Name of the Student:_____
Max. Marks : 17 Marks **Time : 17 Minutes**

Mark Schemes

Q1.

(a) increase

must be in this order

1

decrease

1

(b) $P = I^2R$

1

(c) $1.60 \times 10^9 = 2000^2 \times R$

1

$$R = \frac{1.60 \times 10^9}{2000^2}$$

1

$R = 400\ (\Omega)$

1

(d) $$\text{efficiency} = \frac{\text{useful energy output}}{\text{total energy input}}$$

or

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

1

(e) $$0.992 = \frac{\text{useful energy output}}{34.2}$$

1

useful energy output = 0.992 × 34.2

1

useful energy output = 33.9 (GJ)

allow a correct answer given to more than 3 s.f.

1

[10]

Q2.

(a) so the thermometer temperature was the same as the temperature of the iron block

1

(b) $\Delta\theta = (54 - 28) = 26$ (°C)

1

$26\,000 = 2.0 \times c \times 26$

allow a correct substitution using an incorrect value of Δθ obtained from the graph

1

$$c = \frac{26\,000}{2.0 \times 26}$$

allow a correct rearrangement using an incorrect value of Δθ obtained from the graph

1

$c = 500$ (J/kg °C)

allow an answer consistent with their value of Δθ obtained from the graph

1

(c) the calculated specific heat capacity will be more accurate

1

the iron block will transfer thermal energy to the surroundings at a lower rate

1

[7]