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

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

Mark Schemes

Q1.

(a) (i) $efficiency = \frac{useful\ energy\ out\ (\times 100\%)}{total\ energy\ in}$

1.6 (W)

*allow **1** mark for correct substitution ie* $0.2 / \frac{20}{100} = \frac{output}{8}$

2

(ii) $efficiency = \frac{useful\ energy\ out\ (\times 100\%)}{total\ energy\ in}$

32 (%) / 0.32
or
their (a)(i) ÷ 5 correctly calculated
ignore any units

1

(b) (i) any **two** from:

- comparison over same period of time of relative numbers of bulbs required eg over 50 000 hours 5 CFL's required to 1 LED
  accept an LED lasts 5 times longer
- link number of bulbs to cost eg 5 CFL's cheaper than 1 LED
  an answer in terms of over a period of 50 000 hours CFLs cost £15.50 (to buy), LED costs £29.85 (to buy) so CFLs are cheaper scores both marks
  an answer in terms of the cost per hour (of lifetime) being cheaper for CFL scores 1 mark if then correctly calculated scores both marks
- over the same period of time LEDs cost less to operate (than CFLs)

2

(ii) any **one** from:

- price of LED bulbs will drop
  *do **not** accept they become cheaper*
- less electricity needs to be generated
  accept we will use less electricity

- less CO_2 produced
- fewer chips needed (for each LED bulb)
- fewer bulbs required (for same brightness / light)
- less energy wasted

  *do **not** accept electricity for energy*

1

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Q2.

(a) (i) replaced faster than it is used

accept replaced as quick as it is used
accept it will never run out
*do **not** accept can be used again*

1

(ii) any **two** from:

***two** sources required for the mark*

- wind
- waves
- tides
- fall of water

  *do **not** accept water / oceans*
  accept hydroelectric
- biofuel

  accept a named biofuel eg wood
- geothermal

1

(b) (i) any **two** from:

- increases from 20° to 30°
- reaches maximum value at 30°
- then decreases from 30°
- same pattern for each month

  *accept peaks at 30° for **both** marks*
  *accept goes up then down for **1** mark*
  ignore it's always the lowest at 50°

2

(ii) 648

*an answer of 129.6 gains **2** marks*
*allow **1** mark for using 720 value <u>only</u> from table*
*allow **2** marks for answers 639, 612, 576, 618(.75)*
*allow **1** mark for answers 127.8, 122.4, 115.2, 123.75*

3

(c) (i) (sometimes) electricity demand may be greater than supply (of electricity from the

system)

accept cloudy weather, night time affects supply

or

can sell (excess) electricity (to the National Grid)

1

(ii) decreases the current

accept increases the voltage

1

reducing energy loss (along cables)

accept less heat / thermal energy lost / produced

1

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Q3.

(a) 9

*allow **2** marks for power = 1400 (kW)*

*if a subsequent calculation is shown award **1** mark only*

or

*allow **1** mark for correct substitution and transformation*

power = $\frac{5600}{4}$

*allow **1** mark for using a clearly incorrect value for power to read a corresponding correct value from the graph*

3

(b) (i) system of cables and transformers

both required for the mark

ignore reference to pylons

inclusion of power stations / consumers negates the mark

wire(s) is insufficient

1

(ii) (uses step-up transformer to) increase pd / voltage

accept (transfers energy / electricity at) high voltage

or

(uses step-up transformer to) reduce current

accept (transfers energy / electricity at) low current

ignore correct references to step-down transformers

1

(c) build a power station that uses a non-renewable fuel or biofuel

accept a named fuel

eg coal or wood

or

buy (lots of) petrol / diesel generators

1

stockpile supplies of the fuel

accept fuel does not rely on the weather

or

fuel provides a reliable source of energy

accept as an alternative answer idea of linking with the National Grid (1)

and taking power from that when demand exceeds supply (1)

or

when other methods fail

or

when it is needed

answers in terms of using other forms of renewables is insufficient

1

[7]