Q1. Outline how **one** urban pollution reduction policy has been implemented.

[4 marks]

Q2. Assess the extent to which local weather and climate in an urban area might affect its character and / or people's lived experience.

[9 marks]

Q3. Which of the following is a form of air pollution where exhaust fumes interact with sunlight to produce low-level ozone?

[1 mark]

A Methane released from landfill ⬭

B Particulate pollution ⬭

C Photo-chemical pollution ⬭

D Urban heat island effect ⬭

Q4. Explain why thunderstorms are common in urban areas.

[4 marks]

Q6. What is the urban heat island effect?

[1 mark]

A Higher temperatures are found on large developed islands. The temperatures are higher because of the geographical location of the settlements near to the equator. ⬭

B The physical geography of some cities means that temperatures are higher than the surrounding areas e.g. where they lie on the coast with a warm onshore breeze. ⬭

C Small villages often have higher temperatures than the surrounding areas in the countryside. This is because of the effect of housing and lighting. ⬭

D Large cities have higher temperatures than the surrounding areas because of a variety of human activity. Dark surfaces absorb heat during the day and mass heating causes warming. ⬭

Q1.

Award one mark each for points of knowledge or understanding.

Allow extra marks for developed points (d).

Notes for answers

Allow credit for specific knowledge of an urban pollution reduction policy and an understanding of how it has been used. Allow credit for specific urban areas. Only credit one policy but accept that the policy may encompass different strategies. More than one place may be referenced if referring to the same policy. Allow credit for any type of urban pollution reduction policy eg strategies to tackle waste, drainage or air quality would all be acceptable approaches.

- London has been declared an Air Quality Management Area (1). This was needed as in 2015 it had the highest levels of NO_2 in Europe (1) (d). As part of this policy they issue fines for vehicle engine idling in the Square Mile (1). London has also adopted zero-emission buses and taxis to reduce levels of pollutants (1)
- The National Air Pollution Control Programme is an EU policy (1) that aims to ensure that all member states meet 2020 and 2030 reduction targets (1) (d). One of the key aspects of the policy is reducing PM2.5 emissions by targeting vehicle emissions through encouraging hybrid vehicles (1) (d).
- In order to reduce pollution some cities have adopted congestion charging as a policy (1). These work by charging vehicles to enter the central area of a city discouraging people from using their vehicles (1) (d). The money generated can then be invested in improving public transport (1) (d). New technologies such as GPS vehicle tracking systems have made the policy much easier to police (1) (d).
- In 2016 Mumbai recorded PM2.5 pollution at nearly double the safe limit (1) so it has adopted a pollution reduction policy involving shutting down more than 1000 polluting industrial units (1) (d). Mumbai has also improved waste management by increasing recycling to reduce biomass burning (1)(d).

The notes for answers are not exhaustive. Credit any valid points.

AO1 = 4

[Total 4 marks]

Q2.

AO1 – Knowledge and understanding of the local climate and weather of an urban area. Knowledge and understanding of the character and / or people's lived experience of that urban area.

AO2 – Application of knowledge and understanding to assess the extent to which the local climate and weather have affected the character and / or lived experience of that urban area.

Level 3 (7–9 marks)
AO1 – Demonstrates detailed knowledge and understanding of concepts, processes, interactions and change. These underpin the response throughout.
AO2 – Applies knowledge and understanding appropriately with detail. Connections and relationships between different aspects of study are fully developed with complete relevance. Analysis is detailed and well-supported with appropriate evidence.

Level 2 (4–6 marks)

AO1 – Demonstrates clear knowledge and understanding of concepts, processes, interactions and change. These are mostly relevant, though there may be some minor inaccuracy.
AO2 – Applies clear knowledge and understanding appropriately. Connections and relationships between different aspects of study are evident with some relevance. Analysis is evident and supported with clear and appropriate evidence.

Level 1 (1–3 marks)
AO1 – Demonstrates basic knowledge and understanding of concepts, processes, interactions and change. This offers limited relevance with inaccuracy.
AO2 – Applies limited knowledge and understanding. Connections and relationships between different aspects of study are basic with limited relevance. Analysis is basic and supported with limited appropriate evidence.

Notes for answers

AO1
Case studies of an urban area to illustrate and analyse key themes, to include:
- the nature and impact of physical environmental conditions
- urban form and characteristics in the given setting of the case study used
- the impact of urban forms and processes on local climate and weather
- urban temperatures: the urban heat island effect. Precipitation: frequency and intensity. Fogs and thunderstorms in urban environments. Wind: the effects of urban structures and layout on wind speed, direction and frequency. Air quality: particulate and photo-chemical pollution
- the concept of place and the importance of place in human life and experience
- factors contributing to the character of places: Endogenous factors: location, topography, physical geography, land use, built environment and infrastructure, demographic and economic characteristics
- people's lived experience of place in the past and present.

AO2
Responses are expected to show an understanding of the local weather and climate of an urban area. There should be clear recognition of the learning from the Changing Places unit in assessing the effect of this local climate and weather on the character and / or lived experience of the people in that place. Reciting learned case study material does not constitute AO2. It is the integration of the place study ideas and concepts which allow access to AO2. Assessment will depend on the place named in the response.
- Responses are likely to take a variety of approaches. Some may seek to apply knowledge of urban climates from the Contemporary Urban Environments unit to a place studied in the Changing Places unit, whilst others may apply the concepts of factors affecting character of place and / or lived experience from the Changing Places unit to a case study of urban climate studied in the Contemporary Urban Environments unit. The key is that candidates recognise how local climate and weather affects the character of place and/or lived experience of people in a place. The case study support is likely to be very varied.
- Example:
  - Preston is a city in Central Lancashire in northwest England. During the 19th century the town expanded rapidly due to the development of the textile industries. One of the reasons for mills locating in this area on the north bank of the River Ribble close to the Irish Sea was the prevailing south-westerly winds bringing moist air inland which helped prevent fire risk from dust in the mills. By the middle of the 19th century 80% of the population depended on the mills and by 1927 there were 60 mills in the town.
  - Therefore, the local climate had a clear impact on the character of the urban environment that developed during the 19th and early 20th centuries and on the lives of people living in Preston, as it helped determine the nature of the built

environment and urban form, alongside the nature of employment and housing available to Preston's residents.

