

7.4 Atmospheric CO₂ and Particulates

Name: _____ Class: _____ Date: _____

Total: 10 marks

KEY WORDS particulate matter 颗粒物

Objective

Build the skills to answer exam questions on **atmospheric CO₂ and particulates**.

You must be able to:

- explain rising **CO₂** and its climate link
- describe **particulate matter (PM)** 颗粒物 and its health effects
- distinguish their different impacts

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.

■ Rising CO₂

Burning fossil fuels raises atmospheric **CO₂**, a **greenhouse gas** that traps heat and drives climate change. CO₂ is not directly toxic to breathe at these levels but is a major climate concern.

■ Particulate matter

Particulate matter (PM) is tiny solid/liquid particles (soot, dust). **PM2.5** (very fine) is most dangerous — it lodges deep in the lungs, causing respiratory and heart disease.

■ Different impacts

- **CO₂** → mainly a **climate** problem (global).
- **PM** → mainly a **health** problem (local air quality).

■ A worked distinction

A diesel truck emits both CO₂ (adding to climate change) and PM (harming the lungs of nearby people) — two different kinds of impact.

2 Practice

Now apply the methods above.

2.1 Why is rising CO₂ a concern? [1]

2.2 What is particulate matter? [1]

2.3 Which is mainly a health problem: CO₂ or PM? [1]

3 Exam-style questions

3.1 The most dangerous particulate matter for health is [1]

- **A** large dust only
 - **B** fine PM_{2.5} that lodges deep in the lungs
 - **C** carbon dioxide
 - **D** oxygen
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3.2 A city has high levels of both CO₂ and PM_{2.5}.

(a) State the main impact of each. [2]

(b) Explain why PM_{2.5} is especially harmful to health. [2]

3.3 Explain why CO₂ is described as a global problem while PM is more local. [2]

Solutions

2.1 It is a greenhouse gas that traps heat and drives climate change.

2.2 Tiny solid or liquid particles (soot, dust) in the air.

2.3 PM.

3.1 B — fine PM_{2.5} that lodges deep in the lungs.

3.2 (a) CO₂ → climate change; PM_{2.5} → respiratory/heart disease. (b) It is fine enough to lodge deep in the lungs and enter the bloodstream, causing serious respiratory and heart problems.

3.3 CO₂ mixes throughout the atmosphere and warms the whole planet (global), while PM settles out near its source, so its worst effects are on local air quality.