

Name of the Student: \_\_\_\_\_

Max. Marks : 21 Marks

Time : 21 Minutes

Mark Schemes

**Q1.**

- (a) can be replaced as fast / faster than it is used  
*accept will not run out*  
*can be used again negates this mark*

1

- (b) any **one** from:

- reduce demand on power stations / National Grid (system)
- to increase the amount of electricity generated (from renewable energy)
- to conserve fossil fuels  
*accept use less fossil fuels*
- plenty of animal waste / fuel (available)  
*accept so animal waste can be used usefully*  
*accept to save money / sell the electricity*  
*produces less harmful gases / SO<sub>2</sub> is insufficient*  
*better for environment is insufficient*

1

- (c) 60 (months) / 5 (years)  
*ignore any unit given*

1

(d) *answers must be in terms of the biogas generator*

any **two** from:

- reliable energy source  
**or**  
does not depend on the weather  
*accept works all of the time*
- uses up waste products  
*accept animal waste readily available*
- not visually polluting
- concentrated energy source
- quieter  
*ignore it is renewable*

**Q2.**

- (a) *marks are awarded only for the reason but must match the ringed answer*  
*for both marks a **MAYBE** answer should include a **YES** and **NO** response answers in terms of the sources being renewable or non-renewable are insufficient*

any **two** from:

**YES** answers may include:

- wind produces no pollutant gases  
*accept wind burns no fuel*  
*accept CO<sub>2</sub> / SO<sub>2</sub> / oxides of nitrogen / greenhouse gas for pollutant gases*
- nuclear produces no pollutant gases  
*accept nuclear burns no fuel*
- (burning) gas does not produce SO<sub>2</sub>  
*accept gas does not cause acid rain*  
*do **not** accept they don't / none produce pollutant gases*

**NO** answers may include:

- nuclear produces radioactive waste
- (burning) gas produces CO<sub>2</sub> / pollutant gases / air pollution  
*accept contributes to global warming / greenhouse effect*

2

- (b) nuclear power stations use a non-renewable fuel  
*accept uranium / plutonium is non-renewable*  
*do **not** accept some are unrenewable*

1

[3]

**Q3.**

- (a) (i) decommissioning  
*accept the isotope / cobalt(-60) has decayed (a lot)*  
*accept the isotope / cobalt(-60) has decayed in 2 half lives*  
*accept exposed to less radiation*  
*do **not** accept no radiation left*

1

1

less hazardous / dangerous (to workers' health)  
*accept safer*  
*do **not** accept there is no hazard*

*accept allows reactor to cool (down)*  
*an answer of radiation levels decrease by 75 % or drops to 25 % gains*  
**2 marks**

1

- (b) (i) more in favour  
**or**  
fewer against

*quoting figures alone is insufficient*  
*do **not** accept it increases*  
*ignore any reasons given*

1

- (ii) any **one** from:

- sample too small
- do not know how many (people) were asked
- different people asked (in different years)
- sample not representative (of population)
- people did not understand the questions
- do not know who carried out the surveys  
*do **not** accept they are biased unless acceptable reason for bias given*
- do not know if surveys asked same questions

1

- (iii) any **one** from:

- no / less pollutant gases produced  
*accept a named gas*  
*accept does not contribute to global warming*
- reliable source (of energy / electricity)
- running out of fossil fuels  
*accept a named fossil fuel*
- conserve fossil fuels  
*accept fossil fuels won't have to be used*
- meet increasing demand
- less reliance on imported fossil fuels / electricity  
*accept named fossil fuel*
- concentrated energy source(s)
- lower transportation costs for fuel
- to replace old nuclear power stations  
*ignore references to efficiency / job creation / local economy / selling electricity*

1

**Q4.**

- (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 proportion / percentage 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  $0.2 \times 12$*

*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<sub>2</sub> negates the mark*  
*do **not** accept less energy is produced*
- fewer power stations needed
- less fuel is burned  
*accept a correctly named fuel*  
*do **not** accept less fuel is needed*

1