

5.10 Impacts of Urbanization

Name: _____ Class: _____ Date: _____ **Total: 9 marks**

KEY WORDS urbanization 城市化 • urban sprawl 城市扩张 • urban heat island 城市热岛
• impervious surfaces 不透水面 • green roofs 绿色屋顶

Objective

Build the skills to answer exam questions on **impacts of urbanization**.

You must be able to:

- describe **urban sprawl** 城市扩张 and **impervious surfaces** 不透水面
- link paving to runoff, flooding, and the **urban heat island** 城市热岛
- suggest smart-growth solutions

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.

■ Urbanization impacts

As cities grow (**urban sprawl**), natural land is replaced with **impervious surfaces** (roads, roofs) that water cannot soak into.

■ Runoff and flooding

Impervious surfaces increase **runoff** and reduce **infiltration**, causing more **flooding** and carrying pollutants (oil, litter) into waterways.

■ Urban heat island

Cities are warmer than surrounding areas (the **urban heat island effect**) because dark surfaces absorb heat and there is little vegetation to cool the air.

■ Smart growth

Solutions include **mixed-use, dense development**, public transit, green roofs, and preserving green space — reducing sprawl and its impacts.

2 Practice

Now apply the methods above.

2.1 What is an impervious surface? [1]

2.2 How does paving affect runoff and infiltration? [1]

2.3 What is the urban heat island effect? [1]

3 Exam-style questions

3.1 Cities are often warmer than surrounding rural areas because of the [1]

- **A** rain shadow effect
- **B** urban heat island effect
- **C** Coriolis effect
- **D** greenhouse effect only

3.2 A city expands, paving over fields.

(a) Explain how this increases flooding. [2]

(b) Suggest one smart-growth solution. [1]

3.3 Explain why the urban heat island effect occurs. [2]

Solutions

2.1 A surface (road, roof) that water cannot soak into.

2.2 It increases runoff and reduces infiltration.

2.3 Cities being warmer than surrounding rural areas.

3.1 B — the urban heat island effect.

3.2 (a) Paving stops water soaking in, so more runs off quickly over the hard surfaces, overwhelming drainage and causing floods. (b) Any one: green roofs, permeable pavement, preserving green space, denser development.

3.3 Dark paved surfaces and buildings absorb and re-radiate heat, and there is little vegetation to cool the air by shade and transpiration, so cities stay hotter.