

Section A

Answer **all** questions in this section.

Write your answers in the spaces provided.

- 1 (a) Table 1.1 contains information on the structural components of the atmosphere.

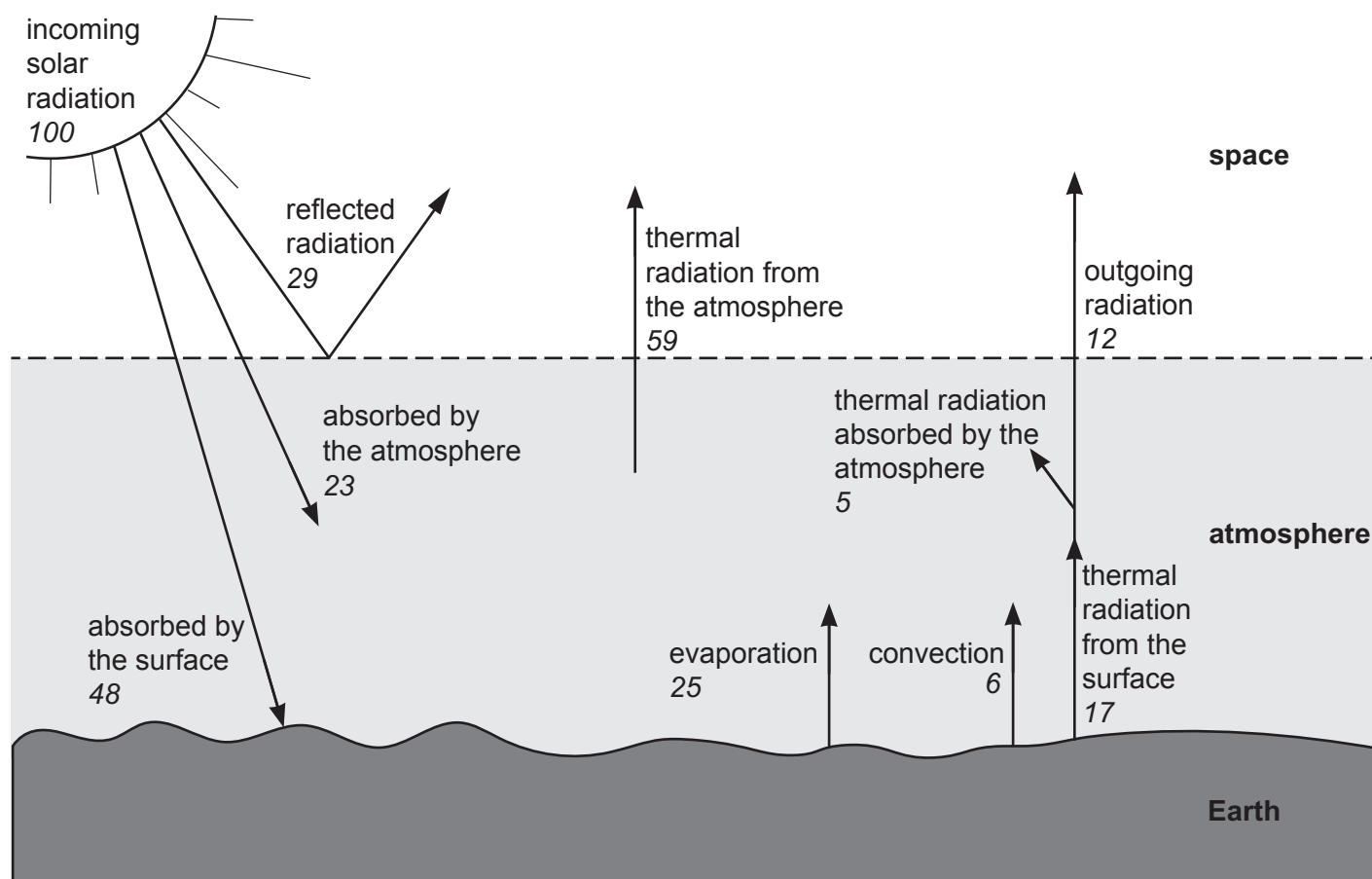
Table 1.1

atmospheric layer	altitude measured above the equator /km	max temperature /°C	min temperature /°C
	0–15	+18	–54
	15–50	–5	–54
Mesosphere	50–85	–5	–90
	85–500	–20	–90

Complete Table 1.1 by adding the names of the atmospheric layers.

