

Name of the Student: _____

Max. Marks : 23 Marks

Time : 23 Minutes

Mark Schemes

Q1.

- (a) (i) kinetic (energy)
allow gravitational potential (energy) / gpe
movement is insufficient
- 1

- (ii) dissipates into the surroundings
allow warms up the surroundings / air / motor
accept lost to the surroundings
accept lost as heat
ignore reference to sound
it is lost is insufficient
- 1

- (b) energy (required) increases with load
accept positive correlation
*do **not** accept (directly) proportional*
- 1

further amplification eg increases slowly at first (or up to 4 / 5 N),
then increases rapidly
simply quoting figures is insufficient
an answer that only describes the shape
of the line gains no marks

1

- (c) (i) $E = P \times t$
2880
accept £28.80 for all 3 marks
an answer £2880 gains 2 marks
*allow 1 mark for obtaining 48 h **or** converting to kW*
allow 2 marks for correct substitution
ie $4 \times 48 \times 15$
note: this substitution may be shown as two steps
an answer 2 880 000 gains 2 marks
an answer £4.80 / 480 gains 2 marks
an answer of 192 (ie calculation of energy without subsequent
calculation of cost) gains 1 mark)
- 3

- (ii) any sensible suggestion eg
- conserves fossil fuels
 - less (fossil) fuels burned
 - less pollutant gas (produced)
accept a named pollutant gas
 - less greenhouse gas (produced)
saves energy is insufficient

1

[8]

Q2.

- (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 / SO₂ 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

Q3.

- (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 CO₂ / SO₂ / oxides of nitrogen / greenhouse gas for pollutant gases
- nuclear produces no pollutant gases
accept nuclear burns no fuel
- (burning) gas does not produce SO₂
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 CO₂ / 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]

Q4.

- (a) (i) decommissioning

1

- (ii) level of radiation **or** radiation dose (to workers) decreased
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

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

