

Exemplar 6
Secondary 1 G3 / Express Humanities Geography
End-of-Year Examination
Question Paper

- 1 a) Using an example, explain what is meant by renewable resources. [2]
- b) The physical environment has four components. They are also known as the four spheres on earth.

Using Fig. 1, indicate the specific spheres on Earth into the boxes provided. [3]

The Global Earth System

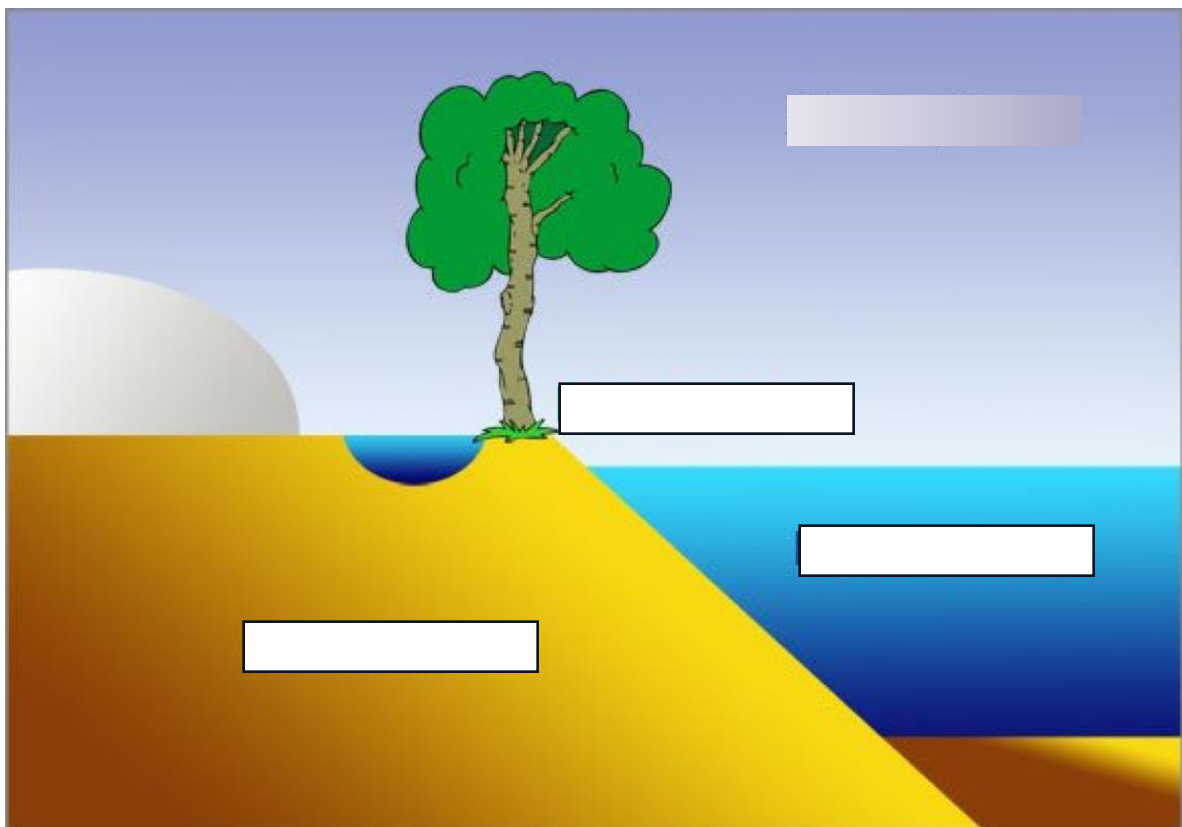


Fig. 1

- c) Describe how water is used in industries. [3]
- d) Explain how the use of fertilisers on farms can lead to death of the aquatic ecosystem. [4]
- e) Study Photograph A, which shows the condition of the land in Iran.

The condition of the land in Iran



Photograph A

[3]

With reference to Photograph A, explain why flash floods may occur in this area.

- f) Study Fig. 2, which shows the changes in water pricing from 2017 to 2018 in Singapore.

Changes in water pricing from 2017 to 2018 in Singapore.

	Phase 1: From 1 Jul 2017	Phase 2: From 1 Jul 2018
	Price (\$/m ³)	Price (\$/m ³)
Tariff	\$0.66	\$0.66
Waterborne Fee	\$0.78	\$0.92
Total Price	\$1.44	\$1.58

Note: Water is charged per cubic metre (m³), which is equivalent to 1,000 litres. Figures are before GST.

Tariff: The water tariff covers the costs incurred in the various stages of the water production process, including collection of rainwater, treatment of raw water and distribution of treated water to customers through an extensive network of water pipes throughout Singapore. The Water Tariff is charged based on the amount of water consumed.

Waterborne Fee: The waterborne fee is a fee charged in Singapore based on the volume of water usage. It goes towards meeting the cost of treating used water and maintaining the used water network.

Fig. 2

With reference to Fig. 2, explain how water pricing might help Singapore achieve sustainable management.

[3]

- 2 a) Study Fig. 3, which shows the distribution of tropical rainforests in the world.

