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**Section A: Atmospheric Systems**

**Do not answer more than ONE question from this section.**

1. Figure 1 summarises the main features of English rainfall.

Rainfall in England varies widely. The Lake District is the wettest part, with average annual totals exceeding 2,000 mm (this is comparable with that in the western Highlands of Scotland). The Pennines and the moors of south-west England are almost as wet. However, all of East Anglia, much of the Midlands, eastern and north-eastern England, and parts of the south-east receive less than 700 mm a year.

Typically, it rains on about one day in three in England, perhaps somewhat more often in winter, though long, dry spells occur in most years.

Near the south coast there is an appreciable summer minimum and winter maximum of rainfall, with totals in July barely half those in January; western, northern and eastern coasts are more likely to see the driest month in spring and the wettest in late autumn. Inland, parts of the Midlands experience a summer rainfall maximum.

(Source: [www.metoffice.com](http://www.metoffice.com))

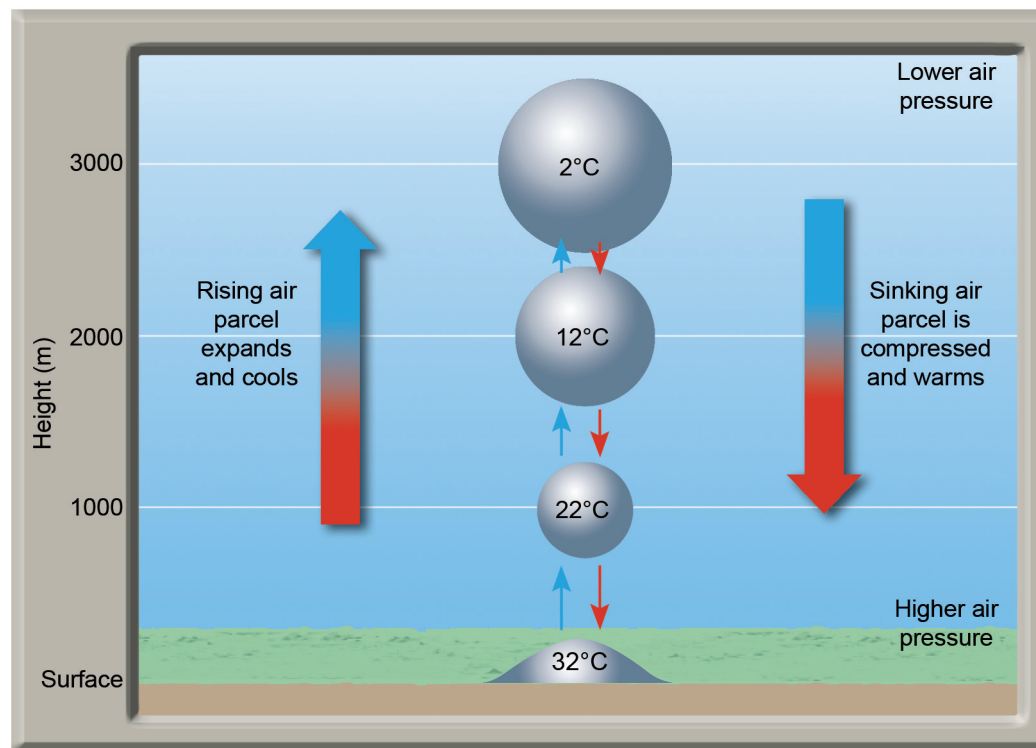
**Figure 1**

- (a) Distinguish between **convectio**nal and **frontal** mechanisms of uplift. **(5)**
- (b) Account for the spatial and temporal variations in Britain's rainfall. **(20)**

**(Total 25 marks)**



2. Figure 2 shows how temperatures change in rising and sinking air parcels.



(Source: www.shelleypotts.com)

Figure 2

(a) Define the term **adiabatic lapse rate** and briefly explain why the rates for dry and saturated air differ.

(5)

(b) Examine the weather characteristics associated with different states of atmospheric stability.

(20)

(Total 25 marks)

















**Section B: Glacial Systems**

**Do not answer more than ONE question from this section.**

3. Figure 3 describes the changes that took place to an Icelandic glacier between 1932 and 1992.

Skeidarárjökull is an outlet glacier from the largest ice cap in Iceland, Vatnajökull. It is about 23 km in length and the width at its snout is also about 23 km. From 1932 to 1964, the glacier retreated. In 1966, a several-decametre [tens of metres] advance of the glacier took place. After phases of recession, subsequent sudden advances took place in the years 1972-1975 and 1983-1986, when the glacier advanced by 450 m. During the next four years, until 1990, the glacier margin retreated. There is evidence of a double advance of the glacier in 1965 and 1992.