[2]

- (b) Fig. 1.1 is a simplified diagram of the Earth's energy budget, with energy values shown in arbitrary units.



Key

29 energy value in arbitrary units

Fig. 1.1

- (i) Calculate the percentage of the energy absorbed by the surface which is transferred to thermal radiation from the surface. Use data from Fig. 1.1.

.....% [2]

- (ii) Describe how the balance between incoming solar radiation and radiation transferred to space is maintained in '*the Earth's energy budget*'. Refer to Fig. 1.1.

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- (iii) Describe the impact of an increase in greenhouse gases on the heat and energy in the atmosphere. Refer to Fig. 1.1.

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- (iv) Name two scientific methods used to provide evidence that *'the Earth's energy budget'* is changing.

State how each method is used to provide this evidence.

method 1

how method provides the evidence

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method 2

how method provides the evidence

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[4]

- (v) Outline ways in which humans are responsible for changes in *'the Earth's energy budget'*.

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[Total: 20]

- 2 (a) Describe how chemical processes can cause weathering of rocks.

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- (b) Fig. 2.1 is an extract from a newspaper article.

January 2018: Mudflows in the Saint Ynez Mountains of California have caused destruction. California's communities were covered with a flow of knee-high mud.

Before the mudflows, many of the surrounding slopes were black and covered with ash as the result of large wildfires destroying vegetation in September 2017.

Fig. 2.1

- (i) Define the mass movement term *mudflow*.

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- (ii) Suggest how the 'wildfires destroying vegetation' in Fig. 2.1 may have increased the risk of mass movement in the Saint Ynez Mountains.

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- (iii) Describe how natural processes, other than loss of vegetation, can cause mass movement on slopes.

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- (iv) Afforestation is one strategy used to reduce the frequency of mass movement on slopes.

Suggest one **other** strategy and explain how this strategy reduces the frequency of mass movement on slopes.

strategy

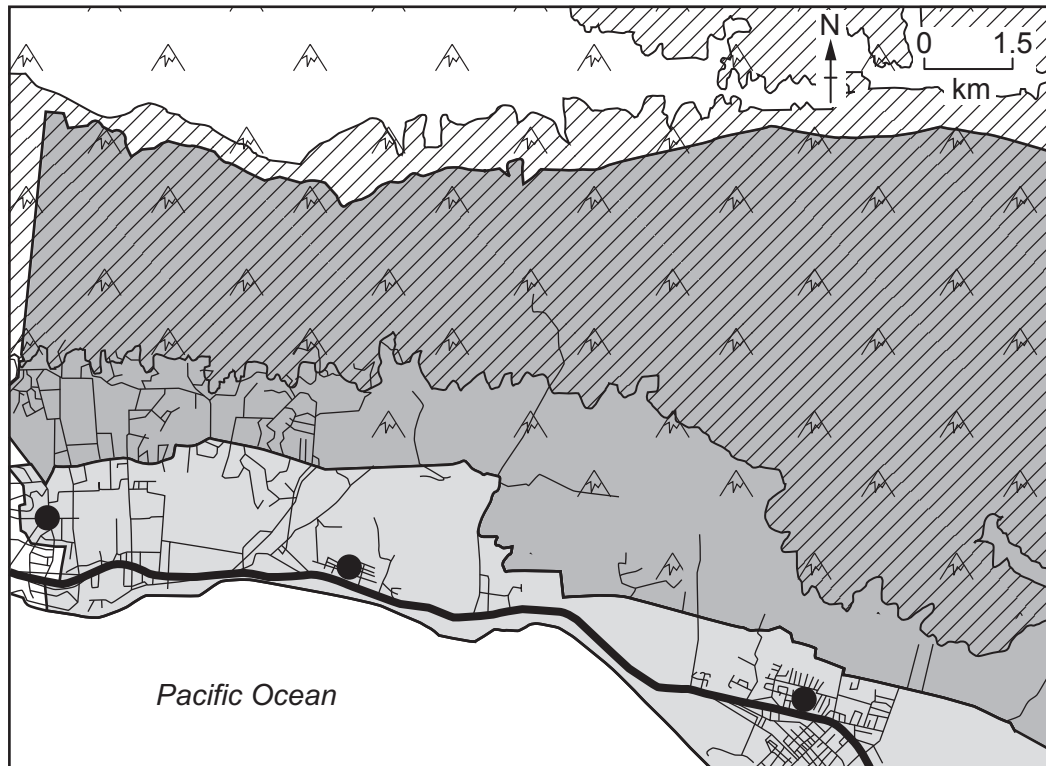
explanation

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..... [2]

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- (c) Fig. 2.2 is a map showing potential source areas for mudflows and the associated evacuation zones around the Saint Ynez Mountains.



