

Mark scheme

Level 1 Simple description of the climate of one type of tropical region. (1–4 marks)

Level 2 Specific detail is used to describe the regime of one tropical climate, with an attempt to explain one aspect (temperature/precipitation/winds). (5–8 marks)

Level 3 Fully developed answer with both accurate description and clear explanation of the climate of one appropriate tropical region. (9–10 marks)

Note This question is also assessing knowledge and understanding, but in this case depth of knowledge is paramount. As is required by the question, references to actual areas (case studies) will be needed to access the higher level. Equally, as there are two commands in the question, both elements must be addressed for maximum credit.

Ecosystems: change and challenge

Question 3

- (a) On an abandoned or neglected site, such as the one shown in Photograph A, a secondary succession, similar to a lithosere, would occur. Changes in the micro-environment occur over time as a result of competition between species and soil-forming processes.
- Stage one — the pioneers such as mosses and lichens develop on bare, concrete surfaces. Weeds, for example ragwort and grasses, grow on open ground where soil is already present.
 - Stage two — windblown seeds germinate in cracks in the tarmac/concrete. Again these would include ragwort, willowherb, meadow-grass, dandelion, clover, etc. Such plants can tolerate waste ground, rubbish and debris. At this stage plant succession is rapid, and decaying vegetation produces organic material/humus for the following stages.
 - Stage three — tall herbs germinate in the richer soil, e.g. rosebay willowherb, michaelmas daisy, fennel and Jacob's ladder among others. These plants gradually shade out the smaller plants, halting photosynthesis.
 - Stage four — grassland develops as soil enrichment continues, with scattered clumps of tall herbs. During this stage Japanese knotweed may invade, and this can grow to 3 m high, shading out many other species.
 - Stage five — scrub woodland eventually occurs with species such as sycamore, rowan and hawthorn, with dense thickets of brambles that grow roots deep into crevices in the concrete.

Mark scheme

Level 1 Basic statements describing simple changes in plants over time, little knowledge of species and very little reference to processes operating. (1–4 marks)

Level 2 There is an understanding of the processes operating within a secondary succession, and the response explains the transition between two or more stages. (5–7 marks)

Note Simple descriptions and/or statements lifted straight from the photograph will be marked within Level 1. Examiners are looking for students to show how the evidence points to the processes operating in such an environment. Such material will be marked within Level 2.

- (b) Routeways are distinctive habitats because exotic species of plants and insects may be brought in by traffic or train. They also represent wildlife corridors, comparable to rural hedgerows.
- **Railway lines** enable animals to move around the city with little or no interference from traffic. Windborne seeds can be sucked along by trains, allowing the establishment of plants such as Oxford ragwort. Because the track is fenced off, a lack of human interference encourages wildlife such as badgers and urban foxes. There are also many areas of brambles, which provide nesting sites for a variety of birds.

- **Roads** have a similar effect, their verges and embankments providing homes for kestrels and scavenging birds. The nitrogen-rich exhaust fumes of vehicles boost the growth of some wild flowers and these in turn increase the presence of insects and animals further up the food chain. However, the number of wild flowers can be reduced by mowing, depending on when this is carried out. Some roadsides are managed: trees and shrubs are planted to act as noise screens; flowers are planted to brighten the landscape, as part of the Britain in Bloom competition or to provide advertising for local businesses.
- **Canals** are like long ponds, providing a habitat for a variety of aquatic plants (e.g. yellow flag iris), waterfowl (e.g. moorhens, ducks, kingfishers) and water-loving insects (e.g. dragonflies, damselflies).

Mark scheme

Level 1 Simple and generalised statements relating to the ecology of one or more types of routeway. (1–4 marks)

Level 2 Specific and detailed knowledge and understanding of the ecology of at least two different types of routeway. (5–8 marks)

Note This question is assessing knowledge and understanding. Credit will be awarded for both depth and/or breadth of knowledge. Although not specifically required by the question, references to actual areas (case studies) will access the higher level.

- (c) Small- or large-scale ecological conservation areas could be selected. An example of a small area would be the Dulwich Upper Wood conservation area in southeast London; a larger-scale example would be the Central Amazon Conservation Complex, in Brazil, both featured in the textbook.

There is likely to be description of the ecology of the chosen location and a description of the conservation and management strategies operating within the area. An assessment of the success of the conservation strategies, for example in the Sundarbans or the Serengeti, may well relate to level of economic development and the ability of governments to manage with limited resources. A reasoned judgement might be that the effectiveness of conservation is more manageable in more economically developed countries where environmental pressure groups, aided by the media, bring conservation issues to the attention of the public. There is also available finance, either from public contributions or from charitable donations.

