

Work and Power

Question paper 3

Level	IGCSE(9-1)
Subject	Physics
Exam Board	Edexcel IGCSE
Module	Single Award (Paper 2P)
Topic	Energy resources and energy transfers
Sub-Topic	Work and Power
Booklet	Question paper 3

Time Allowed: 54 minutes

Score: /45

Percentage: /100

Grade Boundaries:

A*	A	B	C	D	E	U
>85%	'75%	70%	60%	55%	50%	<50%

1 The table gives information about some ways to generate electrical power.

Type of power station	Maximum power output in MW	Time to reach maximum power	Relative fuel cost
wind farm	20	variable	none
gas turbine	600	15 minutes	medium
tidal scheme	6000	variable	none
nuclear power station	1200	2 days	low
coal-fired power station	1800	3 hours	high

An electricity supply company has enough power stations to cover the normal demand for electricity but not enough for cold conditions.

On cold days the demand for electrical power can suddenly increase by 20 000 MW.

The company needs to build new power stations to meet this increased demand.

- 2 An electric kettle is connected to the 230 V mains supply.
The power of the kettle is 960 W.



(a) (i) A power of 960 watts is the same as (1)

- A 960 joules per coulomb
- B 960 joules per second
- C 960 newtons per metre
- D 960 newtons per second

(ii) State the equation linking power, current and voltage. (1)

(iii) Show that the current in the kettle is about 4 A. (2)

(b) The 960 W kettle is earthed and fitted with a fuse.

(i) Explain how this can protect the person using the kettle if there is a fault.

(3)

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(ii) Another kettle has twice as much power.

It is connected to the same mains supply.

Which of these fuse ratings should be used for this kettle?

(1)

- A** 1 A
- B** 3 A
- C** 5 A
- D** 13 A

(c) A student has a pack of fuses labelled 2 A.

Explain how she could use one of these fuses to check that the label is correct.

You may draw a circuit diagram to help your answer.

(3)

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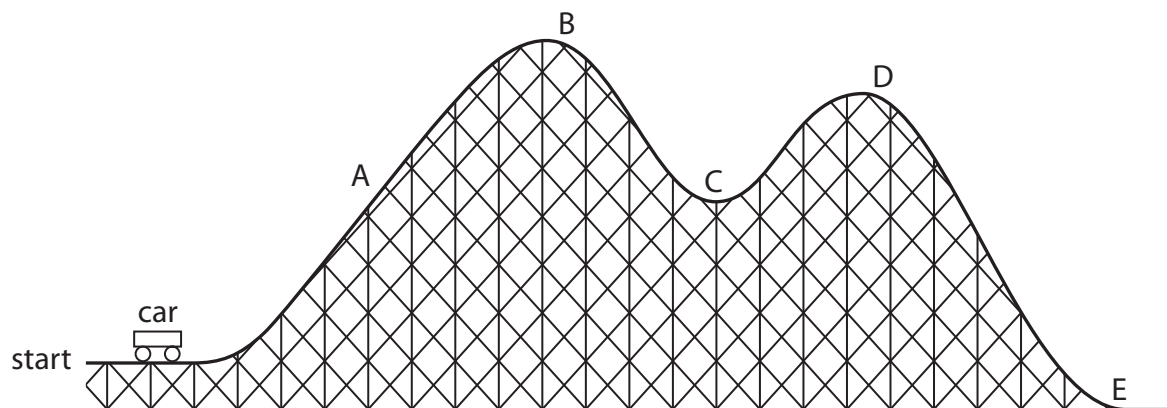
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(Total for Question 2 = 11 marks)

3 The diagram shows a roller-coaster ride.

The car is pulled slowly from the start to point B and then released.



(a) Choose letters from the diagram to complete this sentence.

(2)

The car has the most gravitational potential energy at point

and it goes fastest at point

(b) The mass of the car is 900 kg.

The maximum speed of the car is 15 m/s.

(i) State the relationship between momentum, mass and velocity.

(1)

(ii) Calculate the maximum momentum of the car.

Give the unit.

(3)

maximum momentum = unit

(iii) State the equation linking kinetic energy (KE), mass and speed.

(1)

(iv) Calculate the maximum KE of the car.

(2)

maximum KE = J

(Total for Question 3 = 9 marks)

4 An energy company plans to build a new power station.

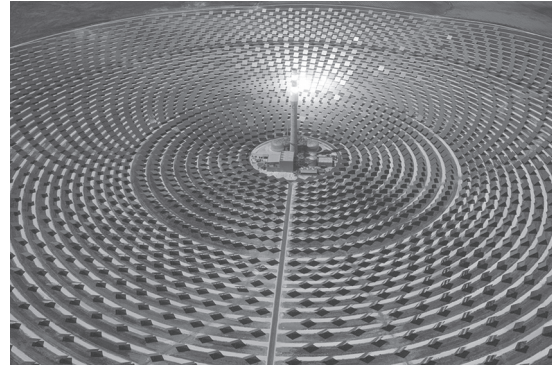
The company must decide between two renewable energy projects, a geothermal power station or a solar power station.

Geothermal power station



(Author: Gretar Ívarsson, geologist at Nesjavellir, 2006)

Solar power station



(Author: Torresol Energy, 2011)

Explain how the location and the climate might affect the type of power station that the company chooses.

(4)

location

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climate

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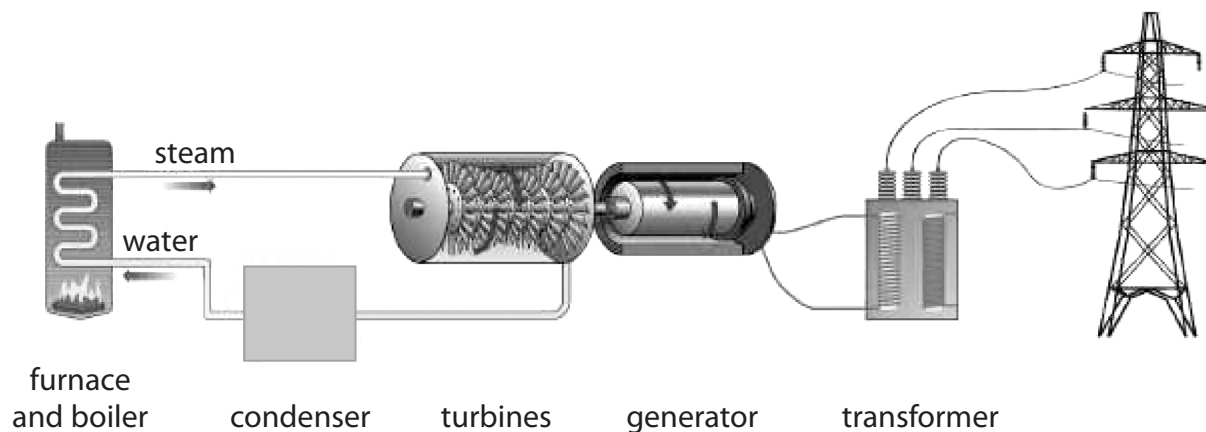
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(Total for Question 4 = 4 marks)

6 The diagram shows a coal-fired power station.



(a) (i) In which part of the power station is heat energy usefully converted to kinetic energy?

(1)

- A boiler
- B turbine
- C generator
- D wires

(ii) In which part of the power station is kinetic energy usefully converted to electrical energy?

(1)

- A boiler
- B turbine
- C generator
- D wires

