

## Urban climate issues and management 3.2.3.4 ANSWERS

Q1	<i>True or False?</i>	
A	Urban areas have lower precipitation levels than the surrounding rural area. <b>It tends to be slightly higher</b>	<b>False</b>
B	Urban areas are warmer than the surrounding rural area because of building density.	<b>True</b>
C	The urban heat island effect has the same impact on temperature across the whole of the urban area. <b>It varies according to building type and density</b>	<b>False</b>
D	Streets in urban areas can increase wind speed by causing a funnelling effect in some situations.	<b>True</b>
E	Photochemical smog has limited impact on the urban environment. <b>It can have very considerable health implications</b>	<b>False</b>

Q2	<b>Match the correct term to the correct definition</b>	
A	The increase in speed of a body of air as it moves through a restricted area.	<b>Venturi effect</b>
B	Haze in the atmosphere caused by the action of sunlight on pollutants.	<b>Photochemical smog</b>
C	The proportion of an area of land that is built on.	<b>Building density</b>
D	A city region where the air temperature is higher than the surrounding region.	<b>Urban heat island</b>
E	A mixture of solid and liquid droplets suspended in the air.	<b>Particulate matter</b>
Select from: <b>Urban heat island    Particulate matter    Photochemical smog    Building density    Venturi effect</b>		

Q3	<b>One sentence is incorrect in each of the explanations below. Identify the wrong one.</b>	
A	Precipitation is higher in urban areas than the surrounding rural areas due to the increase in evaporation from dark surfaces, such as tarmac. This leads to cloud formation and precipitation. <del>Winds also cause precipitation in urban areas as they carry clouds from the rural area into the city and precipitation occurs as they rise over high-rise buildings.</del>	
	<b>Surface winds (not upper winds) travel into the urban area and rise upwards which causes precipitation.</b>	
B	The CBD of a city is always warmer than the area on the outskirts. This is due to building density increasing here, trapping heat between buildings, as well as heat output from electrical appliances in factories and office buildings. <del>Cars give out CO<sub>2</sub> but don't directly contribute to heat exchange with the atmosphere.</del>	
	<b>Car engines give off heat which can contribute to the heat island effect. This happens particularly during rush hour when traffic is stationary for a long time, with the engine still running.</b>	
C	Photochemical smog is caused when sunlight reacts with pollutants in the atmosphere, creating a layer above the city. <del>The smog is dark and blocks out sunlight from reaching the city. It can be a considerable health hazard.</del>	
	<b>The smog can be quite hazy but in most cases it can't be seen.</b>	
D	<del>The urban heat island effect can never be reduced as it is completely caused by building density. Solutions for other climate issues in an urban area are available. Particulate matter in the atmosphere can be reduced by pedestrianising areas and improving public transport.</del>	

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	<b>Whilst developed cities can't be remodified, urban planners have worked to reduce dark materials on the side of existing buildings, which can reduce the effect. Equally, reduction of electrical and traffic use can have an effect too.</b>
E	The venturi effect, whereby in very dense areas of a city, winds can be restricted and this leads to an increase in wind speed, often occurs. <del>Open areas within the city, such as parkland are then always experiencing much stronger gusts of wind during storm conditions than the surrounding rural areas.</del>
	<b>The venturi effect will decline when the funnelling effect of the wind stops and the winds in open parkland areas are no stronger than in a rural area. In fact, the buildings around a park will often reduce the wind circulation in the park itself.</b>

Q4	<b>Decide which heading the various factors would match with, in regards to urban climate</b>		
	<b>Urban climate causes</b>	<b>Urban climate issues</b>	<b>Urban climate management</b>
	Dark building materials High building density Narrow streets and walkways Urban planning (initial planning – high rise buildings and narrow streets) Rural-urban migration	Increase in asthma Flash flooding	Pedestrianising areas Public transport increase Urban planning (To remove dark materials from buildings)
	Pedestrianising areas	Dark building materials	Public transport increase
	High building density	Narrow streets and walkways	Urban planning
	Rural-urban migration	Increase in asthma	Flash flooding

Q5	<b>Think about the implications of management strategies to influence urban climates</b>
A	<p>What are some of the future negative implications?</p> <ul style="list-style-type: none"> <li>• Reduction in use of cars and people having to use public transport – issues with frequency and reliability.</li> <li>• Increased electricity bills and cost of air conditioning units.</li> <li>• Pedestrianised areas – affecting people's transport routes.</li> </ul>
B	<p>What are some of the future positive implications?</p> <ul style="list-style-type: none"> <li>• Increased public transport use – buses, bikes etc. Reduces heat exchange with the atmosphere and a reduction in particulate matter.</li> <li>• Improvement in health – reduction in asthma cases.</li> <li>• Quality of life – stress and obesity levels lower as people walk and cycle more.</li> <li>• Increase in tourism and likelihood of hosting world events, for example, the Olympics. This would happen as a result of improved air quality.</li> </ul>