Exercise walk-through

Reduction of Air Pollutants ▪ 7.6

eXercise

You must be able to

- describe control technologies (**catalytic converters** 催化转化器, **scrubbers** 洗涤器, filters)
- explain regulation (**Clean Air Act**, emission standards)
- link each method to the pollutant it targets

Method — Control technologies

- **Catalytic converters** (cars) — convert CO, NO_x, and unburned fuel into less harmful gases.
- **Scrubbers** (smokestacks) — spray a liquid to remove SO_2.
- **Electrostatic precipitators / filters** — remove **particulates** from exhaust.

Method — Regulation

Laws like the **Clean Air Act** set **emission standards** limiting how much pollution sources may release, forcing cleaner technology.

Method — Prevention vs cleanup

Reducing the source (efficiency, renewables, less driving) prevents pollution; control devices clean it up after it forms. Prevention is often better.

Method — A worked match

A coal plant uses **scrubbers** for SO_2 and **precipitators** for particulates; a car uses a **catalytic converter** for CO/NO_x.

Practice 2.1 ▪ 1 mark

What does a catalytic converter reduce?

Solution 2.1

Method: A worked match

Worked steps

CO, NO_x, and unburned hydrocarbons from car exhaust B1.

Practice 2.2 ▪ 1 mark

What does a scrubber remove from smokestack gases?

Solution 2.2

Method: Control technologies

Worked steps

SO_2 (sulfur dioxide) B1.

Practice 2.3 ▪ 1 mark

What is the purpose of emission standards?

Solution 2.3

Method: Regulation

Worked steps

To limit how much pollution sources may release B1.

Exam-style 3.1 ▪ 1 mark

A device that removes SO_2 from a smokestack is a

A catalytic converter

B scrubber

C wind turbine

D solar panel

Solution 3.1

A catalytic converter

B scrubber ✓

C wind turbine

D solar panel

Worked steps

B — a scrubber.

Exam-style 3.2 ▪ 2 marks

A coal power plant must reduce its emissions.
(a) Name one technology to remove particulates and one to remove SO_2.
(b) Explain how emission standards force cleaner operation.

Solution 3.2

Worked steps

(a) Particulates: electrostatic precipitator/filter; SO_2: scrubber B1 B1. (b) They set legal limits, so plants must install control technology or reduce output to comply M1 A1.

Exam-style 3.3 ▪ 2 marks

Explain why preventing pollution at the source is often better than cleaning it up afterward.

Solution 3.3

Method: Prevention vs cleanup

Worked steps

Prevention avoids creating the pollutant at all (saving cleanup costs and avoiding leaks), while control devices only capture some of it after it forms M1 A1.