**Name of the Student**:_____
**Max. Marks : 23 Marks** **Time : 23 Minutes**

Mark Schemes

## Q1.

(a) conduction

**1**

(b) (i) there is a bigger temperature difference between the water and the surrounding air

*accept the water is hottest / hotter*

**1**

so the transfer of energy (from hot water) is faster

*accept heat for energy*
*ignore temperature falls the fastest*

**1**

(ii) 120

*allow **1** mark for converting kJ to J correctly, ie 4 032 000*

**or**

correctly calculating temperature fall as 8°C

**or**

allow **2** marks for correct substitution, ie 4 032 000 = m × 4200 × 8

answers of 0.12, 19.2 **or** 16.6 gain **2** marks

answers of 0.019 **or** 0.017 gain **1** mark

**3**

(iii) water stays hot for longer

**1**

so heater is on for less time

*accept so less energy needed to heat water*

**1**

so cost of the jacket is soon recovered from) lower energy costs / bills

*accept short payback time*

**1**

**[9]**

## Q2.

(a) (i) produces carbon dioxide / nitrogen oxides

*accept greenhouse gases*
*ignore pollutant gases*

**1**

that (may) contribute to global warming
*accept causes global warming*
*damages ozone layer negates this mark*
*accept alternative answers in terms of: sulfur dioxide / nitrogen oxides causing acid rain*

**1**

(ii) carbon capture / storage
*answer must relate to part (a)(i)*
*collecting carbon dioxide is insufficient*

**or**

plant more trees

**or**

remove sulfur (before burning fuel)

**1**

(b) (i) (power station can be used) to meet surges in demand
*accept starts generating in a short time*
*can be switched on quickly is insufficient*

**1**

(ii) can store energy for later use
*accept renewable (energy resource)*
*accept does not produce $CO_2$ / $SO_2$ / pollutant gases*

**1**

(c) (i) turbines do not generate at a constant rate
*accept wind (speed) fluctuates*
*accept wind is (an) unreliable (energy source)*

**1**

(ii) any **one** from:

- energy efficient lighting (developed / used)
*use less lighting is insufficient*

- increased energy cost (so people more likely to turn off)
*accept electricity for energy*

- more people becoming environmentally aware

**1**

**[7]**

## Q3.

(a) any **one** from:

- energy / source is constant

- energy / source does not rely on uncontrollable factors

*accept a specific example, eg the weather*

- can generate all of the time
  *will not run out is insufficient*

**1**

(b) (dismantle and) remove radioactive waste / materials / fuel
*accept nuclear for radioactive*
*knock down / shut down is insufficient*

**1**

(c) any **two** from:

- reduce use of fossil fuelled power stations
  *accept specific fossil fuel*
  *accept use less fossil fuel*

- use more nuclear power
  *accept build new nuclear power stations*

- use (more) renewable energy sources
  *accept a named renewable energy source*
  *do **not** accept natural for renewable*

- make power stations more efficient

- (use) carbon capture (technology)
  *do **not** accept use less non-renewable (energy) sources*

**2**

(d) (by increasing the voltage) the current is reduced

**1**

this reduces the energy / power loss (from the cable)
*accept reduces amount of waste energy*
*accept heat for energy*
*do **not** accept stops energy loss*

**1**

and this increases the efficiency (of transmission)

**1**

**[7]**