Practice Question Set For GCSE
Subject : Physics
Paper-1 Topic: Energy (Standard Demand)

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Name of the Student:_____
Max. Marks : 24 Marks **Time : 24 Minutes**

Mark Schemes

Q1.

(a) 78 (°C)

*allow **2** marks for correct temperature change ie 22 °C*
*allow **1** mark for correct substitution*
ie 46 200 = 0.5 × 4200 x θ
or

$$\frac{46200}{0.5 \times 4200} = \theta$$

3

(b) 6.4 (W)

*allow **2** marks for an answer that rounds to 6.4*
*allow **1** mark for correct substitution*
ie 46 200 = P × 7200
an answer of 23 000 or 23 100 or 385 gains 1 mark

2

[5]

Q2.

(a) (i) high levels of infrared radiation (from the Sun)

allow lots of (solar) energy (available)
*do **not** accept 'heat' for infrared*
'it is hot' is insufficient
'lots of sunlight' is insufficient

1

(ii) reflected

1

(iii) boiler

correct order only

1

turbine

1

transformer

1

(b) 2 100 000 (kWh)

*allow **1** mark for correct substitution i.e. 140 000 × 15 provided no subsequent step*

2

(c) (i) only 1 wind turbine was considered

accept only one location is considered

1

or

other wind turbines may have generated more electricity

accept insufficient sample size

only 1 week's weather was reported on

or

wind speed varies from one week to another

'wind speed varies' is insufficient

1

(ii) any **one** from:

- wind speed is too high / low

  allow no wind
  allow too windy
- wind is unreliable.

  allow wind is variable

1

(iii) any **one** from:

- wind is a renewable energy source
- do not use fuel
- energy source is free
- do not release carbon dioxide
- do not release greenhouse gases
- do not release sulfur dioxide
- do not cause acid rain
- do not cause climate change
- do not cause global warming
- do not cause global dimming.

answer must be an advantage of wind, converse answers in terms of fossil fuels are insufficient

accept do not release pollutant gases

'no pollution' is insufficient

1

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Q3.

(a) Marks awarded for this answer will be determined by the Quality of Written Communication (QWC) as well as the standard of the scientific response. Examiners should also apply a 'best-fit' approach to the marking.

0 marks
No relevant information

Level 1 (1-2 marks)
There is a relevant statement about an energy saving method

Level 2 (3-4 marks)
There is at least one clear comparison of energy saving methods and their cost effectiveness with an appropriate calculation

Level 3 (5-6 marks)

There is a comparison of energy saving methods and their cost effectiveness with appropriate calculations. Comparison to include further detail.

examples of physics points made in the response

examples of relevant statements

- energy efficient boiler saves the most (energy / money) per year
- loft insulation costs the least to install
- double-glazing costs the most to install

examples of statements that include cost effectiveness

- loft insulation is the most cost effective in the long term
- double-glazing is the least cost effective
- loft insulation has the shortest payback time
- double-glazing has the longest payback time
- payback time calculated for any method

  payback times:
  energy efficient boiler: 6.25 years
  loft insulation: 2 years
  double glazing: 100 years
  cavity wall insulation: 2.86 years

examples of further detail

- for cost effectiveness install in the following order: loft, cavity wall, boiler, double-glazing
- for reducing energy use install in the following order: boiler, loft, cavity wall, double glazing
- don't install double-glazing for insulation purposes
- double-glazing won't pay for itself in your lifetime
- justified choice of best / worst method

6

(b) (i) how effective a material is as an insulator

accept 'heat' for energy
accept how effective a material is at keeping energy in
accept the lower the U-value the better the insulator
accept the lower the U-value the lower the rate of energy transfer

1

(ii) (the U-value) decreases

1

[8]