- Much of the housing of central Preston is terraced housing built on a grid pattern. Long streets with an east-west orientation experience significant wind channelling and Venturi effect, especially on streets where 3 to 5 storey mill buildings remain. This is due to Preston's location close to the Irish Sea to the west, where prevailing south westerly winds follow the estuary inland where they are channelled along the narrow straight terraced streets. On windy days, especially in the winter, this can be quite unpleasant for residents and often results in significant amounts of litter and other debris being blown around.
- Therefore, the lives of local people have been / and are affected by the local weather conditions. Also, the character of local places is affected as some streets experience different local weather conditions.
- In winter Preston can experience more fog than surrounding areas, which can cause issues for traffic especially early in the morning. The fog results from warm moist air moving inland from the Irish Sea along the River Ribble, as it passes over the cooler ground condensation occurs and the fog forms in the Ribble Valley, therefore, affecting the lives of people, especially those commuting in an out of the urban area for work.
- Housing density is quite high in Preston, and the central urban area is usually a few degrees warmer than the surrounding rural areas on clear calm nights. In winter this reduces the number of frosts people experience, but can make conditions quite uncomfortable on hot summer nights.

Whatever place is chosen assessment should show understanding of the impact of local weather and climate on the character of the place and / or the lived experiences of the people in that place. Assessment of the level of connections between the different elements of the question is the key, and responses that assess past or present aspects are equally valid.

AO1 = 4
AO2 = 5
[Total 9 marks]

Q3.

C

AO1 = 1
[Total 1 mark]

Q4.

Point marked
Allow 1 mark per valid point with extra mark(s) for developed points (d).
For example:

Notes for answers

- Thunderstorms form in hot humid air and are characterised by heavy precipitation, thunder and lightning. They are produced by rapid convectional uplift under conditions of extreme instability (1).
- Urban convection caused by the urban heat island effect is most powerful in summer around late afternoon and early evening (1).
- Low pressure caused by convectional uplift draws in moist air from the surrounding countryside, (1) this creates tall cumulonimbus clouds (1) (d). The rising heat, water vapour and condensation nuclei from industry and vehicles (1) creates intense precipitation and thunderstorms (1) (d).
- The more intense the urban heating, the more violent the storm (1). The extreme temperatures cause a rapid expansion of air which develops a shock wave, creating

the thunder sound (1) (d).

- The tall cumulonimbus clouds create an updraught of air through the centre causing rapid cooling and condensation (1). During condensation, latent heat is released further fuelling the convectional uplift (1) (d). Raindrops are split in the uplift creating a positive electrical charge, forming lightning (1) (d).

The notes for answers are not exhaustive. Credit any valid points.

AO1 = 4

[Total 4 marks]

Q6.

D

AO1 = 1

[Total 1 mark]

Q1.

Students must be encouraged to use examples to support their points in this question. Where this was done, students often were able to access the full mark range. The London congestion charge was a popular choice but students could have chosen any type of pollution reduction policy, for example a recycling scheme would have been creditworthy. Some students failed to read the question carefully and produced responses evaluating the policies, rather than outlining how the policy was implemented.

Q2.

The requirements of this question crossed the specification units. It is important to remind centres that in every series there will be one question which crosses the specification units at both AS and A-level. In this case, the link was to *Changing Places*.

This question required students to make a link across the specification units and it remains worthwhile to remind centres that in every series, there will be one question which crosses specification units – at both AS and A-level. The concept (from that unit) of the character of place and / or people's lived experience was integrated into this contemporary urban environments question focusing on the effects of local weather and climate in an urban area on the character of the place of people's lived experience. A significant number of responses showed little AO1 knowledge and understanding rooted in the 'Urban Climate' section of the specification.

Many responses included very simple statements along the lines of 'when it is raining people will be unhappy', or 'when it is sunny the place will look nice'. Such responses lacked the sophistication and gained little credit. The more effective responses clearly engaged with how specific characteristics of urban areas affect the local weather and climate and then gave clear assessment of how this specifically affected the character of that place. For example how high levels of rainfall and damp atmospheric conditions experienced in many areas of northwest England were a factor in the development of the textile industries of the 18th and 19th centuries, impacting on the characteristics of such urban areas as Lancashire mill towns today. Others gave very specific impacts of characteristics of urban weather and climate on specific lived experiences. While some engaged with the cross specification link well, many others did not and a notable proportion did not attempt the question or scored zero.

Q3.

68% of students scored this mark by shading lozenge C. Those getting the question wrong most often chose option B relating to particulate pollution.

Q4.

Many students found this question challenging. Most students were able to gain one mark from identifying the urban heat island effect being a root cause of increased thunderstorms in urban areas. However, many were not able to develop their answers further. Some linked thunderstorms to condensation nuclei occurring as result of pollution and some were able to gain further credit by linking the urban heat island effect to convectional uplift. The best answers had obviously made good use of the advanced information and prepared well, sequencing information to explain the process of the formation of thunder and lightning and how this linked to urban areas.