1.14 Energy sources and storage: 10-minute Pack

AQA 8552 · Calculator allowed · about 10 minutes

Total Marks

Name: _____ Date: ____ / ____ / _____

Answer ALL questions.

1 A remote footpath marker needs light after dusk. Option A uses a small solar panel to generate electricity during daylight and a rechargeable cell to store it. Option B uses replaceable cells only. Identify which part of Option A is the energy source and which is the energy store. (2 marks)

(Total for Question 1 is 2 marks)

---

2 A fictional bicycle safety light is used on short journeys. The design requirements are low purchase cost, simple replacement when its supply is depleted, and no need for recharging equipment. Compare rechargeable and replaceable supplies and recommend one approach. The fictional cost data are: rechargeable unit, £18; replaceable-cell unit, £7; replacement cell pair, £2 per pair. Do not assume how many journeys either supply lasts.

(Total for Question 2 is 3 marks)

© Revision Library | revisionlibrary.co.uk

3 A fictional outdoor notice board uses energy stored earlier in a rechargeable pack. Explain why storing energy does not create a new energy source, and describe one design reason for choosing storage alongside a variable renewable source.

(Total for Question 3 is 2 marks)

4 A fictional battery pack stores 1.8 kWh of usable energy. A display uses energy at a steady rate of 0.30 kW. Assume all the stated usable energy can be supplied and the rate stays constant. Calculate the running time. Use time = energy / power. Give your answer in hours.

(Total for Question 4 is 2 marks)

© Revision Library | revisionlibrary.co.uk

Mark scheme · 1.14 Energy sources and storage: 10-minute Pack

Question 1

solar panel is the energy source because it converts incoming sunlight into electrical energy	**B1**
rechargeable cell is the energy store because it holds energy for later use	**B1**

Answer: The solar panel is the source; the rechargeable cell is the store.

Question 2

replaceable-cell unit has lower stated initial cost: £7 compared with £18	**B1**
replaceable cells can be swapped without charging equipment; alternatively, rechargeable supply can be recharged and reused if charging becomes available	**B1**
recommends replaceable cells for the stated low initial cost and no-charger requirements, or gives a different defensible choice that explicitly addresses both requirements and the supplied cost data	**B1**

Answer: The replaceable-cell unit costs less initially and can be swapped without charging equipment, so it fits the stated requirements. Rechargeable cells can be reused where charging is available.

Question 3

a store holds energy supplied by a source and does not generate that energy itself	**B1**
storage can make energy available when the renewable source output is low or unavailable	**B1**

Answer: The pack holds energy provided by a source rather than creating it. It can supply energy when variable generation is low.

Question 4

time = energy / power = 1.8 / 0.30	**M1**
6 hours	**A1**

Answer: 6 hours

© Revision Library | revisionlibrary.co.uk