

## 6.6 Nuclear Power

Name: \_\_\_\_\_ Class: \_\_\_\_\_ Date: \_\_\_\_\_

**Total: 10 marks**

**KEY WORDS** nuclear power 核能 • waste 核废料 • fission 裂变 • nuclear fission 核裂变  
• methane 甲烷

### Objective

Build the skills to answer exam questions on **nuclear power**.

You must be able to:

- describe **nuclear fission** 核裂变 to generate electricity
- state advantages (no CO<sub>2</sub>, high energy density)
- state disadvantages (radioactive waste, accidents)

### 1 Worked examples

Study these first. Each one shows the method for a question type used later — follow the steps and you can do the Practice and Exam-style questions yourself.

#### ■ How it works

**Nuclear power** splits uranium atoms (**fission**), releasing huge heat that boils water to spin a turbine — generating electricity, like a steam plant but with a nuclear heat source.

#### ■ Advantages

- Produces **no** CO<sub>2</sub> during operation (helps climate).
- Very high energy density** — a tiny amount of fuel yields a lot of energy.
- Reliable “baseload” power.

#### ■ Disadvantages

- Radioactive waste** stays dangerous for thousands of years and must be stored safely.
- Risk of **accidents** (Chernobyl, Fukushima) releasing radiation.
- High cost and **thermal pollution** of cooling water.
- Uranium is **nonrenewable**.

#### ■ A worked judgement

Nuclear power is low-carbon and energy-dense, but the long-lived waste and accident risk make it controversial.

## 2 Practice

Now apply the methods above.

**2.1** What process generates the heat in a nuclear plant? [1]

**2.2** State one advantage of nuclear power. [1]

**2.3** State one disadvantage. [1]

## 3 Exam-style questions

**3.1** A climate advantage of nuclear power is that it [1]

- A** produces no CO<sub>2</sub> during operation
- B** burns coal
- C** releases methane
- D** needs no fuel

**3.2** A country considers building nuclear plants to cut carbon emissions.

(a) State one benefit and one drawback. [2]

(b) Explain the main challenge of nuclear waste. [2]

**3.3** Explain why nuclear power is low-carbon but still not fully renewable. [2]

## Solutions

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**2.1** Nuclear fission (splitting uranium atoms).

**2.2** Any one: no CO<sub>2</sub>, high energy density, reliable.

**2.3** Any one: radioactive waste, accident risk, high cost, thermal pollution.

**3.1 A** — produces no CO<sub>2</sub> during operation.

**3.2** (a) Benefit: low-carbon, energy-dense power; drawback: radioactive waste or accident risk. (b) The waste stays radioactive and dangerous for thousands of years, so it must be stored safely for a very long time.

**3.3** It emits no CO<sub>2</sub> during operation, but its fuel (uranium) is a finite mined element, so it is nonrenewable.