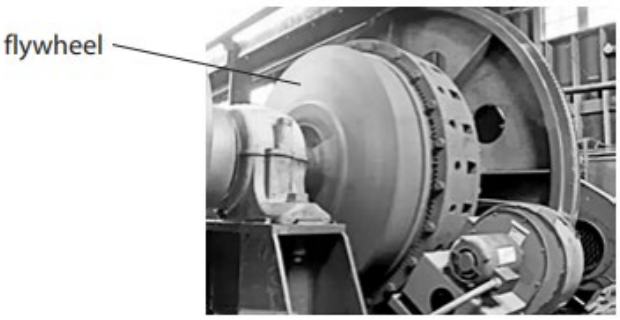

Figure 6

(i) State how energy is stored in a spinning flywheel.

(1)

.....

(ii) State **one** way to increase the amount of energy stored in the flywheel.

(1)

.....

(b) Figure 7 shows a skier going down a hill.

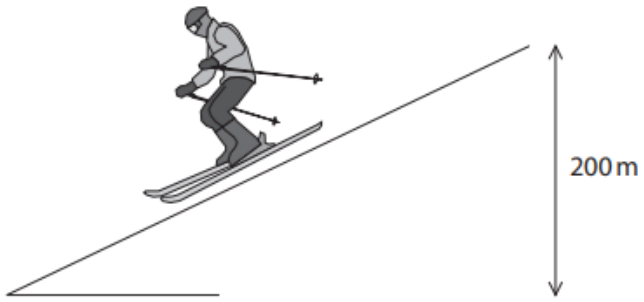

Figure 7

She descends through a vertical height of 200 m.

The skier's mass is 65 kg.

(i) Calculate the change in gravitational potential energy.

Use the equation

$$\Delta GPE = m \times g \times \Delta h$$

Take the gravitational field strength, g, as 10 N / kg.

(2)

change in gravitational potential energy = ... J

(ii) At the bottom of the slope her speed was 36 m/s.

Calculate her kinetic energy at the bottom of the slope.

Use the equation

$$KE = \frac{1}{2} \times m \times v^2$$

(3)

kinetic energy = ... J

(c) Describe how her speed at the bottom of the slope could be determined.

(3)

6 (a) State **two** non-renewable energy sources.

(2)

1 .....

2 .....

(b) Figure 9 shows the renewable energy sources used in the UK in 2015.

Figure 9 is to scale.

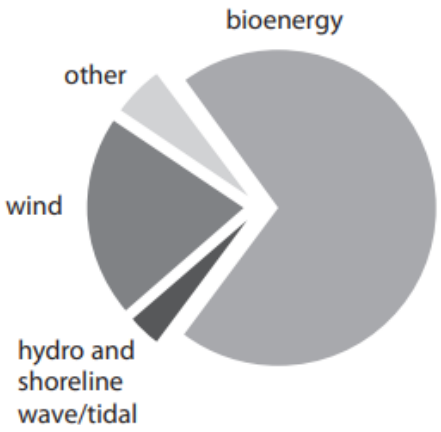

Figure 9

(i) State the energy source that gave the greatest amount of renewable energy for the UK in 2015.

(1)

.....

(ii) Justify your choice of energy source in part (i).

(1)

.....

.....

(iii) State which of these energy sources gave about 20% of the energy from renewable sources for the UK in 2015.

(1)

.....

(c) Figure 10 shows all the energy sources used in Canada in 2014 and a prediction for 2040.

