Name of the Student:_____
Max. Marks : 20 Marks **Time : 20 Minutes**

Mark Schemes

Q1.

(a) (i) radiation

1

(ii) traps (small pockets of) air
*do **not** accept it's an insulator*
*do **not** accept reduces conduction and / or convection*
*do **not** allow it doesn't allow heat to escape*

1

(b) (i) bigger temperature difference (between the water and surroundings) at the start (than at the end)
*do **not** accept water is hotter*

1

(ii) starting temperature (of the water)
accept thickness of fleece
*do **not** accept same amount of fleece*
*do **not** accept thermometer / can*
*do **not** accept time is the same*

1

(iii) 18 (°C)
correct answer only

1

(iv) **M**

1

smallest temperature drop (after 20 mins)
*cannot score if **M** is not chosen*
accept it's the best insulator
accept smallest loss in heat
accept keeps heat / warmth in for longer

1

[7]

Q2.

(a) transferred to surroundings / surrounding molecules / atmosphere
'it escapes' is insufficient
or
becomes dissipated / spread out

accept warms the surroundings
accept degraded / diluted
accept a correct description for surroundings eg to the washing machine
*do **not** accept transformed into heat on its own*

1

(b) a smaller <u>proportion / percentage</u> of the energy supplied is wasted

owtte
*accept a statement such as 'less energy is wasted' for **1** mark*
*do **not** accept costs less to run*
ignore references to uses less energy

2

(c) (i) 2.4 (p)

accept 2 p if it is clear from the working out this is rounded from 2.4 p
*allow **1** mark for correct substitution of correct values*
ie 0.2 × 12
*allow **1** mark for calculating cost at 40 °C (13.2 p)*
or
cost at 30 °C (10.8 p)

2

(ii) any **one** from:

- less electricity needed
  ignore answers in terms of the washing machine releasing less energy
  an answer in terms of the washing machine releasing CO_2 negates the mark
  *do **not** accept less energy is produced*
- fewer power stations needed
- less fuel is <u>burned</u>
  accept a correctly named fuel
  *do **not** accept less fuel is needed*

1

[6]

Q3.

(a) (i) 2.1

correct answer only

1

(ii) 3.15
or
their (a)(i) × 1.5 correctly calculated

*allow **1** mark for correct substitution*
ie 2.1 × 1.5
or
their (a)(i) × 1.5

2

kilowatt-hour

accept kWh

or

*a substitution 2100 × 5400 scores **1** mark*

*2100 × 5400 incorrectly calculated with answer in joules scores **2** marks*

*an answer of 11 340 000 scores **2** marks*

*an answer of 11 340 000 J scores **3** marks*

1

(iii) most (input) energy is usefully transformed

accept does not waste a lot of energy

accept most of the output / energy is useful

*do **not** accept it does not waste energy*

1

(b) the room is losing energy / heat

1

at the same rate as the heater supplies it

this mark only scores if the first is scored

*do **not** accept heater reaches same temperature as room / surroundings*

rate of heat gain = rate of heat loss scores both marks

1

[7]