

# MARK SCHEME

# GCSE

## PHYSICS

## AQA - COMBINED SCIENCE

---

P1 - TEST 2

ENERGY

Beginner

## Mark schemes

1.

(a) wood

1

(b) **Advantage:**

Breaks in overhead power lines are easier to find than in underground cables.

1

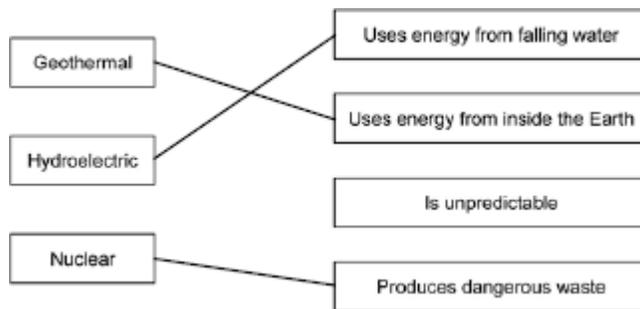
**Disadvantage:**

Overhead power lines are more dangerous than underground cables if they break.

1

[3]

2.



*allow 1 mark for each correct line*

*if more than one line goes from an energy source then all lines from that energy source are wrong*

[3]

3.

(a) 46 200

*accept 46 000*

*allow 1 mark for correct substitution*

*ie  $0.5 \times 4200 \times 22$  provided no subsequent step*

2

(b) Energy is used to heat the kettle.

1

[3]

4.

(a) any **one** from:

- starting temperature
- volume of beaker

*allow size / shape / material of beaker*

- surface area (of beaker)
- volume of water

*allow mass / amount of water*

- type of insulation.

1

- (b) the more layers of insulation the slower the temperature fell  
*accept the converse*  
*answer must be a comparison*  
*allow 'heat' for energy*  
*accept when more layers are added less energy is lost*

**or**

the more layers of insulation the smaller the temperature drop  
*accept the more layers (of insulaion) the slower the energy loss*

1

- (c) (i) point at 7 minutes for 5 layers of insulation circled

1

(ii) any **one** from:

- misread the thermometer
- took the temperature at the wrong time  
*human / recording error needs to be qualified*
- lifted the thermometer out of the water (when reading it)
- misplotted the point.

1

- (d) conduction

1

**[5]**

**5.**

- (a) the same as

1

- (b) 36 000 (J)

*allow correct substitution for 1 mark:  $E = 120 \times 300$  provided no subsequent step*

*Allow 1 mark for an answer of 600 (watt-minutes) or an answer of 10 (watt-hours).*

*If unit on answer line is crossed out and a correct unit is given with answer award 2 marks:*

*e.g. 600 watt-minutes*

*or*

*10 watt-hours*

2

- (c) kinetic

*correct order only*

1

light

1

**[5]**

<b>6.</b>	(a)	it would decrease the time	1
	(b)	720 (J)	
		<i>allow 1 mark for correct substitution ie 12 × 60 provided no subsequent step</i>	2
	(c)	decreases	1
		decreases	1
		decreases	1
		<i>more than one tick in any row negates the mark</i>	1
			<b>[6]</b>
<b>7.</b>	(a)	(i) electrical	
		<i>answers must be in the correct order</i>	1
		kinetic	1
		(ii) any <b>one</b> from:	
		• thermal (energy)	
		• sound (energy).	
		<i>allow "heat" (energy)</i>	1
		(iii) The wasted energy is transferred to the surroundings	1
	(b)	<i>advantage of A:</i>	
		<i>answers must be comparative</i>	1
		any <b>one</b> from:	
		• bigger wash load	
		• uses less energy	
		<i>allow uses less electricity</i>	
		• uses less water.	
		<i>disadvantage of A:</i>	
		higher cost (to buy)	1
			<b>[6]</b>
<b>8.</b>	(a)	(i) infrared radiation	1
		(ii) absorbed	1

- (b) France has more hours of sunlight (all year round)  
**or**  
 France has more hours of sunlight in every month of the year  
*accept the converse*  
*allow France is sunnier*

1

- (so) there will be more energy to heat the water  
**or**  
 (so) more energy can be absorbed / transferred  
*allow (so) more water can be heated*  
*allow 'heat' for energy*

1

- (c) 42 000 000  
*allow  $4.2 \times 10^7$*   
*allow for 1 mark correct substitution*  
*200 × 4200 × 50 provided no subsequent step shown*  
**or**  
 42 000

2

joules

*42 000 kJ = 3 marks*

1

[7]

9.

- (a) iron

1

hairdryer

1

kettle

1

*answers can be in any order*

- (b) (i) **Y**

1

- (ii) bar drawn with any height greater than **Y**  
*ignore width of bar*

1

- (c) (bigger volume) takes more time (to boil)  
*accept explanation using data from graph*

1

- (so) more energy transferred  
*do **not** accept electricity for energy*

1

(and) this costs more money

*ignore reference to cost of water*

*wasting more money because heating more water than needed is insufficient*

1

[8]

10.

(a) biofuel

1

geothermal

1

(b) it is predictable

1

(c) 2.8 MW

1

(d) any **two** from:

- visual pollution
- noise pollution
- dangerous to birds
- may lower house prices

2

(e) **Level 2:** Relevant points (reasons / causes) are identified, given in detail and logically linked to form a clear account.

3–4

**Level 1:** Points are identified and stated simply, but their relevance is not clear and there is no attempt at logical linking.

1–2

**No relevant content**

0

**Indicative content**

- less fossil fuel burnt
- more nuclear fuel used
- more renewables used
- gas remained the same
- less carbon dioxide released
- less greenhouse gases
- less global warming
- less acid rain
- less environmental pollution
- more hazardous waste produced (nuclear)
- the percentage generated by coal has decreased 8%
- the percentage generated by renewables has increased by 6%
- the percentage generated by nuclear has increased by 2%

[10]

11.

- (a) thermometer 1
- stopclock / stopwatch 1
- accept measuring cylinder*
- accept top pan balance*
- (b) independent: type of oil 1
- dependent: temperature rise in °C 1
- (c) wear safety goggles 1
- oil not heated directly 1
- accept any reasonable comment about not handling hot apparatus.*
- (d) repeat the experiment 1
- and calculate the mean temperature rise
- OR**
- heat the oil for a longer period of time (1)
- to get a wider range of temperatures (1)
- (e)  $(17 + 17 + 18) / 3 (= 17.33)$  1
- temperature rise = 17 (°C) 1
- accept 17 (°C) with no working shown for 2 marks*
- allow 17.33 with no working shown for 1 mark*
- (f)  $E = 0.025 \times 1800 \times 20$  (J) 1
- $E = 900$  (J) 1
- allow 900 without working shown for the 2 calculation marks*
- Joule 1

[13]