

# MARK SCHEME

# GCSE

## PHYSICS

## AQA - COMBINED SCIENCE

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P1 - TEST 1

ENERGY

Beginner

## Mark schemes

- 1.** (a) Mountainous region – falling water (hydroelectric) 1
- Coastal region – waves 1
- Volcanic region – geothermal 1
- River estuary – tides 1
- (b) boiler 1
- generator 1
- (c) decrease 1
- (d) any named biofuel eg wood, ethanol, straw 1
- [8]**
- 2.** (a) chemical 1
- electrical 1
- kinetic 1
- must be in correct order*
- (b) (i) 70(%) 1
- allow 0.7*
- allow  $\frac{7}{10}$  **or**  $\frac{70}{100}$*
- ignore units*
- (ii) increase 1
- [5]**
- 3.** (a) heat / thermal  
**or / and**  
sound 1
- do **not** accept noise*
- other forms of energy eg light negates answer*
- 1

- (b) 0.4  
or  
40 %

allow 1 mark for  $\frac{2000}{5000}$

or

equivalent fraction

an answer 0.4 % gains 1 mark

answers 0.4 or 40 given with any unit gains 1 mark

40 without % gains 1 mark

2

[3]

4.

- (a) fan

1

drill

1

washing machine

four circled including correct three scores 1 mark

five circled scores zero

1

- (b) Appliances only transfer part of the energy usefully

1

The energy transferred by appliances makes the surroundings warmer

1

[5]

5.

- (a) chemical

correct order only

1

kinetic

1

sound

1

- (b) 48% or 0.48

an answer of 0.48 with a unit gains 1 mark

an answer of 0.48% gains 1 mark

an answer of 48 with or without a unit gains 1 mark

2

[5]

6.

- (a) gravity

accept weight for gravity

air resistance is insufficient

1

(b) (i) 800

*allow 1 mark for correct substitution ie*

$$P = \frac{2240}{2.8}$$

*provided no subsequent step*

2

(ii) 2240 J

1

(c) (i) (vertical) height

*accept (height of) stairs*

1

(ii) a fast / short time (for a lighter student) may give the greatest power

*accept time is a factor*

**or**

a slow / long time (for a heavy student) may give the least power

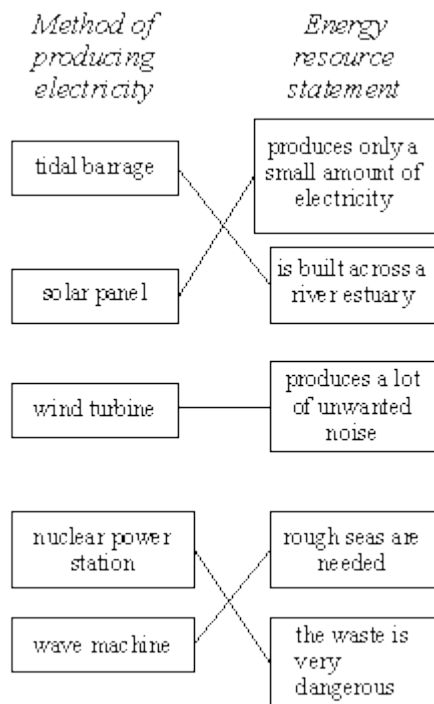
*fitness is insufficient*

1

[6]

7.

(a) (i) correct links shown



4

*1 link for 1 mark*

*2 links for 2 marks*

*3 links for 3 marks*

*4 links for 3 marks*

*5 links for 4 marks*

*do not credit if more than one link goes to or from any box*

(ii) nuclear (power station)  
*do not accept power station* 1

(b) (i) heat from the Sun 1

(ii) kinetic 1

(iii) insufficient wind (to turn turbine)  
*accept wind does not always blow*  
*do not allow it does not always work or it is switched off*  
*do not accept wind in wrong direction* 1

[8]