Tropical Rainforests in the world

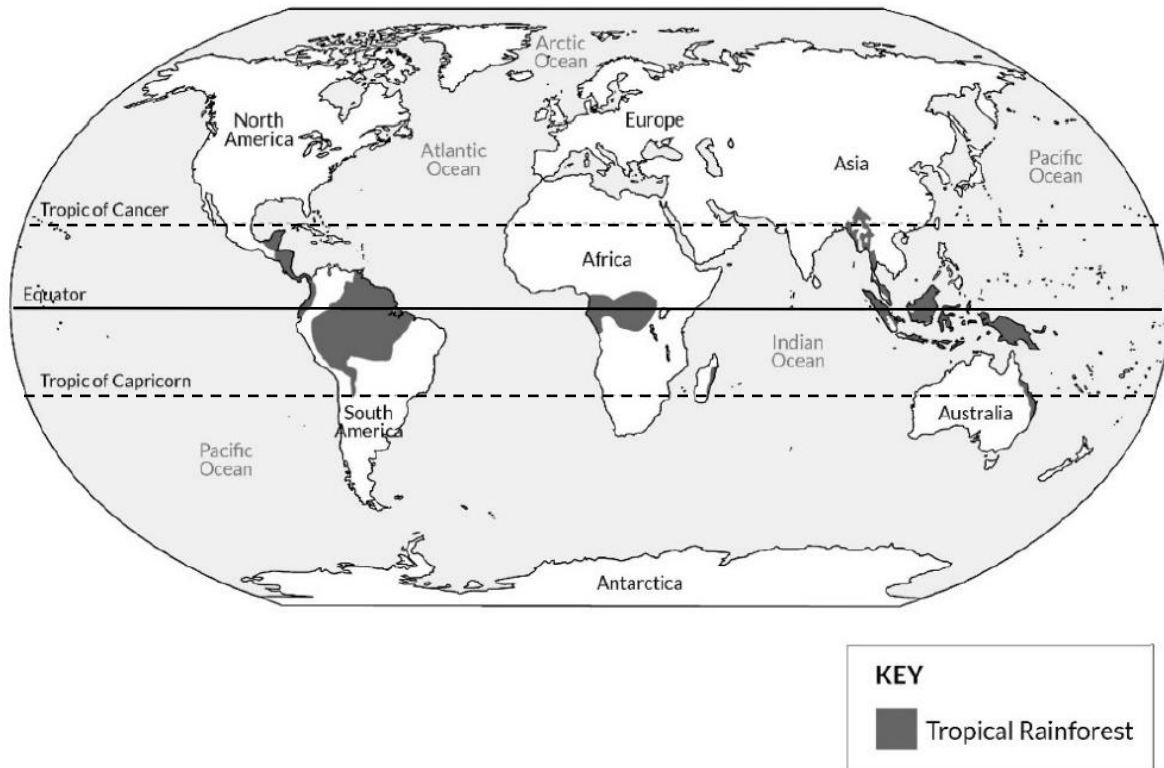


Fig. 3

Using Fig. 3, describe where tropical rainforests are found in the world.

[2]

b) Describe the climatic conditions suitable for tropical rainforests to grow.

[2]

- c) Study Fig. 4, which shows an image of mangroves near a coast.

Mangroves near a coast

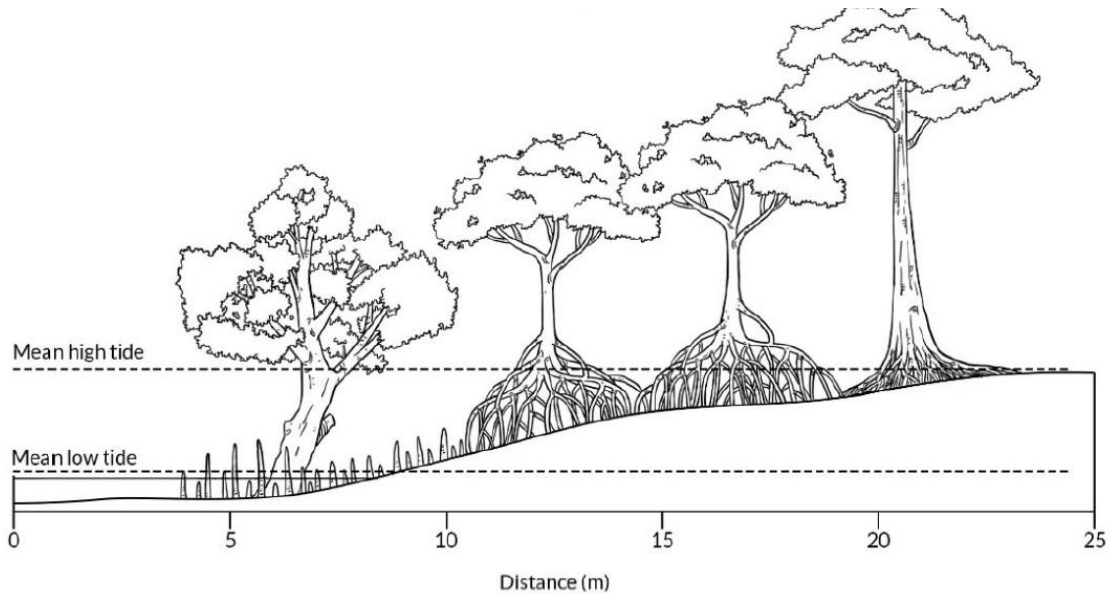


Fig. 4

With reference to Fig. 4, explain how the 2 specific types of roots shown help the mangrove trees thrive in coastal areas.

