

MARK SCHEME

GCSE

PHYSICS

AQA - TRIPLE SCIENCE

P1 - TEST 2

ENERGY

Beginner

Mark schemes

- 1.** (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]**
- 2.** (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]**

3.	(a) (i) 24	<i>allow 1 mark for converting time to 600 seconds or showing method ie 14400/10 or $\frac{14400}{10 \times 60}$ provided no further steps shown</i>	2
	(ii) 24	<i>ignore any unit or their (a)(i)</i>	1
	(b) (i) 20 45	<i>both required – either order</i>	1
	(ii) the block transfers energy to the surroundings		1
			[5]
4.	(a) electrical		1
	chemical		1
	light		1
	(b) 25% or 0.25	<i>allow 1 mark for correct substitution, ie $50 \div 200$ provided no subsequent step shown or answers of 25 with a unit or 0.25 with a unit gain 1 mark answers of 25 without a unit or 0.25% gain 1 mark</i>	2
	(c) the information board can be used anywhere it is needed		1
			[6]

5.

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

- produces no (air / atmospheric) pollution
accept named pollutant eg CO₂
accept no harmful gases
accept produces no emissions
accept does not add to global warming
environmentally friendly is insufficient
- energy (source) is free
accept no fuel costs
accept the wind / it is free

1

(ii) any **one** from:

- waves
- tides
- falling water
accept hydroelectric
*do **not** accept water (flow)*
- solar
accept Sun / sunlight
accept solar panels / cells
- geothermal
- biofuel / biomass
accept a named biofuel

1

(b) (i) 3000 (kilowatts)

accept 3 megawatts / MW
accept 3 000 000 watts / W

1

(ii) (average) wind speed below 6 m/s

answers giving a wind speed greater than 3 but less than 6 m/s
gain both marks
allow 1 mark for calculating the output as 500 kW (maximum)
and
allow 1 mark for wind speed too low or wind not strong enough
*do **not** accept wind above 25 m/s*
*do **not** accept the turbines are frozen*

2

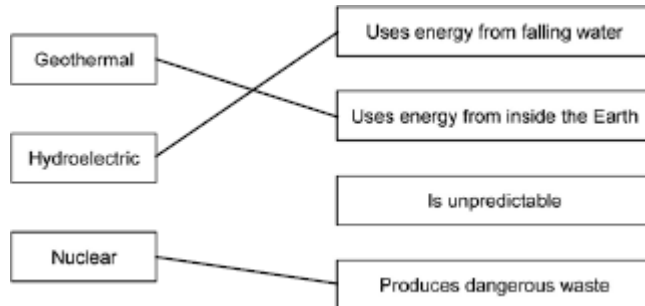
- (iii) A small amount of nuclear fuel generates a large amount of electricity.
both required

Nuclear power stations do not depend on the weather to generate electricity.

1

[6]

6.



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]

7.

- (a) (i) temperature (increase) and time switched on are directly proportional
accept the idea of equal increases in time giving equal increases in temperature

answers such as:

- *as time increases, temperature increases*
- *positive correlation*
- *linear relationship*
- *temperature and time are proportional*

score 1 mark

2

- (ii) any **one** from:

"it" refers to the metal block

- energy transfer (from the block) to the surroundings
accept lost for transfer
accept air for surroundings
- (some) energy used to warm the heater / thermometer (itself)
accept takes time for heater to warm up
- (metal) block is not insulated

1

- (iii) 15 000

allow 1 mark for correct substitution, ie 50×300 provided no subsequent step shown

2

(b) lead

reason only scores if lead is chosen

1

needs least energy to raise temperature by 1°C

accept needs less energy to heat it (by the same amount)

lowest specific heat capacity is insufficient

1

[7]

8.

(a) potential

1

(b) (i) 13 200

allow 1 mark for correct substitution, ie 660×20 provided no subsequent step shown

2

(ii) 16.5

allow 1 mark for correct

or

their (b)(i) correctly calculated
 $\frac{\quad}{800}$

substitution, ie $\frac{13\,200}{800}$ or $\frac{\text{their (b)(i)}}{800}$

provided no subsequent step shown

2

[5]

9.

(a) (i) changing the distance may / will affect / change the voltmeter reading

accept so only one independent variable

accept distance affects speed of wind (turbine)

accept it is a control variable

accept to give valid results

fair test is insufficient

to make the results accurate is insufficient

1

(ii) any sensible practical suggestions, eg

- so fan reaches a steady / full speed

accept power for speed

- so wind (turbine) reaches a steady / full speed

- so voltmeter reaches / gives a steady reading

accept accurate or valid reading a correct reading is insufficient

*do **not** accept precise reading*

1

(iii) as the number of blades increases so does the (voltmeter) reading / output / voltage

number of blades affects the reading / output is insufficient

1

further relevant detail, eg

- voltmeter increase is greatest up to 3 blades
- voltmeter reading hardly changes with 4, 5 or 6 blades
accept does not change between 4 and 6 blades
- increase is directly proportional up to 3 blades
- it reaches a limit
accept does not change after 4 / 5 blades
- a numerical example giving two pairs of numbers, eg 2 blades = 0.6V, 4 blades = 1V

1

(b) C

reason scores only if C is chosen

1

wind speed / strength varies

*accept wind is **not** constant / reliable*

1

[6]

10.

(a) (i) electrical

correct order only

1

kinetic

1

sound

1

(ii) transferred into surroundings / atmosphere

accept warms the surroundings

allow released into the environment

becomes heat or sound is insufficient

1

(b) 0.7 / 70 %

*an answer of 70 without % or with the wrong unit **or** 0.7 with a unit gains 1 mark*

2

[6]

11.

(a) 20 790 (J)

an answer of 21 000 (J) (2 s.f.) gains 2 marks

allow 1 mark for correct

substitution:

ie $E = 0.33 \times 4200 \times 15$ provided no subsequent step shown

2

(b) temperature

1

(c) (top pan) balance

accept scales

*do **not** accept a scale*

*do **not** accept weighing scales*

*do **not** accept newtonmeter*

*do **not** accept spring balance*

1

(d) dark / black / (dark) grey

1

convection

correct order only

1

(e) (i) created

accept made

1

(ii) increases

1

[8]