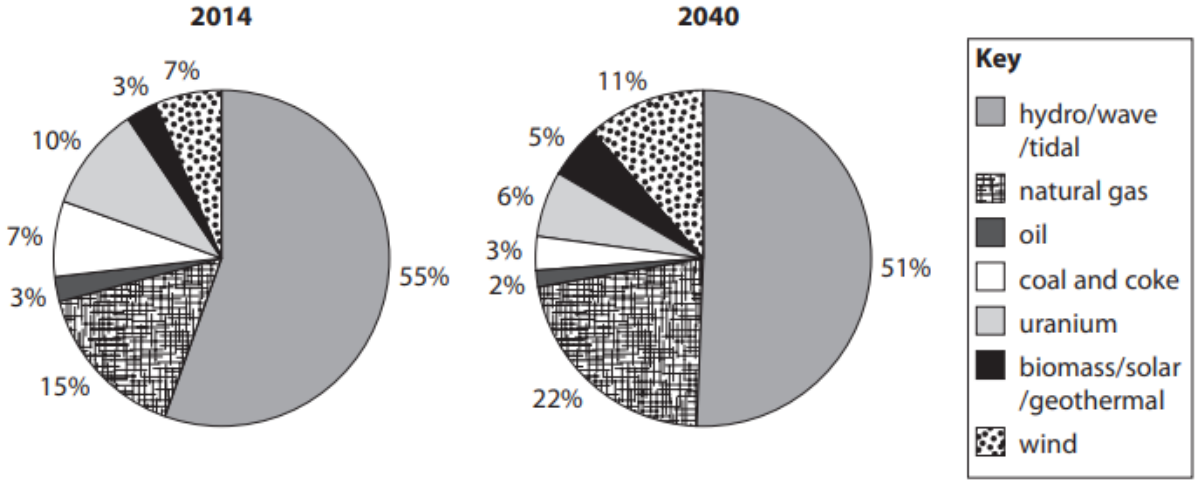

Figure 10

Discuss the effects on the environment of **two** predicted changes between 2014 and 2040.

(4)

change 1 .....

.....

effect on the environment .....

.....

change 2 .....

.....

effect on the environment .....

.....

(d) Figure 11 shows a wind turbine.

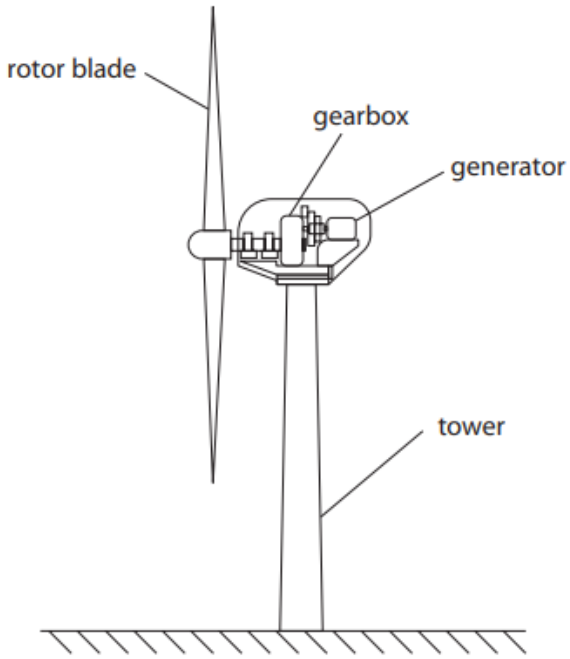

Figure 11

Explain how unwanted energy transfers could be reduced in the gear box.

(2)

2 (a) Figure 2 shows an energy transfer diagram for a steam engine.

The diagram shows the amounts of energy transferred each second by the steam engine.

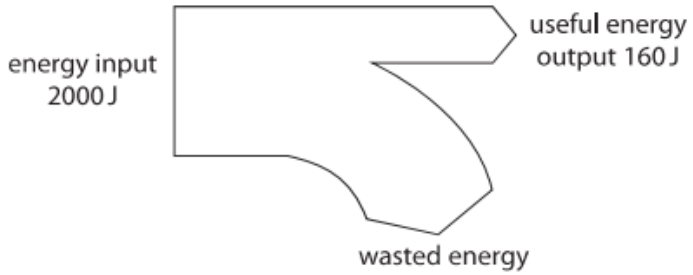

Figure 2

(i) Calculate the amount of wasted energy.

(1)

wasted energy = ... J

(ii) Calculate the efficiency of the steam engine.

Use the equation

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

(2)

efficiency = ...

(iii) State what happens to the wasted energy.

(1)

.....

.....

(iv) Coal is a fossil fuel that is burnt in some steam engines.

State **two** ways that the use of coal might be harmful to the environment.

(2)

1 .....

.....

2 .....

.....

(b) A model train has a mass of 8.0 kg.
It travels at a speed of 1.5 m/s.

Calculate the kinetic energy of the model train.

Use the equation

$$\text{kinetic energy} = \tfrac{1}{2} \times \text{mass} \times (\text{speed})^2$$

(3)

kinetic energy = ... J

8 A student lifts a toy car from a bench and places the toy car at the top of a slope as shown in Figure 16.

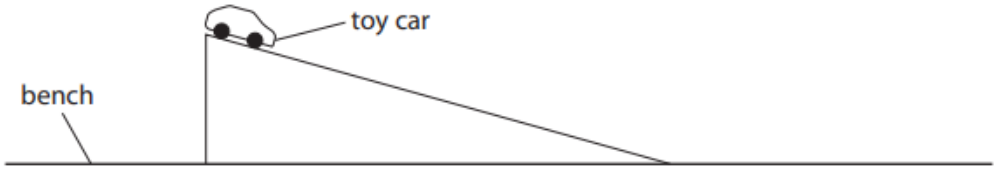

Figure 16

(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)

(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)

(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)

(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)

(e) Explain **one** way the student could reduce the amount of thermal energy transferred to the surroundings as the toy car rolls down the slope.

(2)

TOTAL FOR PAPER IS 41 MARKS