[4]

- d) Compare the forest structure and leaves of tropical rainforests and mangroves.

[4]

- e) Explain how trees contribute to carbon storage.

[3]

- f) Study Fig. 5, which shows the area deforested in the Amazon Rainforest from 2004 to 2020.

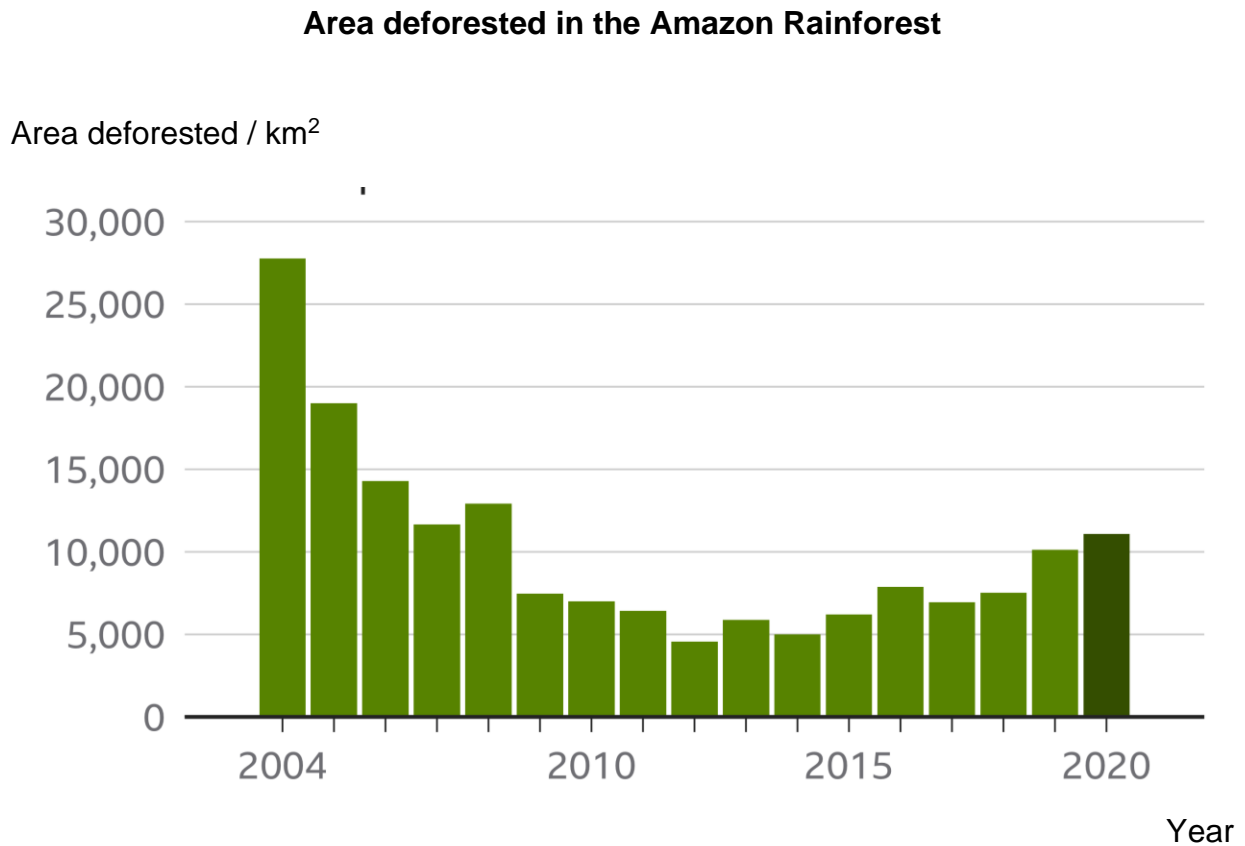


Fig. 5

Source: https://ichef.bbci.co.uk/news/640/cpsprodpb/ED5C/production/_115746706_optimised-amazongdp-nc.png

With reference to Fig. 5, describe the changes in the area deforested from 2004 to 2020. [3]

End of paper

Mark Scheme

1	a)	<p>Using an example, explain what is meant by renewable resources.</p> <p>Award 1 mark for each explanation on what is meant by renewable resources, to a maximum of 1 mark. Award 1 mark for a relevant example, to a maximum of 1 mark.</p> <p>Possible responses include:</p> <ul style="list-style-type: none"> • Renewable resources are resources that replenished more or less within the same time period they are used [1 mark]. This means that it is sustainable despite its consumption by human [1 additional mark]. • For instance, solar energy is an example of renewable resource as it is derived from the sun, which is an abundant and virtually inexhaustible source of energy [1 mark]. <p>Other plausible examples of renewable resources: wind energy, water energy.</p> <p>AO1</p>	[2]
	b)	<p>The physical environment has four components. They are also known as the four spheres on earth.</p> <p>Using Fig. 1, indicate the specific spheres on Earth into the boxes provided.</p> <p>Award 1 mark for each sphere correctly identified.</p> <p style="text-align: center;">The Global Earth System</p>	[3]

