Name of the Student:_____
Max. Marks : 19 Marks **Time : 19 Minutes**

Mark Schemes

Q1.

(a) The energy transferred each second to the bulb.

1

(b) power = potential difference × current
or

P = VI

1

(c)

*an answer of 0.17 (A) scores **3** marks*

40 = I × 230

1

$$I = \frac{40}{230}$$

1

I = 0.17 (A)

*a correct answer that rounds to 0.17 (A) scores **3** marks*

1

(d)

$$\text{efficiency} = \frac{\text{useful power output}}{\text{total power input}}$$

1

(e)

*an answer of 2.7 (W) scores **3** marks*

$$0.30 = \frac{\text{useful power output}}{9.0}$$

1

useful power output = 0.30 × 9.0

1

useful power output = 2.7 (W)

1

(f) bulbs also transfer thermal energy

allow light bulbs emit infrared radiation as well as visible light
ignore so people know how bright the bulb is

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1

the efficiency of the light bulb also needs to be considered

allow the cost to power the light bulb depends on the efficiency

allow to see how much energy is wasted

1

[11]

Q2.

(a) **Level 3:** The design/plan would lead to the production of a valid outcome. All key steps are identified and logically sequenced.

5–6

Level 2: The design/plan would not necessarily lead to a valid outcome. Most steps are identified, but the plan is not fully logically sequenced.

3–4

Level 1: The design/plan would not lead to a valid outcome. Some relevant steps are identified, but links are not made clear.

1–2

No relevant content

0

Indicative content

- Wrap N layers of newspaper around the metal can
- Heated water in a kettle
  or
  Using a Bunsen burner
- Put hot water in the metal can
- Use a measuring cylinder to measure the volume of water
- Measure initial and final temperature with the digital thermometer
- Use a stopclock / stopwatch to measure a time of 5 minutes
- Calculate temperature decrease
- Repeat with different number of layers of newspaper
- Repeat with no layers of newspaper
- Use same initial temperature of hot water
- Use same volume of water each time

Level 3: Workable method which includes changing the number of layers and includes at least one control variable (same volume of water or same starting temperature)

(b) the digital thermometer and the datalogger have the same resolution

allow both measure to 1 d.p.

ignore accuracy

ignore precision

they give the same result is insufficient

1

only need to measure the start and end temperature
or
only need 2 readings
or
only need to calculate the temperature change

1

[8]

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