Mark scheme

Level 1 A simple generic description of one conservation area; the emphasis is not on the effectiveness of conservation strategies. (1–4 marks)

Level 2 Conservation strategies for at least one accurately located conservation area are known, but there is only a token acknowledgement of their effectiveness. (5–8 marks)

Level 3 A fully developed answer, where one or more conservation areas are used accurately to examine the effectiveness of the strategies put in place to manage them. (9–10 marks)

Note This question is assessing depth of knowledge and understanding. The requirement is that only the concept of ecological conservation areas is discussed, though it could be examined in the context of more than one area. It is also clear that actual areas (case studies) should be referred to. The key command is 'discuss', which means that the student must examine the overall effectiveness of the concept from a variety of standpoints in order to access the highest level.

- (c) The storm event selected should be from the last 30 years. This event can be one from the British Isles, such as the great storm of 1987, or it could be a tropical revolving storm, such as Hurricane Katrina, USA, from 2005 or Cyclone Nargis, Burma, from 2008.

The impacts of the storm will vary depending on the example selected. A good candidate will use precise located detail and will categorise the impacts as economic, social, political etc. Responses to the event may vary spatially, but again will depend largely on the example selected.

Discussion is invited, so candidates are expected to make some reasoned comment, for example in relation to the effectiveness of the response in relation to economic development.

Mark scheme

Level 1 A basic generalised description of a storm, which may be named, however there will be no attempt to separate the impacts from the responses, and the response will be generic. (1–4 marks)

Level 2 A clear description of the impacts of a named storm event, which will be accurately located. Responses to the event will be described but there will be no obvious discussion. (5–8 marks)

Level 3 A fully developed answer with accurate and more detailed elaboration of the impacts and responses to the named event. There will be a clear discussion of the responses and impacts, perhaps in relation to location or level of economic development. (9–10 marks)

Note The question makes clear reference to one case study, which means that there will be specific credit for it in the mark scheme. The key words/phrases that must be addressed are: discuss, impacts and responses where a storm has taken place.

Ecosystems: change and challenge

Question 3

- (a) The changes can be described in terms of:
- Shifting cultivation — store in the biomass is smaller but stores in the litter and soil are slightly larger than in an undisturbed tropical rainforest, some of the biomass has been removed from the system by harvesting.
 - Plantation agriculture — biomass is also smaller than in an undisturbed tropical rainforest, however the litter store is of a similar size to that in a natural forest as weeding removes some of the possible vegetation. The soil store is slightly greater than in a natural tropical rainforest but lower than it would be under shifting cultivation. In this system application of fertiliser has improved the store of nutrients in the soil.

Mark scheme

Level 1 Basic/simple but incomplete statements stating the differences between the undisturbed forest and at least one of the other nutrient cycle diagrams. (1–4 marks)

Level 2 Clear description of the differences between the nutrient stores in the undisturbed tropical rainforest and both shifting cultivation and plantation agriculture. (5–7 marks)

Note Simple statements lifted straight from the diagrams will be marked within Level 1. Examiners are looking for students to demonstrate an ability to describe differences/changes using either quantitative or qualitative statements. Such material will be marked within Level 2.

- (b) It is expected that candidates will select the tropical rainforest, the tropical savanna grasslands, or (less likely) the tropical monsoon forest.
- (i) Description of the main characteristics of the biome can include reference to the climate, soil, vegetation and the wildlife. Most answers are likely to use the tropical rainforest, so a description of

the layered nature of the climatic climax vegetation, the equatorial climate regime and knowledge of the latosol soil might be offered. Answers at the wrong scale, e.g. a plant succession or a small-scale ecosystem should be confined to Level 1.

Mark scheme

Level 1 A basic description of one or more elements of the chosen biome/ecosystem. (1–4 marks)

Level 2 A clear description, using some accurate facts, relating to vegetation, climate and soils. (5–8 marks)

Note This question is assessing knowledge and understanding. Credit will be awarded for both depth and/or breadth of knowledge. Although not specifically required by the question, detailed references to the vegetation of named areas will access the higher level.

(ii) Again depending on the biome chosen, it is expected that candidates will discuss the ways in which the plants and the wildlife have adapted to the particular climate. This will be most easily achieved if the tropical rainforest or savanna grasslands have been selected. For the tropical rainforest expect reference to be made to adaptations, such as buttress roots, drip-tip leaves and epiphytes. Insect, bird and animal species are most diverse in the tropical rainforest because of the abundance of food all year round and the complicated food webs in existence, all of which can be linked to the climate.

Mark scheme

Level 1 Simple adaptations that describe either the ways that the vegetation or the animals have evolved to survive in the climate of the selected biome. (1–4 marks)

Level 2 A clear response which describes adaptations of both vegetation and wildlife to the climate of the chosen biome. (5–8 marks)

Level 3 At this level expect to see detail in the response, particular species of vegetation or animal might be used accurately to discuss the ecological responses to the climate. (9–10 marks)

Note This question is assessing depth of knowledge and understanding. The requirement is that only the concept of ecological response is discussed in the context of one biome, though it could be examined in the context of more than one area. It is also clear that actual areas (case studies) need to be referred to. The key command is 'discuss', which means that the student must examine the overall effectiveness of the concept from a variety of standpoints to access the highest level.