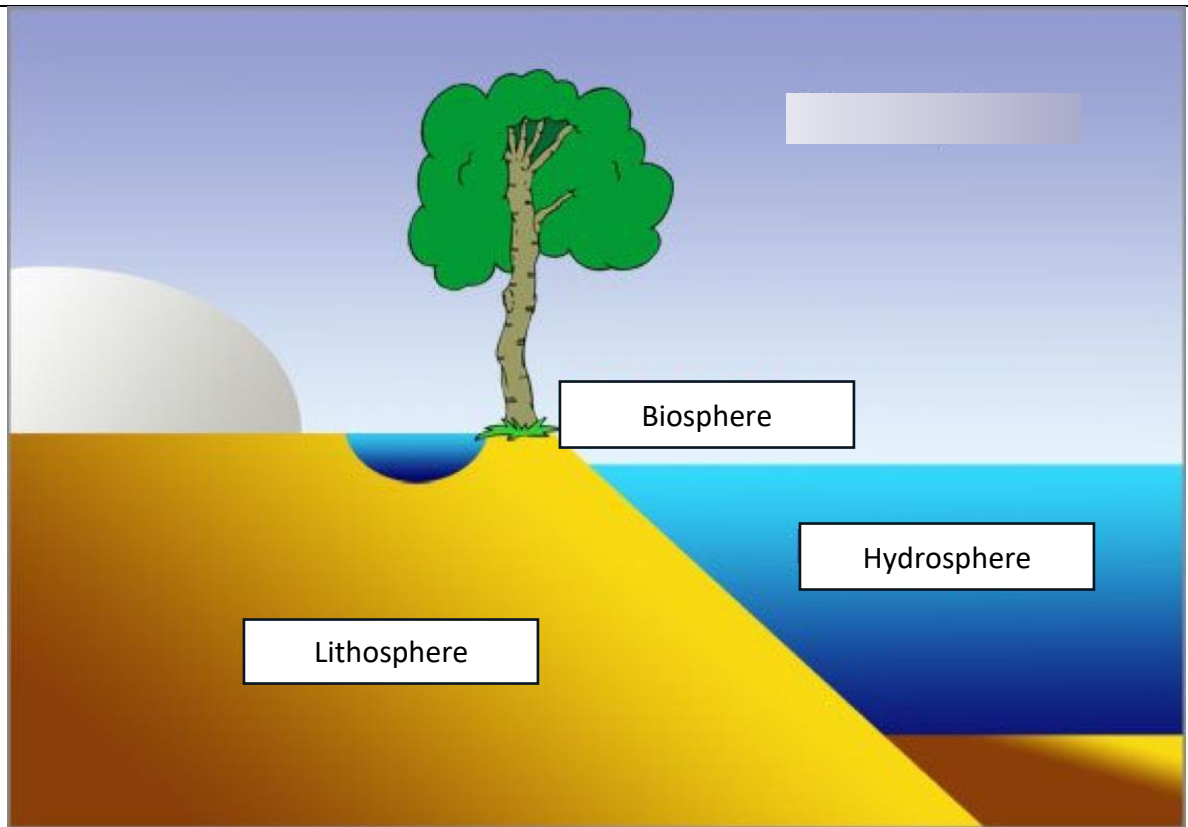


Fig. 1

AO1

c) Describe how water is used in industries.

[3]

Award 1 mark for each description on the usage of water in industries, to a maximum of 3 marks.

Possible responses include:

- Water is used industries to cool machines to manufacture goods [1 mark].
- In some industries, water could also be used to turn turbines to produce electricity in dams [1 mark].
- Cleaning agent for wafer fabrication to produce or clean the electrical components [1 mark].

AO1

	<p>d) Explain how the use of fertilisers on farms can lead to death of the aquatic ecosystem.</p> <p>Award 1 mark for each explanation on how the use of fertilisers on farms can lead to death of the aquatic ecosystem, to a maximum of 4 marks.</p> <p>Award a maximum of 1 additional mark for further development of each explanation, where applicable.</p> <p>Possible responses include:</p> <ul style="list-style-type: none"> • When nutrients enter rivers and lakes via surface runoff, algae will grow rapidly [1 mark]. This is due to the high level of high levels of nutrients such as nitrogen and phosphorus which would promote algae growth [1 additional mark]. • The rapid growth of algae can block sunlight and make it difficult for aquatic plants to photosynthesise causing them to die [1 mark]. This is because aquatic plants require sunlight to photosynthesise and produce food. Without enough sunlight, the plants cannot produce enough energy to survive and grow. As a result, the plants may die, leading to a loss of habitat for aquatic animals and a decrease in biodiversity [1 additional mark]. • As the algae and plants die and decompose, they consume oxygen from the water, leading to a decrease in dissolved oxygen levels [1 mark]. • This decrease in oxygen levels can lead to the death of fish and other aquatic organisms that require oxygen to survive [1 mark]. • Additionally, the decomposition of the excess plant matter can also release toxins into the water, further harming the aquatic ecosystem [1 mark]. This is because the decomposition process consumes oxygen from the water, leading to a decrease in dissolved oxygen levels. This decrease in oxygen levels can create an environment that is conducive to the growth of harmful bacteria that produce toxins [1 additional mark]. • The death of fish and other aquatic organisms can also have a ripple effect on the food chain, leading to further ecological imbalances [1 mark]. This is because fish and other aquatic organisms are an important part of the food chain in aquatic ecosystems. When they die, the predators that rely on them for food may also suffer. This can lead to a decrease in the population of these predators, which can then affect the organisms that rely on them for food, and so on [1 additional mark]. <p>AO1</p>	[4]
	<p>e) Study Photograph A, which shows the condition of the land in Iran.</p> <p style="text-align: center;">The condition of the land in Iran</p>	



