Name of the Student:_____
Max. Marks : 24 Marks **Time : 24 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.

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(a) polarity of the potential difference doesn't change

allow direction of the potential difference doesn't change

1

(b) $E = QV$

1

(c) $5010 = Q \times 12$

1

$$Q = \frac{5010}{12}$$

1

$Q = 417.5$ (C)

allow 418 (C)

1

(d) $5010 = 0.015 \times L$

1

$$L = \frac{5010}{0.015}$$

1

$L = 334\,000$ (J/kg)

1

(e) **Level 3:** Relevant points (reasons / causes) are identified, given in detail and logically linked to form a clear account.

5-6

Level 2: Relevant points (reasons / causes) are identified, and there are attempts at logical linking. The resulting account is not fully clear.

3-4

Level 1: Points are identified and stated simply, but their relevance is not clear and there is no attempt at logical linking.

1-2

No relevant content

0

Indicative content

- particles in a solid are in a regular pattern
- particles in a liquid are in a random arrangement

- particles in a solid are vibrating about fixed positions
- particles in a liquid are moving freely

- as the ice changes to water the temperature remains constant
- because as the ice changes to water the potential energy of the particles increases

- as the water warms the particles move faster
- so the kinetic energy of the particles increases

- internal energy is the total kinetic and potential energy of all the particles

ignore any references to density of ice vs liquid water
ignore any references to spacing of particles

[14]

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