Key

- | | | | |
|---|-----------------------|---|--------------------|
|  | mudflow source area |  | major road |
|  | compulsory evacuation |  | minor road |
|  | voluntary evacuation |  | mountainous region |
|  | settlement | | |

Fig. 2.2

Explain how mapping hazards can help reduce the impact of mass movement events on the damage and loss of life in the region shown in Fig. 2.2.

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..... [6]

[Total: 20]

Section B

Answer **one** question from this section.

Write your answers on the separate answer paper provided.

- 3 Fig. 3.1 is a diagram illustrating how acid rain can form.

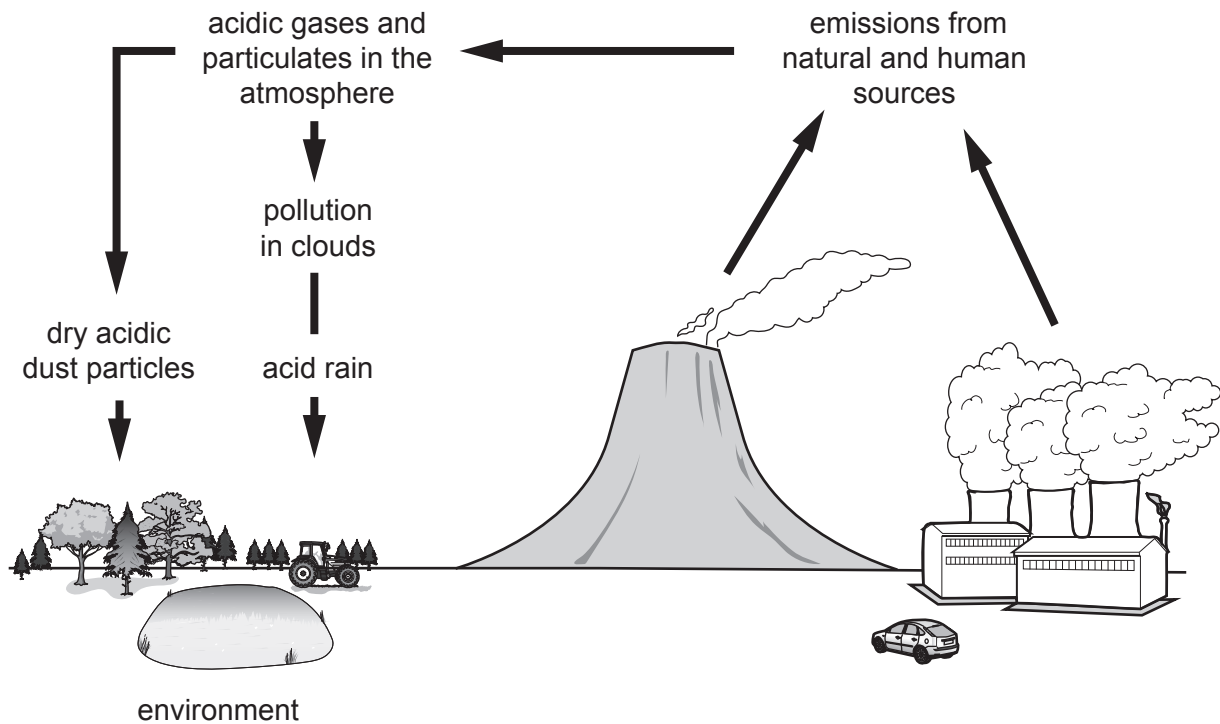


Fig. 3.1

- (a) Describe how emissions form acid rain and explain the impact this can have on the environment. Refer to Fig. 3.1 in your answer. [10]
- (b) 'The widespread impact of acid rain can only be managed successfully by strategies at a local level.'