Photograph A

[3]

With reference to Photograph A, explain why flash floods may occur in this area.

Award 1 mark for each explanation on why flash floods may occur in this area, to a maximum of 3 marks.

Award a maximum of 1 additional mark for further development of each explanation, where applicable.

Possible responses include:

- Flash floods often occur in dry areas [1 mark].
- In Photograph A, it shows an area which is very dry with cracks on the ground hence, this area would likely to have flash flood [1 mark].
- In very dry areas, the soil is often hard and compacted, which means that the soil cannot absorb water easily [1 mark]. This is because the soil particles on dry land are tightly packed together, leaving little space for water to infiltrate [1 additional mark].
- Furthermore, in dry areas, there is often little vegetation to help break up the soil and create spaces for water to enter [1 mark]. Vegetation helps to hold soil in place and create channels for water to flow through, which can help to prevent soil from becoming compacted [1 additional mark].
- Therefore, in very dry areas, most of the rainwater that falls onto the ground becomes surface runoff which quickly floods low-lying areas, resulting in flash floods [1 mark].

AO2

f) Study Fig. 2, which shows the changes in water pricing from 2017 to 2018 in Singapore.

Changes in water pricing from 2017 to 2018 in Singapore.

	Phase 1: From 1 Jul 2017	Phase 2: From 1 Jul 2018
	Price (\$/m ³)	Price (\$/m ³)
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Tariff: The water tariff covers the costs incurred in the various stages of the water production process, including collection of rainwater, treatment of raw water and distribution of treated water to customers through an extensive network of water pipes throughout Singapore. The Water Tariff is charged based on the amount of water consumed.

Waterborne Fee: The waterborne fee is a fee charged in Singapore based on the volume of water usage. It goes towards meeting the cost of treating used water and maintaining the used water network.

Fig. 2

With reference to Fig. 2, explain how water pricing might help Singapore achieve sustainable management.

[3]

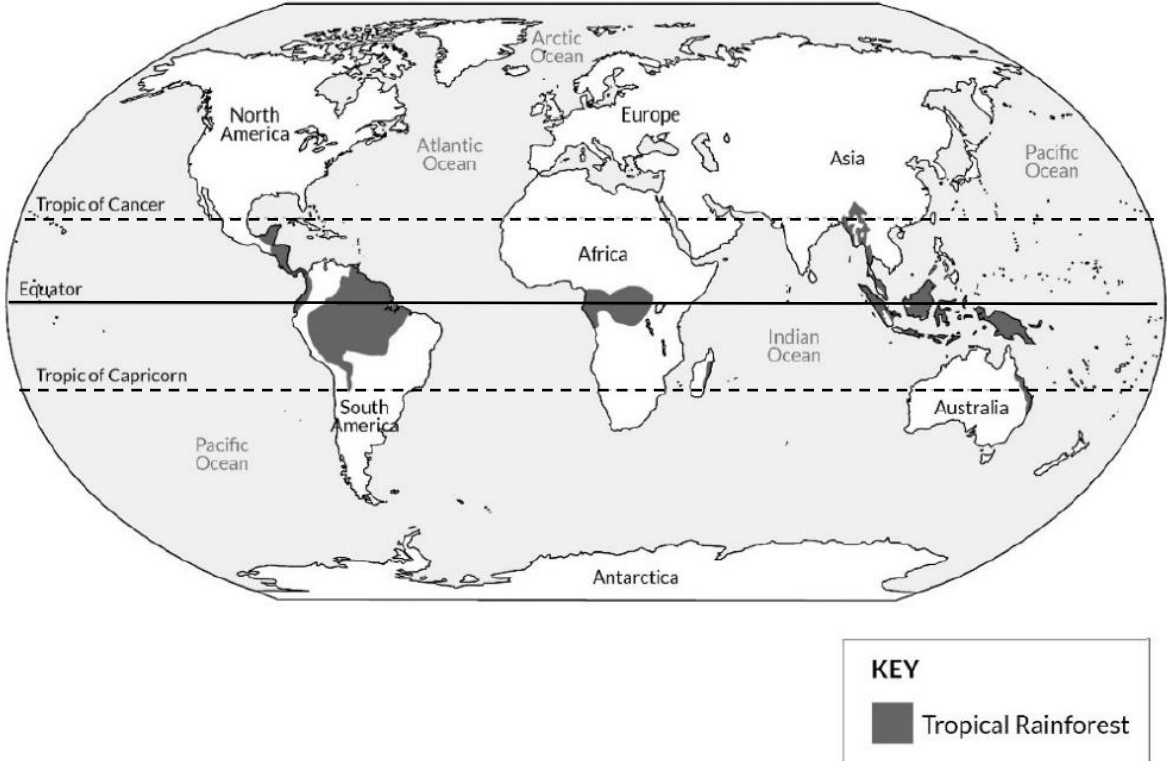
Award 1 mark for each explanation on how water pricing might help Singapore achieve sustainable management, to a maximum of 3 marks.

