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

Mark Schemes

## Q1.

(a) conduction

*do **not** accept conductor*

**1**

(b) the freezer

*both parts needed*

greater <u>temperature</u> difference (between freezer and room)

*do **not** accept because it is the coldest*

**1**

(c) any **two** from:

- poor absorber of heat / radiation

  *accept does not absorb heat poor emitter of heat / radiation is neutral*

- reflects heat / radiation (from room away from fridge-freezer)

- reduces heat transfer <u>into</u> the fridge-freezer

- reduces power consumption of fridge-freezer

  *do **not** accept it is a bad conductor / good insulator*

**2**

**[4]**

## Q2.

(a) four calculations correctly shown

*200 × 10 – 1800 = £200*
*100 × 10 – 2400 = –£1400*
*50 × 10 – 600 = –£100*
*20 × 10 – 75 = 125*

*accept four final answers only **or** obvious rejection of solar water heater and underfloor heating, with other two calculations completed*
*any 1 complete calculation correctly shown **or** showing each saving × 10 of all four calculations = 1 mark*
*answers in terms of savings as a percentage of installation cost **may** score savings mark only*

**2**

hot water boiler

*correct answers only*

**1**

(b) less electricity / energy to be generated / needed from power stations

*accept less demand*

**1**

reduction in (fossil) fuels being burnt

*accept correctly named fuel*

*accept answer in terms of:*
*fewer light bulbs required because they last longer (1 mark)*
*less energy used / fuels burnt in production / transport etc. (1 mark)*

*ignore reference to $CO_2$ or global warming*

*ignore reference to conservation of energy*

**1**

**[5]**

## Q3.

(a) (i) £190

*nb mention idea of cost per J in £ will come to an approx figure full credit given*

*allow **1** mark for showing that the energy loss through the roof is ¼ of the total energy loss ie 150 / 600*

**2**

(ii) £142.50

*allow ecf 50 % of their (a)(i) × 1.5 ie their (a)(i) × 0.75*

**1**

(b) transferred to surroundings / atmosphere

**or** becomes spread out

**1**

**[4]**

## Q4.

(a) ions / electrons gain (kinetic) energy

*accept atom / particles / molecules for ion*
*accept ions vibrate faster*
*accept ions vibrate with a bigger amplitude*
*accept ions vibrate more*
*do not accept ions move faster*

**1**

(free) electrons transfer energy by collision with ions
**or** energy transferred by collisions between vibrating ions

**1**

(b) move faster or take up more space

*do **not** accept start to move / vibrate*

**1**

(warmer) water expands **or** becomes less dense (than cooler water)

*do **not** accept answers in terms of particles expanding*

**1**

warm water rises (through colder water) **or** colder water falls to take its place

**1**

(c) transfer of energy by waves / infrared (radiation)

*accept rays for waves*

*do **not** accept transfer of energy by electromagnetic waves*

*ignore reference to heat*

**1**

**[6]**