(Source: E. Wisniewski, L. Andrzejewski, P. Molewski, *Landform Analysis* 1:73–78, University of Silesia and the Association of Polish Geomorphologists, 1997)

**Figure 3**

- (a) Define the term **glacier system** and suggest why glaciers are regarded as **open** systems. **(5)**
- (b) Examine the factors influencing the short and long-term variations in the position of glacier snouts. **(20)**

**(Total 25 marks)**



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4. Figure 4 is a photograph of a Scottish landscape that has been glaciated.



Photograph courtesy of Andy Palmer

**Figure 4**

- (a) Distinguish between the processes of **erosion** and **weathering** as experienced in glacial environments. **(5)**
- (b) Explain how erosion and weathering processes influence the characteristics and location of glacial landforms. **(20)**

**(Total 25 marks)**



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**Section C: Ecosystems**

**Do not answer more than ONE question from this section.**

5. Figure 5 shows mean rates of litter input into the soil system in selected biomes.

<b>BIOME</b>	<b>LITTER INPUT (tonnes/hectare/year)</b>
Tundra	1.5
Coniferous forest	7.5
Temperate deciduous forest	11.2
Temperate grassland	7.5
Tropical grassland	9.5
Tropical rainforest	30.0

(Source: Swift M.J., Heal O.W. and Anderson J.M., *Decomposition in Terrestrial Ecosystems*, Basil Blackwell, 1979)

**Figure 5**

- (a) Distinguish between the terms **litter** and **humification**. **(5)**
- (b) Examine the influence of **organisms** (plants, animals and man) on soil profile characteristics. **(20)**

**(Total 25 marks)**



6. Figure 6 shows a model of plant succession.

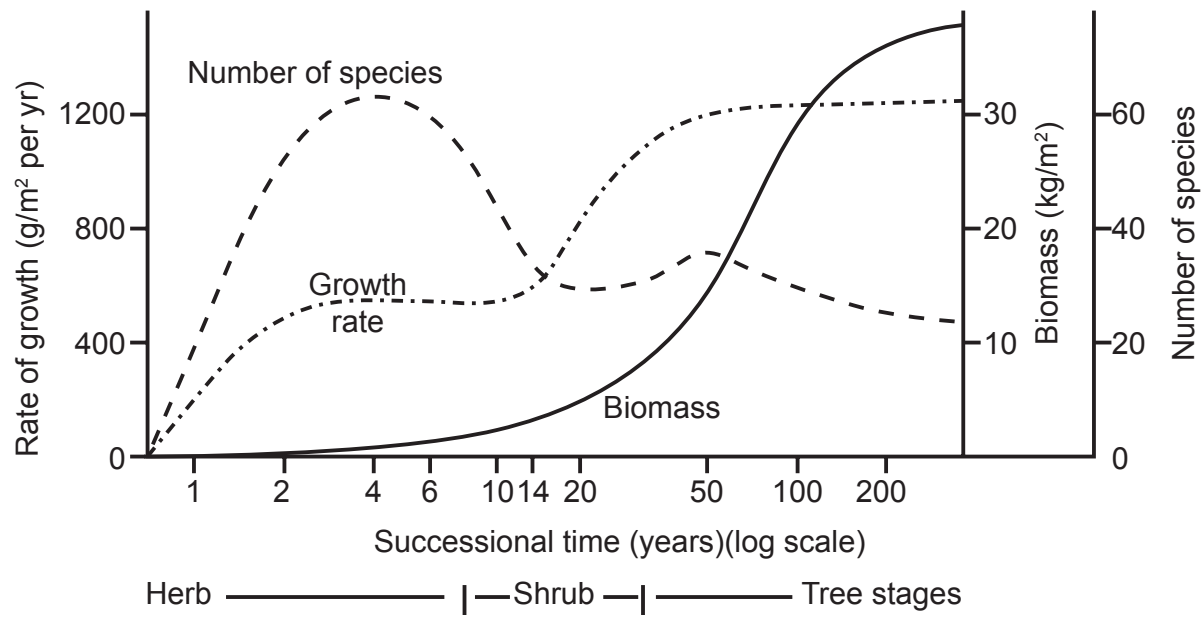


Figure 6

- (a) Distinguish between the terms **primary succession** and **secondary succession**, giving an appropriate example of each. (5)
- (b) Examine the factors that have influenced either a named **lithosere** OR a named **hydrosere**. (20)

(Total 25 marks)

















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