Award a maximum of 1 additional mark for further development of each explanation, where applicable.

Possible responses include:

- With water prices increases from \$1.44 to \$1.58 (Fig. 2), there can be several positive contributions to sustainable water management in Singapore [1 mark].
- The higher water prices can incentivise consumers to use water more efficiently, leading to reduced water wastage [1 mark]. This is because when water prices are higher, consumers are more likely to be mindful of their water usage and take steps to conserve water [1 additional mark].
- With the reduction in water demand due to higher water pricing, consumers would not be using water faster than it can be replenished, making water usage more sustainable in the long term [1 mark].
- Higher Increased revenue from higher water prices can be reinvested in developing and maintaining advanced water infrastructure [1 mark], such as water recycling and desalination plants. [1 additional mark]

AO2

2	a)	<p>Study Fig. 3, which shows the distribution of tropical rainforests in the world.</p> <div data-bbox="219 283 1380 1102"> <p style="text-align: center;">Tropical Rainforests in the world</p>  <p style="text-align: center;">Fig. 3</p> </div>	
		<p>Using Fig. 3, describe where tropical rainforests are found in the world.</p> <p>Award 1 mark for each description on where tropical rainforests are found in the world, to a maximum of 2 marks.</p> <p>Possible responses include:</p> <ul style="list-style-type: none"> • Tropical rainforests are found in regions near the equator, where the climate is warm and humid throughout the year [1 mark] • Between the Tropic of Cancer and Tropic of Capricorn [1 mark] • The largest tropical rainforests are found in South America, Central Africa and Southeast Asia [1 mark]. <p>AO2</p>	[2]
	b)	<p>Describe the climatic conditions suitable for tropical rainforests to grow.</p> <p>Award 1 mark for each description on the climatic conditions suitable for tropical rainforests to grow, to a maximum of 2 marks.</p>	[2]

Award a maximum of 1 additional mark for further development of each description, where applicable.

Possible responses include:

- Tropical rainforests are found in regions near the equator, where temperatures are warm throughout the year [1 mark]. The average temperature in tropical rainforests is around 27°C, with little seasonal variation [1 additional mark].
- Tropical rainforests require high levels of humidity, with an average humidity of around 80% [1 mark]. This is because the high humidity helps to create the moist conditions that are necessary for the growth of the dense vegetation found in rainforests [1 additional mark].
- Tropical rainforests receive high levels of rainfall, with an average annual rainfall of around 2500mm or more [1 mark].

AO1

c) Study Fig. 4, which shows an image of mangroves near a coast.

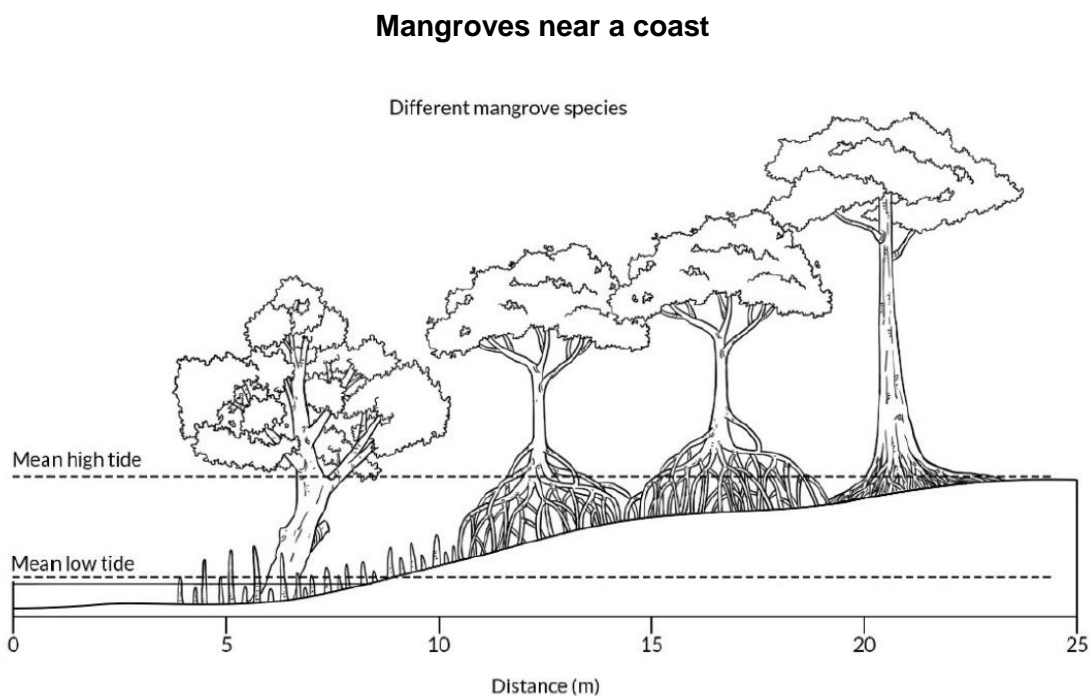


Fig. 4

With reference to Fig. 4, explain how the 2 specific types of roots shown help the mangrove trees thrive in coastal areas.