Discuss the extent to which you agree with this statement.

[30]

[Total: 40]

- 4 Fig. 4.1 is a map of a town where a new coal-fired power station is planned.

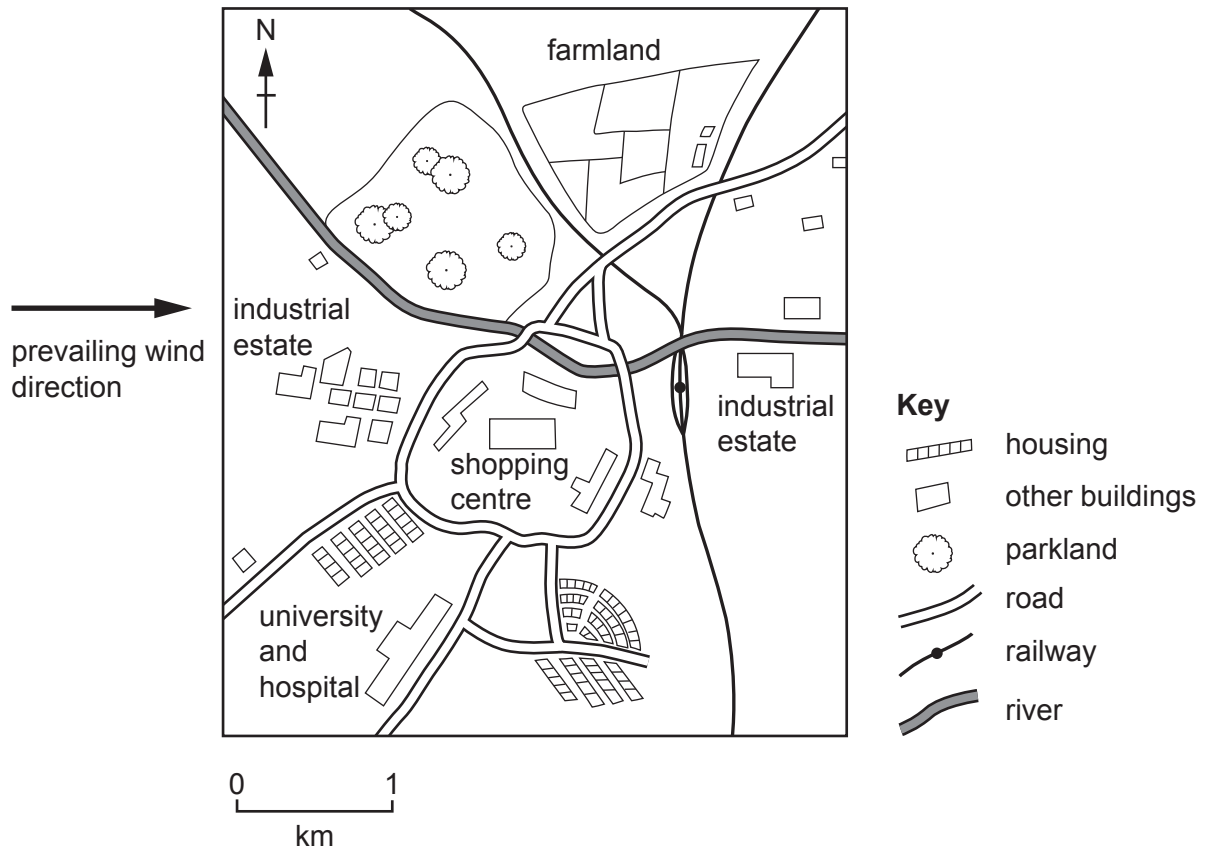


Fig. 4.1

- (a) Discuss the factors involved in planning the most suitable site for the coal-fired power station, with the aim to balance the environmental, social and economic impacts. Refer to Fig. 4.1. [10]
- (b) Discuss how pollution management strategies can affect levels of pollution within urban areas. Refer to examples from countries at different stages of economic development. [30]

[Total: 40]

5 Fig. 5.1 is a map of a plate boundary.

Fig. 5.2 shows the depths at which earthquakes occur at different distances along line A–B.

