Practice Question Set For GCSE
Subject : Physics
Paper-1 Topic: Electricity (Low Demand)

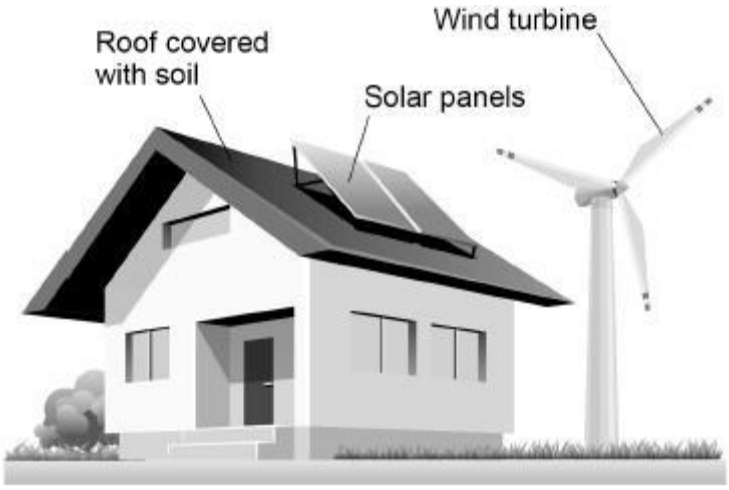
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Exam Preparation and Free Resources

Name of the Student:_____
Max. Marks : 26 Marks **Time : 26 Minutes**

Q1.

An eco-house is designed to be environmentally friendly.

The diagram below shows a picture of an eco-house.



(a) The solar panels and a wind turbine are used to generate electricity for the eco-house.

Solar and wind are both renewable energy resources.

What does renewable energy resource mean?

Tick (✓) **one** box.

It can be replenished as it is used.	☐
It is unreliable.	☐
It has no fuel costs.	☐
It produces no greenhouse gases.	☐

(1)

(b) Biomass, nuclear and natural gas are three other energy resources.

Complete the table to show whether each energy resource is renewable or non-renewable.

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Tick (✓) **one** box for **each** energy resource.

Energy resource	Renewable	Non-renewable
Biomass		
Nuclear		
Natural gas		

(2)

(c) Moving air makes the wind turbine spin.

The wind turbine generates electricity which is used to charge a battery.

Complete the sentences.

Choose answers from the box.

chemical	electrical	gravitational	kinetic

When the wind turbine spins faster there is an increase in its _____ energy.

Charging the battery increases the _____ store of energy of the battery.

(2)

(d) The roof of the eco-house is covered with soil.

Covering the roof with soil decreases the thermal conductivity of the roof.

What are the advantages of having a roof with a lower thermal conductivity?

Tick (✓) **two** boxes.

Less energy is needed to heat the house. ☐

The rate of energy transfer by conduction is greater. ☐

The roof is a better insulator. ☐

The roof is less likely to leak. ☐

Weather will have a greater effect on the temperature of the house. ☐

(2)

(e) The average power transferred to the solar panels by sunlight is 26 000 W

Calculate the average energy transferred to the solar panels in 30 seconds.

Use the equation:

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energy transferred = power × time

Average energy transferred to solar panels = _____ J

(2)

(f) Write down the equation that links efficiency, total power input and useful power output.

(1)

(g) The solar panels on the roof of the eco-house have an efficiency of 0.15

The average power input to the solar panels is 26 000 W

Calculate the average useful power output from the solar panels.

Average useful power output = _____ W

(3)

(h) Explain why it is a good idea for the eco-house to have both a wind turbine and solar panels.

(2)

(Total 15 marks)

Q2.

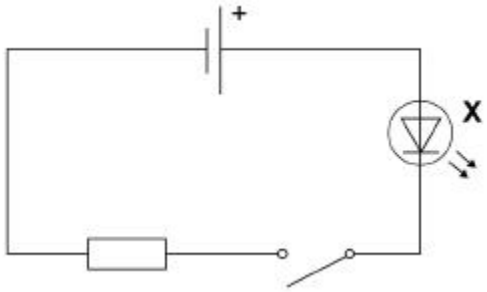
A designer made some shoes that have lights in them.

Each shoe has a switch which closes when a person puts their foot on the floor.

Figure 1 shows the circuit.

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Figure 1



(a) What is component **X**?

Tick (✓) **one** box.

Lamp ☐

LDR ☐

LED ☐

(1)

(b) Complete the sentence.

Choose the answer from the box.

greater than	**less than**	**the same as**

When the switch was closed, the current in component **X** was

_____ the current in the resistor.

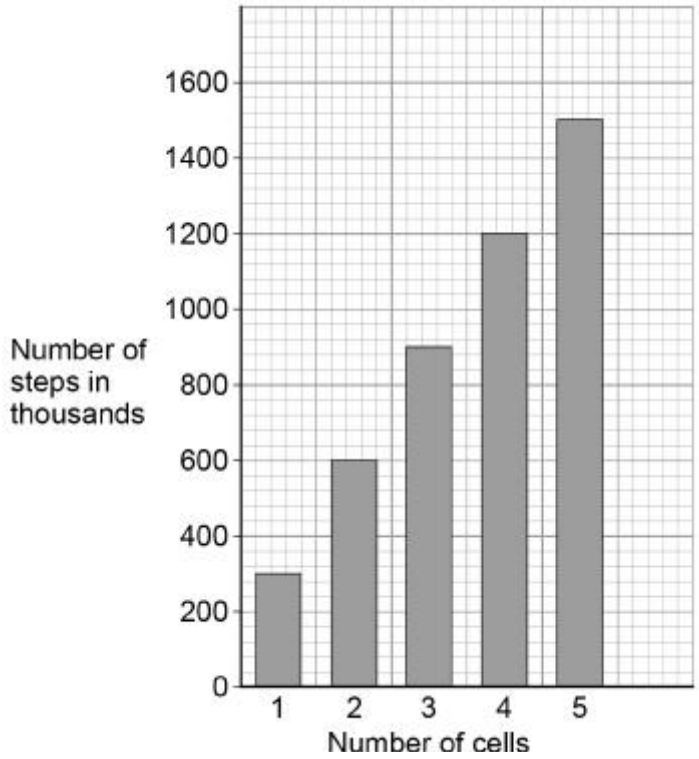
(1)

The designer tested how the number of cells affected the number of steps that could be taken before the lights stopped working.

Figure 2 shows the results.

Figure 2

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(c) Determine how many more steps could be taken when the number of cells was increased from 3 to 5

_____

_____

Number of steps = _____ thousand

(2)

(d) How could the designer check the repeatability of the results?

Tick (✓) **one** box.

Repeat the experiment with a different resistor in the circuit. ☐

Repeat the experiment using exactly the same method. ☐

Repeat the experiment with different types of shoe. ☐

(1)

(e) When the potential difference across the resistor was 0.80 V, the current in the resistor was 0.020 A

Calculate the power dissipated by the resistor.

Use the equation:

power = potential difference × current

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_____

_____

_____

Power = _____ W

(2)

(f) Which other equation can be used to calculate the power dissipated by a resistor?

Tick (✓) **one** box.

Power = (current)^2 × resistance ☐

Power = $\frac{\text{current}}{(\text{resistance})^2}$ ☐

Power = current × (resistance)^2 ☐

(1)

(g) What happens to the temperature of the resistor when there is a current in it?

_____

_____

(1)

(h) There was a current of 0.020 A in the resistor for 180 seconds.

Calculate the charge flow through the resistor.

Use the equation:

charge flow = current × time

_____

_____

_____

Charge flow = _____ C

(2)

(Total 11 marks)

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