

Exercise walk-through

Solar Energy ■ 6.8

eXercise

You must be able to

- distinguish **photovoltaic (PV)** 光伏 and **active/passive solar** 主动/被动太阳能
- state advantages and disadvantages
- explain intermittency

Method — Types of solar

- **Photovoltaic (PV) cells** — convert sunlight **directly** into electricity.
- **Active solar** — uses pumps/fans to move solar-heated water/air (e.g. solar water heaters).
- **Passive solar** — building design (windows, materials) that captures heat without machines.

Method — Advantages

- **Renewable**, no CO₂ during use.
- No fuel cost; low maintenance; works off-grid.

Method — Disadvantages

- **Intermittent** — no power at night or when cloudy (needs storage/batteries).
- Manufacturing has some impact; needs space; upfront cost.

Method — A worked judgement

Solar PV is clean and renewable, but because it is **intermittent**, it needs batteries or a backup supply for constant power.

Practice 2.1 ■ 1 mark

What does a photovoltaic cell do?

Solution 2.1

Worked steps

Converts sunlight directly into electricity **B1**.

Practice 2.2 ■ 1 mark

What is passive solar design?

Solution 2.2

Method: Types of solar

Worked steps

Building design that captures solar heat without machines **B1**.

Practice 2.3 ■ 1 mark

Why is solar power called intermittent?

Solution 2.3

Method: A worked judgement

Worked steps

It produces no power at night or when cloudy **B1**.

Exam-style 3.1 ■ 1 mark

A photovoltaic cell converts sunlight directly into

A heat only

B electricity

C biomass

D wind

Solution 3.1

Method: Types of solar

A heat only

B electricity



C biomass

D wind

Worked steps

B — electricity.

Exam-style 3.2 ■ 2 marks

A home installs solar panels.

- (a) State one advantage and one disadvantage.
- (b) Explain how the intermittency problem can be addressed.

Solution 3.2

Worked steps

(a) Advantage: renewable, no CO₂, no fuel cost; disadvantage: intermittent or high upfront cost **B1** **B1**. (b) Store energy in batteries (or use a backup/grid) for use when the sun is not shining **M1** **A1**.

Exam-style 3.3 ■ 2 marks

Explain the difference between active and passive solar heating.

Solution 3.3

Method: Types of solar

Worked steps

Active solar uses pumps/fans to move solar-heated water or air; passive solar uses building design (windows, materials) to capture heat with no machines **M1** **A1**.