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

Mark Schemes

## Q1.

(a) £15

*allow **1** mark for use of 125 (kWh)*
*allow **1** mark for an answer 1500*
*allow **both** marks for 1500 pence / p*
*allow **1** mark for correct calculation of annual cost for either freezer (£27 and £42)*

**2**

(b) £45

**or** their (a) × 3

*allow **1** mark for correct use of 3*
*allow **1** mark for 12 – 9 = 3*

**2**

(c) any **two** from:

*the marks are for the explanation*

yes **plus** explanation

- less electricity / energy needed / used
  *accept less energy wasted*
- less (fossil) fuels burned
  *accept a named fossil fuel*
  *do **not** accept conserving (fossil) fuels*
- less polluting gases emitted
  *accept a named polluting gas / greenhouse gases / carbon emissions / reduce global warming*
  *accept an answer in terms of nuclear fuel*
  *eg less nuclear fuel required (1)*
  *less nuclear waste (1)*

**2**

**or** no **plus** explanation

- old freezer must be disposed of
- hazardous chemicals inside freezer
  *accept CFC gases*

- *(*lot of*)* energy used in producing new freezer

**[6]**

## Q2.

(a) (i) makes it warmer / raises the temperature

*accept produces convection (current)*

*accept makes it less dense*

**1**

(ii) reduced **or** slows down

**1**

(b) (i) electrical energy (to run the pump) must be paid for

*accept electricity for electrical energy*

*accept electricity is needed for the pump*

*accept it uses electricity*

*accept because of the pump*

**1**

(ii) more useful (heat) energy is transferred into the house than the energy used to operate the pump

**or** reduced cost of heating the house is greater than the cost of running the (electrical) pump

**or** costs little to run compared to the savings made

*accept for **1** mark*

*reduces energy bills*

***or** reduced fuel costs / heating costs owtte*

*do **not** accept it's cheap*

**2**

**[5]**

## Q3.

(a) (i) as a source of thermal <u>radiation</u>

*accept heat for thermal radiation*

*accept to act as the Sun*

*do **not** accept sunlight alone*

**1**

(ii) any **one** from:

- volume of water

  *accept amount for volume*
- distance between lamp and boiling tube
- initial / starting temperature of water
- same room temperature

  *do **not** accept time or same insulation material*

**1**

(iii) any **one** from:

- greater sensitivity / precision
  *do **not** accept more reliable (negates mark)*
- could link to a computer for (automatic) data analysis
- could take more frequent readings
- reduces instrument reading error
  *accept more accurate*
  *do **not** accept easier to use on its own*

**1**

(b) (i) acts as a control
*accept to be able to make a comparison*
*accept to see the difference*
*do **not** accept 'to make it a fair test' OWTTE on its own*

**1**

(ii) (plastic) foam and aluminium foil

**1**

(iii) (aluminium) foil is a poor absorber of thermal radiation
*accept heat / infra red for thermal radiation*

**1**

**or** (aluminium) foil is a (good) reflector of thermal radiation
*do **not** accept 'reflects sunlight' on its own*

(plastic) foam traps air which is a (good) insulator
*accept (plastic) foam is a poor conductor / (good) insulator*
*do **not** accept 'the material' is a good insulator / poor conductor*

**1**

(c) particles vibrate with a bigger / stronger amplitude / faster / with more (kinetic) energy
*accept particles vibrate more*
*do **not** accept start to vibrate only*

**1**

energy transferred by collisions with other particles
*do **not** accept answers in terms of free/mobile electrons*

**1**

**[9]**