Award 1 mark for each explanation on how the 2 specific types of roots shown help the mangrove trees thrive in coastal areas, to a maximum of 4 marks.

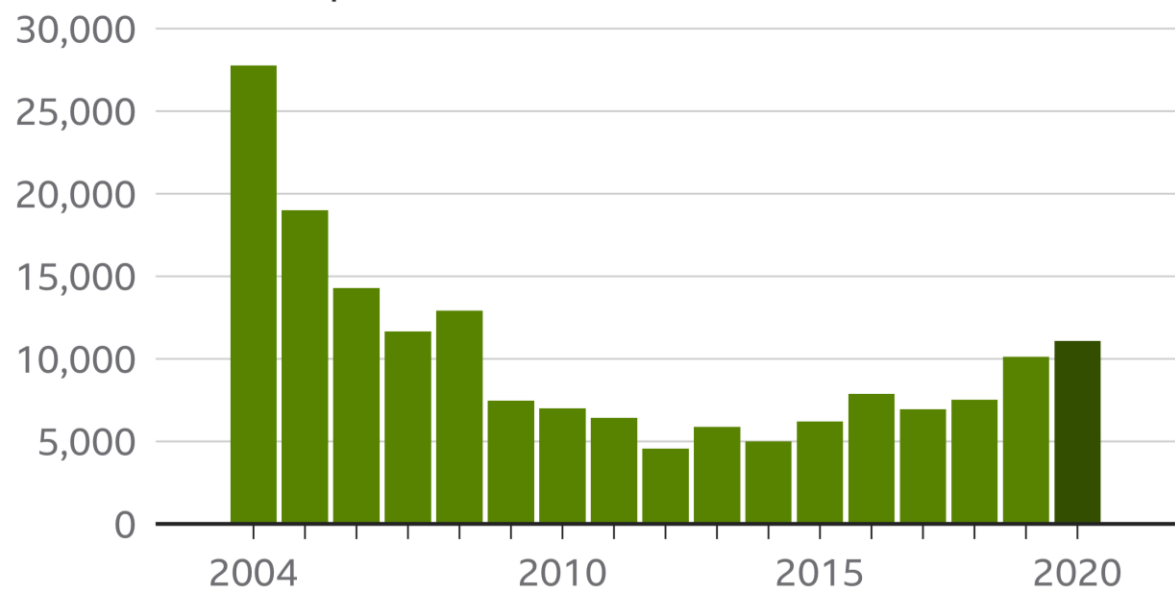
Award a maximum of 1 additional mark for further development of each explanation, where applicable.

Possible responses include:

[4]

	<ul style="list-style-type: none"> • The thin and long pencil roots help to anchor the tree in the soft, muddy soil found in coastal areas [1 mark]. This helps to prevent the tree from being uprooted by strong winds or waves [1 additional mark]. • The pencil roots, which grow partially above surface, are able to take in oxygen from the air during low tide and even when the soil around them is waterlogged during high tide [1 mark]. This is important because the muddy soil in coastal areas can be low in oxygen, which can be harmful to the tree's roots [1 additional mark]. • The prop roots help to anchor the tree in the soft, muddy soil found in coastal areas [1 mark]. This is important because the soil in coastal areas can be unstable, and the tree needs to be able to withstand strong winds and waves [1 additional mark]. • Prop roots help plants to breathe by providing aeration to the roots [1 mark]. These roots are exposed to air during low tide, which allows them to take in oxygen from the air [1 additional mark]. • The prop roots help to trap sediment and organic matter, which can help to build up the soil and create new land [1 mark]. This is important because coastal areas are often subject to erosion, and the ability to build up the soil can help to protect the coastline and provide additional habitat for mangrove trees and other species [1 additional mark]. • Salt-excreting roots help the mangrove trees to survive in saline environments as these roots can exclude salt from entering the tree [1 mark]. This is important because excessive salt can be toxic to plants [1 additional mark]. • In addition to excluding salt, salt-excreting roots of mangrove trees also help to stabilise the soil and prevent erosion [1 mark]. The roots are able to trap sediment and organic matter, which helps to build up the soil and create a stable substrate for the tree to grow in [1 additional mark]. <p>AO2</p>	
d)	<p>Compare the forest structure and leaves of tropical rainforests and mangroves.</p> <p>Award 1 mark for each comparison on the forest structure and leaves of tropical rainforests and mangroves, to a maximum of 4 marks. Award a maximum of 1 additional mark for further development of each comparison, where applicable.</p> <p>Possible responses include:</p> <ul style="list-style-type: none"> • Tropical rainforests have a vertical forest structure [1 mark] • whereas the mangrove forests have a horizontal forest structure [1 mark]. Tropical rainforests have a very dense and layered forest structure, with tall trees reaching up to 60 meters in height, and a variety of other vegetation layers including understory trees, shrubs, and ground cover. In contrast, mangroves have a much simpler forest structure, with fewer layers of vegetation [1 additional mark]. • The shape of the leaves of tropical rainforests and mangroves are different [1 mark]. The leaves of tropical rainforest trees are typically broad and flat, with a large surface area that allows them to capture sunlight for photosynthesis. In contrast, the leaves of mangrove trees are typically small and thick, with a waxy coating that helps to prevent 	[4]

