

Name of the Student: _____

Max. Marks : 24 Marks

Time : 24 Minutes

Mark Schemes

Q1.

- | | | | |
|-----|-------|--|---|
| (a) | (i) | 150 | 1 |
| | (ii) | transferred to the surroundings by heating
<i>reference to sound negates mark</i> | 1 |
| | (iii) | 0.75
<i>450 / 600 gains 1 mark</i>
<i>accept 75% for 2 marks</i>
<i>maximum of 1 mark awarded if a unit is given</i> | 2 |
| | (iv) | 20 (s)
<i>correct answer with or without working gains 2 marks</i>
<i>correct substitution of 600 / 30 gains 1 mark</i> | 2 |
| (b) | (i) | to avoid bias | 1 |
| | (ii) | use less power and last longer

1 LED costs £16, 40 filament bulbs cost £80

or

filament costs (5 times) more in energy consumption | 1 |
| | (iii) | any one from: <ul style="list-style-type: none"> • availability of bulbs • colour output • temperature of bulb surface | 1 |

[10]

Q2.

- (a) advantage
- any **one** from:

- produce no / little greenhouse gases / carbon dioxide
allow produces no / little polluting gases
allow doesn't contribute to global warming / climate change
allow produce no acid rain / sulphur dioxide
reference to atmospheric pollution is insufficient
produce no harmful gases is insufficient
- high(er) energy density in fuel
accept one nuclear power station produces as much power as several gas power stations
nuclear power stations can supply a lot of or more energy is insufficient
- long(er) operating life
allow saves using reserves of fossil fuels or gas

1

disadvantage

any **one** from:

- produce (long term) radioactive waste
accept waste is toxic
accept nuclear for radioactive
- accidents at nuclear power stations may have far reaching or long term consequences
- high(er) decommissioning costs
accept high(er) building costs
- long(er) start up time

1

- (b) (i) 12 000 (kWh)
- allow 1 mark for correct substitution eg*
 2000×6
or
 $2\,000\,000 \times 6$
or

$$\frac{12\,000\,000}{1000}$$

an answer of 12 000 000 scores 1 mark

2

(ii) any idea of unreliability, eg

- wind is unreliable
reference to weather alone is insufficient
- shut down if wind too strong / weak
- wind is variable

1

(c) any **one** from:

- cannot be seen
- no hazard to (low flying) aircraft / helicopters
- unlikely to be or not damaged / affected by (severe) weather
unlikely to be damaged is insufficient
- (normally) no / reduced shock hazard

safer is insufficient
less maintenance is insufficient
installed in urban areas is insufficient

1

[6]

Q3.

- (a) water moves (from a higher level to a lower level)

1

transferring GPE to KE

1

rotating a turbine to turn a generator

accept driving or turning or spinning for rotating
moving is insufficient

1

transferring KE to electrical energy

transferring GPE to electrical energy gains 1 mark of the 2 marks
available for energy transfers

1

- (b) (TVs in stand-by) use electricity

accept power / energy

1

generating electricity (from fossil fuels) produces CO₂

accept greenhouse gas
accept sulfur dioxide

1

(CO₂) contributes to global warming

accept climate change for global warming
accept greenhouse effect if CO₂ given
accept acid rain if linked to sulfur dioxide

1

- (c) a factor other than scientific is given, eg economic, political or legal

personal choice is insufficient

1

[8]