3.7 Option: Urban environments

Name: _____ Class: _____ Date: _____ **Total: 30 marks**

KEY WORDS urbanization • megacity • urban stress • urban heat island • informal settlement • urban regeneration • gentrification

Objective

Build the skills to answer Paper 1 questions on the **urban environments** option: urbanization and megacities, land-use models, **urban stress** (housing, traffic, pollution), the **urban heat island**, regeneration and gentrification, and strategies for more sustainable cities.

You must be able to:

- distinguish urbanization and urban growth, and explain why cities grow
- calculate a city growth rate from census data
- test land-use models against a real city
- explain the urban heat island and other urban stresses
- evaluate regeneration, transport and sustainability strategies

1 Key knowledge and worked examples

Growth

- **Urbanization**: a rise in the **proportion** of people living in cities. **Urban growth**: a rise in the **number** of people in cities. More than half of the world's people live in cities.
- A **megacity** has more than 10 million people (33 in 2018, UN). Shenzhen grew from a small border town in 1980 (a Special Economic Zone) to about 17.6 million in the 2020 census.
- Cities grow by rural–urban migration and natural increase. **Suburbanization** moves people to the edge; **counter-urbanization** moves them to small towns and the countryside.

Models and stress

Burgess's model shows **rings** around the centre; Hoyt's model shows **sectors** along transport routes. Use them as ideas to test, not as truths.

Urban stress: housing shortages and **informal settlements**, traffic congestion, air pollution, waste. The **urban heat island**: city centres are often several °C warmer than the countryside, especially at night, because concrete and tarmac store heat, there is less vegetation and water to cool the air, and traffic, buildings and air conditioners release heat.

Responses

strategy	example	limit
road pricing	Singapore (1998), London congestion charge (2003)	unpopular; can hit poorer drivers
public transport	metro systems in Chinese cities	very expensive to build
urban regeneration	old industrial land → homes, offices, parks	rents rise; poorer residents pushed out (**gentrification**)
green space, sponge-city parks	cools the city, stores rain	needs valuable land

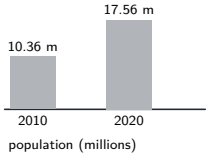
Worked example. Shenzhen: 10.36 million (2010 census) → 17.56 million (2020). Growth $= \dfrac{17.56 - 10.36}{10.36} \times 100 \approx 69.5\ \%$ in ten years.

2 Practice

2.1 Distinguish between **urbanization** and **urban growth**. [2]



2.2 Shenzhen had 10.36 million people in the 2010 census and 17.56 million in 2020. Calculate the percentage growth, and give **one** reason for it. [3]

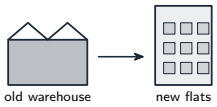


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2.3 State **two** causes of the urban heat island. [2]



2.4 Explain how urban regeneration can lead to **gentrification**. [3]



2.5 Evaluate road pricing (congestion charging) as a way to reduce traffic in cities. [4]

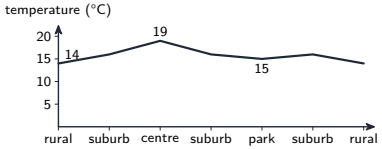


3 Exam-style questions

3.1 *(Paper 1 style.)* The graph shows night-time air temperatures measured along a line across a city.

(a) Calculate the difference in temperature between the city centre and the countryside, and identify **one** place that does not fit the overall pattern. [2]

(b) Explain **two** reasons why the city centre is warmer at night. [4]



3.2 Evaluate the success of strategies used to make cities more sustainable. [10]

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Solutions

Marking: **M1** a correct method, **A1** the correct answer, **B1** an independent mark.

Each answer shows the steps, then the **result**.

2.1

urbanization: an increase in the **proportion** of a country's people living in urban areas; urban growth: an increase in the **number** of people living in urban areas

2.2

$\frac{17.56 - 10.36}{10.36} \times 100 \approx \mathbf{69.5}\ \%$; any one: migrants attracted by jobs in factories, technology and services / the Special Economic Zone and foreign investment

2.3

any two: concrete, tarmac and brick store heat by day and release it at night; less vegetation and water to cool the air; heat from traffic, buildings and air conditioners; pollution traps heat

2.4

regeneration improves an old area with new homes, shops and parks; the area becomes attractive to richer people, so house prices and rents rise; poorer residents can no longer afford to stay and are pushed out (gentrification)

2.5

drivers pay to enter the centre at busy times, e.g. Singapore (1998), London (2003); fewer cars, faster journeys and cleaner air, and the money can fund public transport; but it is unpopular, and it costs poorer drivers more of their income; it works best with good public transport, so people have another way to travel

3.1

(a) $19 - 14 = \mathbf{5}$ °C; the park, cooler (15 °C) than the suburbs around it

(b) any two, explained: concrete, tarmac and brick absorb heat by day and release it slowly at night; tall buildings trap heat and block wind, so warm air is not mixed away; heat from traffic, buildings and air conditioners adds energy to the air; less vegetation and water, so less cooling by evaporation

3.2

Mark with the markbands: [9-10] focused on the command term, detailed and accurate knowledge, well-developed explanation, specific named examples (places, dates, numbers), balanced evaluation and a supported conclusion; [7-8] mostly focused, good knowledge and examples, some evaluation; [5-6] relevant knowledge and examples, explanation partly developed, little evaluation; [3-4] general knowledge, few examples, mostly description; [1-2] little that is relevant. Points that may be included: public transport: metro systems in Chinese cities carry millions a day and cut car use; but they are very expensive and take years to build; road pricing in Singapore and London reduced traffic in the centre; but it is unpopular and costs poorer drivers more; green space and sponge-city parks cool the city and store rain; but they need valuable land, and the 2021 Zhengzhou rain was beyond the design; regeneration reuses old industrial land instead of farmland at the edge; but it can cause gentrification, so it is less sustainable socially; informal settlements need housing and services, which no single strategy solves; conclusion: strategies work best together and when they are fair to poorer residents; environmental success can hide social costs

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