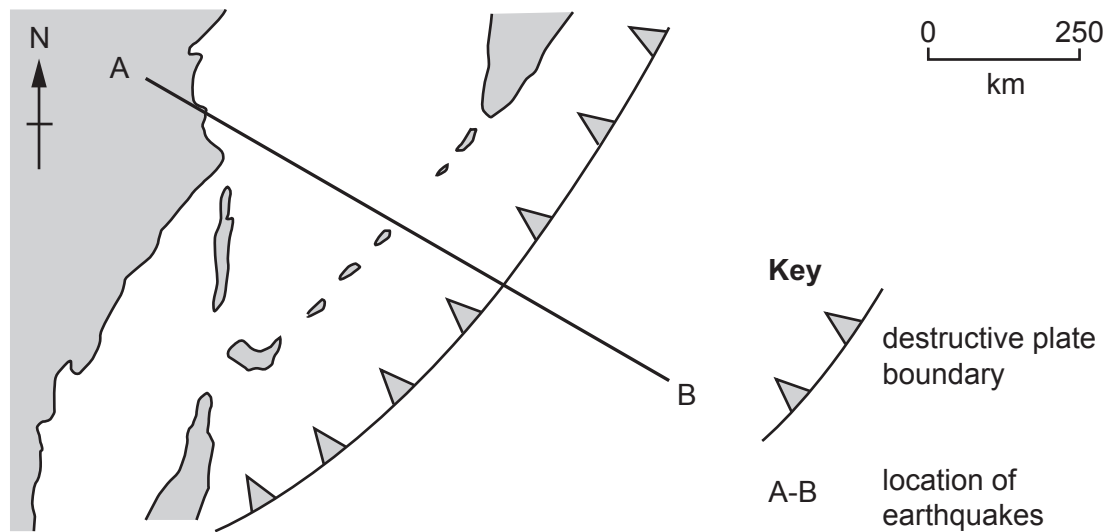


Fig. 5.1

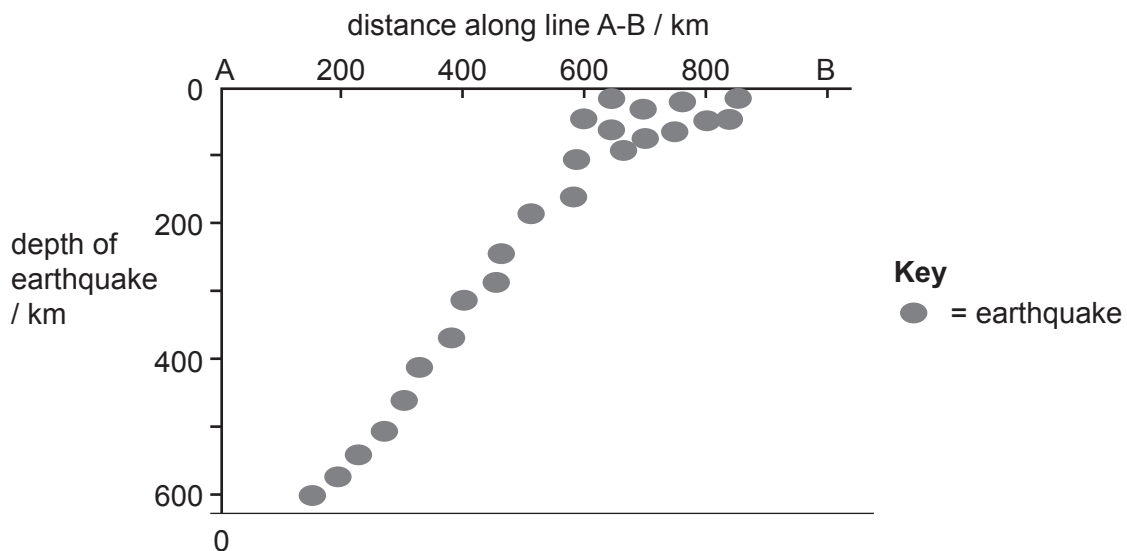


Fig. 5.2

- (a) Describe the pattern of the depth of earthquakes in Fig. 5.2. Suggest how the depth of earthquakes provides evidence for plate tectonics. [10]
- (b) Explain how earthquakes can cause a range of natural hazards and discuss the strategies used by different countries to prepare for these hazards. [30]

[Total: 40]

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