Section B

World cities

Question 4

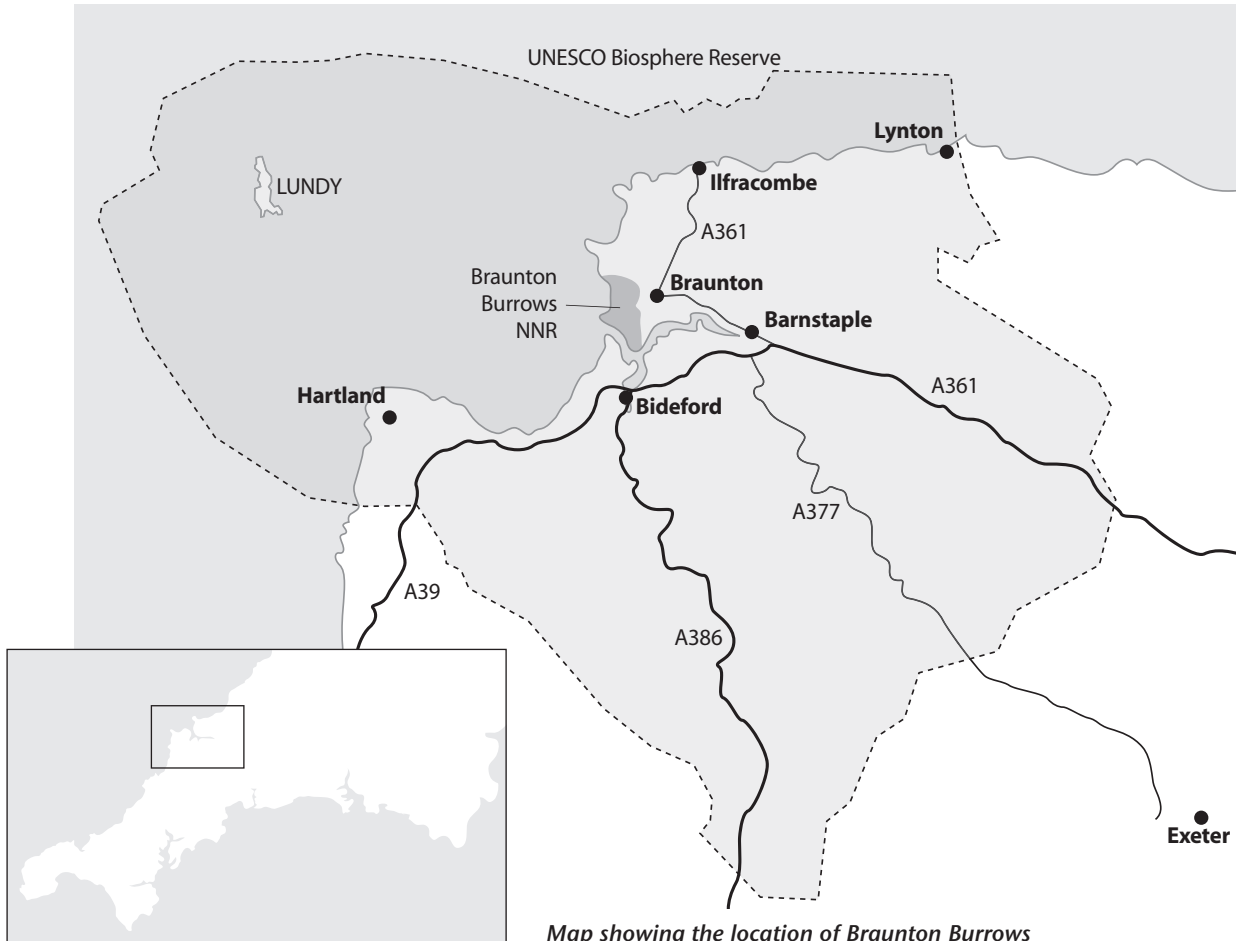
- (a) The photograph demonstrates the two main elements of urbanisation in developing countries:
- the rich — the tall apartment blocks/offices, densely packed together and covering an extensive area (but with some green spaces). These are areas of high-class residential property as well as places of employment
 - the poor — the favelas in the foreground. Ramshackle, made of timber and old doors with corrugated iron roofs. Despite this there are aspects of permanence — the roadway, the cars, the electricity lines, maybe telephone lines. Not a great deal of evidence of planning of layout. Some of the buildings have an air of permanence (use of brick and concrete)