**8.** (a) add thermal insulation to the roof 1

replace the single-glazed windows with double-glazed windows 1

(b) 110 1

(c) the time taken increases 1

(d) **advantage of solar panel:**

cheap(er) to run / use (1)  
*ignore cheap / free unqualified*

(as) no energy / fuel cost (1)

**or**

no carbon dioxide emissions (1)  
*allow no greenhouse gases emitted*

(so) does not contribute to global warming **or** climate change (1)  
*allow description of effect of global warming*

**or**

renewable (1)

(as) sunlight is replenished (1)

**or**

conserves nuclear / fossil fuels (1)

(as) sunlight is renewable (1)

**or**

does not burn fossil fuels (1)

(so) no carbon dioxide emissions (1)

*allow no greenhouse gases emitted*

**Max 2 marks**

**disadvantage of solar panel:**

unreliable (1)

*allow water not always hot enough*

*allow it may not (always) work*

(as sun)light not available (1)

*allow not always sunny*

*allow as it might be cloudy / dark*

*ignore weather*

*ignore night unqualified*

*ignore no sun*

**or**

expensive (1)

due to high cost of manufacturing / installing solar panels (1)

**Max 2 marks**

**[8]**

**9.**

(a) (the) Sun

*ignore solar*

**1**

(b) (i) any **one** from:

- the energy is free
- renewable (energy source)
- can be used in remote areas
- no effect on the environment.

*allow no carbon dioxide produced*

*allow does not contribute to global warming*

*allow no pollution*

**1**

(ii) so that the street lamp works at night

*allow to store energy for use at night*

**1**

- (c) (i) 64 (W) 1
- (ii) point plotted at (0.4, 64)  
ecf from (i) 1
- straight line of best fit through given points  
allow a line of best fit drawn using the points already on the figure 1
- (iii) 0.25 m<sup>2</sup>  
allow 0.24-0.26 m<sup>2</sup>  
allow answers that are consistent with the candidate's line of best fit 1
- (iv) any **one** from:  
  - waste of raw materials
  - supporting post would need to be stronger. 1
- (d) any **one** from:  
  - more electricity can be generated  
accept (the manufacturer) could use a smaller solar cell  
allow the street light would be more reliable
  - wind turbine can generate electricity when it is dark.  
allow wind turbine would generate some of the electricity 1

[9]

10.

- (a)  $E_p = 50 \times 9.8 \times 4.0$  1
- $E_p = 1960$  (J)  
allow an answer rounded to 2000 (J) 1
- allow a maximum of 1 mark if  $g = 10$  N/kg is used  
an answer of 1960 scores 2 marks
- (b)  $E_k = 0.5 \times 50 \times 7^2$  1
- $E_k = 1225$  (J)  
allow 1200 or 1230 (J) 1
- an answer of 1225 scores 2 marks
- (c) some energy is wasted 1
- the g.p.e of the girl is not zero 1

(d) reduces the amount of friction

*do **not** accept reference to friction between the wheels and the ramp*

1

so more energy is usefully transferred

*allow less energy is wasted **or** less heating*

1

greater kinetic energy

1

[9]

11.

(a) **Using wind (advantage)**

any **one** from

can be used in remote locations

renewable

clean

*accept does not cause pollution to the air / land*

1

**Using wind (disadvantage)**

any **one** from

does not generate much (electrical) energy

many hundreds wind turbines would be needed

*accept many hundreds wind turbines would be needed **or** too much land would be needed for wind farms **or** wind energy is 'dilute'*

the wind is unreliable

*accept the wind does not blow all of the time **or** the wind is not always strong enough*

noise / visual pollution

*do **not** accept just the word pollution*

1

**Using coal (advantage)**

any **one** from

can generate electricity all of the time

*accept reliable electrical / energy supply*

generates a lot of (electrical) energy

1



**Using coal (disadvantage)**

any **one** from

pollution by carbon dioxide / greenhouse gas

*accept slow start-up time **or** production of ash **or** difficult to transport (coal) **or** there's not much coal left*

non renewable

pollution by sulphur dioxide acid rain

1

(b) all link lines correct

*accept one link line correct for one mark*

2

**[6]**