		<p>water loss [1 additional mark].</p> <ul style="list-style-type: none"> The colour of the leaves of tropical rainforests and mangroves are very different as well [1 mark]. The colour of the leaves of tropical rainforests are often dark green in colour, which helps them to absorb as much light as possible. Whereas the leaves of mangroves are often a light green or greyish colour, which helps to reflect sunlight and reduce heat absorption [1 additional mark]. <p>AO2</p>	
	e)	<p>Explain how trees contribute to carbon storage.</p> <p>Award 1 mark for each explanation on how trees contribute to carbon storage., to a maximum of 3 marks.</p> <p>Award a maximum of 1 additional mark for further development of each explanation, where applicable.</p> <p>Possible Responses include:</p> <ul style="list-style-type: none"> Trees absorb carbon dioxide from the atmosphere during photosynthesis, which is the process by which they convert sunlight into energy [1 mark]. During photosynthesis, trees take in carbon dioxide and water, and use energy from the sun to convert them into glucose (sugar) and oxygen. The glucose is used by the tree for energy and growth, while the oxygen is released back into the atmosphere [1 additional mark]. The carbon that is absorbed by the tree during photosynthesis is stored in the tree's biomass, which includes the trunk, branches, leaves, and roots [1 mark]. As the tree grows, it continues to absorb carbon dioxide from the atmosphere and store it in its biomass [1 additional mark]. In addition to storing carbon in their biomass, trees also store carbon in the soil [1 mark]. When leaves and branches fall to the ground, they decompose and release carbon into the soil [1 additional mark]. <p>AO1</p>	[3]
	f)	<p>Study Fig. 5, which shows the area deforested in the Amazon Rainforest from 2004 to 2020.</p>	

	<div><p style="text-align: center;">Area deforested in the Amazon Rainforest</p><p>Area deforested / km²</p><table><caption>Data for Fig. 5: Area deforested in the Amazon Rainforest (km²)</caption><tr><th>Year</th><th>Area deforested (km²)</th></tr><tr><td>2004</td><td>27,500</td></tr><tr><td>2005</td><td>19,000</td></tr><tr><td>2006</td><td>14,500</td></tr><tr><td>2007</td><td>11,500</td></tr><tr><td>2008</td><td>13,000</td></tr><tr><td>2009</td><td>7,500</td></tr><tr><td>2010</td><td>7,000</td></tr><tr><td>2011</td><td>6,500</td></tr><tr><td>2012</td><td>4,900</td></tr><tr><td>2013</td><td>6,000</td></tr><tr><td>2014</td><td>5,000</td></tr><tr><td>2015</td><td>6,500</td></tr><tr><td>2016</td><td>8,000</td></tr><tr><td>2017</td><td>7,000</td></tr><tr><td>2018</td><td>7,500</td></tr><tr><td>2019</td><td>10,000</td></tr><tr><td>2020</td><td>11,000</td></tr></table><p>Year</p><p style="text-align: center;">Fig. 5</p><p>Source: https://ichef.bbci.co.uk/news/640/cpsprodpb/ED5C/production/115746706_optimised-amazongdp-nc.png</p></div>	Year	Area deforested (km ²)	2004	27,500	2005	19,000	2006	14,500	2007	11,500	2008	13,000	2009	7,500	2010	7,000	2011	6,500	2012	4,900	2013	6,000	2014	5,000	2015	6,500	2016	8,000	2017	7,000	2018	7,500	2019	10,000	2020	11,000	
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	<div><p>With reference to Fig. 5, describe the changes in the area deforested from 2004 to 2020.</p><p>Award 1 mark for each description of the changes in the area deforested from 2004 to 2020, to a maximum of 3 marks. Award a maximum of 1 additional mark for further development of each description, where applicable.</p><p>Possible responses include:</p><ul style="list-style-type: none">• Overall, the area deforested has shown a general decline [1 mark]. The yearly decreased from 27,500km² in 2000 to 11,000 km² in 2020 [1 additional mark]• The first decrease is observed from 2000 to 2012 [1 mark]. The decrease is from about 27,500 km² in 2000 to 4,900 km² in 2012. [1 additional mark]• The deforested area then showed a steady increase from 2012 to 2020 [1 mark]. The increase is from 4,9000 km² in 2012 to 11,000km² in 2020. [1 additional mark]<p>AO2</p></div>	<div><p>[3]</p></div>																																				