Mark scheme

Level 1 Simple identification of features on the photograph with no attempt to describe or classify. Commentary is either lacking or simplistic. (1–4 marks)

Ecosystems: change and challenge

Braunton Burrows, part of north Devon's UNESCO Biosphere Reserve



Map showing the location of Braunton Burrows

Braunton Burrows lies at the heart of north Devon's UNESCO Biosphere Reserve, close to Barnstaple. Braunton Burrows, which is also a National Nature Reserve, is one of the largest natural sand dune ecosystems remaining in western Europe. The area gets its name from the large numbers of rabbit burrows to be found within the dunes. The rabbits' constant grazing has strongly influenced the vegetation, as they have cropped short the turf of herbs and grasses in many places. The Braunton Burrows area encompasses some 1346 hectares and, in addition to the fragile sand dunes, has examples of mud and sand flats, a rocky foreshore, salt marshes, rough grazing and woodland. The sand dunes are an example of an active psammosere, where plant succession is ongoing. They provide a habitat for rare species of plants, butterflies and small mammals such as dormice. The area exhibits extraordinary biodiversity, with between 400 and 500 species of plant, including rare species of orchid, and over 30 species of butterfly. The rare Amber Sandbowl Snail makes its home in the wet dune slacks, one of only two known sites in the UK.

Some 53,000 people live in the area immediately around the reserve and north Devon is visited by huge numbers of tourists every year. The land is predominantly privately owned and managed by the Christie Devon Estates, although a small part of it is used by the Ministry of Defence for amphibious training.

Surprisingly, this activity helps the wildlife in the dunes because it creates mobile sand, which particularly benefits plants such as the sea stock, water germander and sand toadflax. Part of the dune system is closed for 10 days every year for military training, the remainder is open to the public and provides an important recreational site all year round for both locals and tourists.

There are three important criteria to consider in the management of biosphere reserves. These are:

- conservation
- learning and research
- sustainable development

Local people are encouraged to follow traditional land practices in the wider area of the North Devon Biosphere Reserve, such as grazing sheep on salt marshes, harvesting mussels and fishing locally for Atlantic salmon, sea trout and sea bass. Pupils attending Braunton Community College, located close to the reserve, are educated about the importance of conservation and sustainable development in the local area. There is a long tradition of botanical research in Braunton Burrows; the North Devon College offers foundation degrees related to the Biosphere Reserve.

In recent years non-native plants such as the evening primrose have started to invade the dunes, so management is necessary to prevent them from out-competing indigenous species. An agreement has been made with the landowner to re-introduce grazing to the majority of the Burrows area to halt the spread of coarse vegetation and alien species and this has proved largely successful.

AQA A2 Geography
The physical options

Ecosystems: change and challenge

1

AQA A2 Geography: The physical options
Ecosystems: change and challenge

Model of nutrient cycling

2

AQA A2 Geography: The physical options
Ecosystems: change and challenge

Food web

3

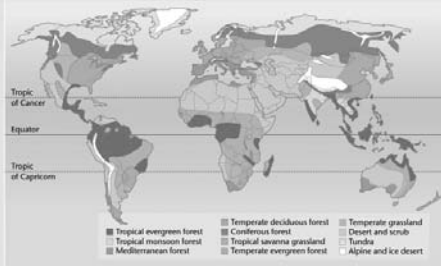
AQA A2 Geography: The physical options
Ecosystems: change and challenge

The development of a lithosere

4

AQA A2 Geography: The physical options
Ecosystems: change and challenge

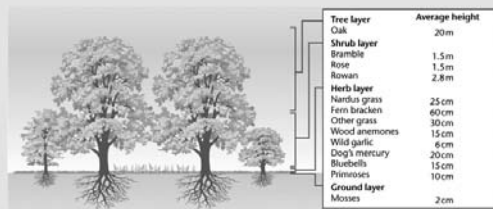
World vegetation zones



5

AQA A2 Geography: The physical options
Ecosystems: change and challenge

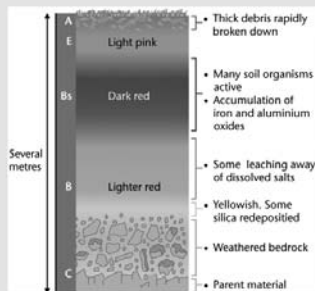
Structure of an English woodland



6

AQA A2 Geography: The physical options
Ecosystems: change and challenge

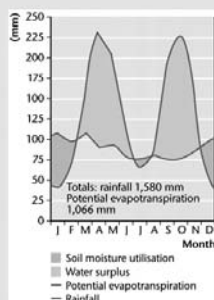
Soil profile
 latosol



7

AQA A2 Geography: The physical options
Ecosystems: change and challenge

Soil moisture budget for Cameroon



8
