

Energy Transfers

Mark Scheme 1

Level	GCSE (9-1)
Subject	Combined Science: Trilogy - Physics
Exam Board	AQA
Topic	6.2 Electricity
Sub-Topic	Energy Transfers
Difficulty Level	Bronze Level
Booklet	Mark Scheme 1

Time Allowed: 60 minutes

Score: /59

Percentage: /100

Grade Boundaries:

M1.(a)	230 V	1
(b)	Earth <i>must be in the correct order</i>	1
	Neutral	1
(c)	It is easy to identify each wire.	1
(d)	current <i>must be in the correct order</i>	1
	shock	1
(e)	50 Hz	1
(f)	output = 25×16	1
	400 (kV)	1

allow 400 (kV) with no working shown for 2 marks

- (g) It reduces the energy lost due to heating 1
- (h) It is safer for consumers 1
- [11]**

M2.(a) solid 1

(b) decreased
correct order only 1

decreased 1

increased 1

(c) (i) A
reason only scores if A chosen 1

uses least / less energy (in 1 year)
a comparison is required
accept uses least power
accept uses least kWh 1

(ii) greater the volume the greater the energy it uses (in 1 year) 1

- (iii) a very small number sampled
accept only tested 3
accept insufficient evidence / data
allow not all fridges have the same efficiency **or** a correct description implying different efficiencies
only tested each fridge once is insufficient
there are lots of different makes is insufficient

1

[8]

- M3.(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]

M4.(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]

M5.(a) £16.50

allow 1 mark for correct substitution ie 110×15

an answer of 1650 gains **both** marks

an answer of 43.80 gains **both** marks

allow 1 mark for 292×15

2

(b) 292

allow 1 mark for correctly using the reading 53490 ie $53782 - 53490$

accept £43.80 for both marks

2

[4]

M6. (a) (i) TV

1

(ii) hairdryer and sandwich toaster

both required either order but no others

1

(b) (i) 1.2

allow 1 mark for correct substitution

ie 0.4×3 provided that no subsequent step is shown

2

(ii) 18

accept £0.18 for both marks

or

their (b)(i) $\times 15$ correctly calculated

an answer 0.18 scores 1 mark

allow 1 mark for correct substitution

ie 1.2 or their (b)(i) $\times 15$ provided that no subsequent step is shown

2

[6]

M7. (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]

M8.	(a)	(i)	A	1
		(ii)	bar drawn with correct height <i>ignore width of bar</i>	1
	(b)	(i)	$E = P \times t$ 2.4 <i>allow 1 mark for correct substitution ie 1.2×2 provided no subsequent step shown</i>	2
		(ii)	36 or their (b)(i) $\times 15$ correctly calculated or their (b)(i) $\times 0.15$ correctly calculated with an answer given in £ <i>allow 1 mark for correct substitution ie 2.4×15 or their (b)(i) $\times 15$ allow 1 mark for correct substitution provided no subsequent step shown an answer £0.36 gains both marks</i>	2

[6]