Section A: Short-Answer Questions

1 Study Fig. 1, which is a topographical map of Saracenia.

Topographical map of Saracenia



Fig. 1

(a)	State the 4-figure grid reference of Fort Meteora.				
		[1]			
(b)	State the 6-figure grid reference of the northernmost settlement in 2762.				
		[1]			
(c)	In what direction is the Meat Factory from the Car Park?				
		[1]			
(d)	Calculate the straight-line distance from the Meat Factory to Fort Meteora. Express your answink m.	er			
		[1]			
(e)	According to the map, what might Rin's River be used for?				
		[1]			

Section B: Structured Questions

2 (a) Define the term 'drought'. [1] (b) Explain how flash floods occur. [2]

(c) Fig. 2 shows a sketch of an area that is experiencing water pollution.

Annotate on the sketch to show **three** human activities that could cause pollution. An example has been done for you.



Domestic: Homes do not have proper systems to treat wastewater which leaks into the river

[3]



(d) Study Fig. 3, which shows a pie chart on the global uses of water.

Fig. 3

(i) Use evidence from Fig. 3 to describe the pattern of how water is used globally.

[3]
(ii) Describe two ways water is used for industrial purposes.

(e) Using examples, describe two ways by which Singapore has managed water sustainably.

6

 3 (a) Study Fig. 4, which shows a map of mangrove areas around the world.



Mangroves areas around the world



Using Fig. 4, describe the distribution of mangroves around the world.

(b) Describe how tropical rainforests and/or mangroves can be sources of food.

[2]





Amount of forest lost in Columbia



Use evidence from Fig. 5 to describe the changes in the amount of forest lost in Columbia from 2002 to 2020.

[4]

9

(d) Explain how deforestation leads to the enhanced greenhouse effect.

(e) Using examples, describe two strategies that countries can adopt to manage tropical rainforests and/or mangroves sustainably.

[4]

End of paper

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Question 1 Figure 1 Author's own Question 2 Figure 2 Adapted from https://www.kissclipart.com/prevent-water-pollution-drawing-clipart-water-poll-zlvdvq/ Question 2 Figure 3 Adapted from https://rdmc.nottingham.ac.uk/bitstream/handle/internal/112/Engineering%20Sustailability/45_global_use_of_water.htt Question 3 Figure 4 Adapted from https://racetozero.unfccc.int/wp-content/uploads/2021/07/World_map_mangrove_distribution.png Question 3 Figure 5 Adapted from https://content.globalforestwatch.org/wp-content/uploads/2021/03/21.03.08GFW-Tree-Loss-v3_Colombia-Primary-Forest-Loss.png	Question 1 Question 2 Question 2 Question 3 Question 3
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1

[Suggested Response]

Section A: Short-Answer Questions

Study Fig. 1, which is a topographical map of Saracenia. **Topographical map of Saracenia** Fig. 1 (a) State the 4-figure grid reference of Fort Meteora. - 2962 [1] (b) State the 6-figure grid reference of the northernmost settlement in 2762. - 276626 (also accept 277 or 627) [1] (c) In what direction is the Meat Factory from the Car Park? - Northwest [1] (d) What is the straight-line distance from the Meat Factory to Fort Meteora? Express your answer in km. - 8.7 cm (measured distance) x 50,000 = 435,000 cm - 435,000 cm = 4350m = 4.35 km [1] (e) According to the map, what might Rin's River be used for? - Water supply for the settlements / Water supply for the meat factory (Accept any other plausible answer)

[1]

Section B: Structured Questions

2 (a) Define the term 'drought'.

- A drought is a long period of little or no rainfall (in a specific area).
[1]

(b) Explain how flash floods occur.

Flash floods occur when there is an exceptionally heavy rainfall over a short period of time.
Most of the rainwater becomes surface runoff which floods low-lying areas.

(c) Fig. 2 shows a sketch of an area that is experiencing water pollution.

Annotate on the sketch to show **three** human activities that could cause pollution. An example has been done for you.



Domestic: Homes do not have proper systems to treat wastewater which leaks into the river Agriculture: Excess fertilisers can be washed into rivers providing nutrients for algae to grow Recreational: People from boats may litter directly into the river

(d)	Study Fig. 3,	which shows a	pie chart on	the global	uses of water.
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Global use of water Fig. 3

(i) Use evidence from Fig. 3 to describe the pattern of how water is used globally.

Cap @ 1 mark max if no data is used. - Most of the water is used for Agricultural purposes with 65%

- Least amount of water is used for Domestic purposes with 10%.

- The remaining amount of water is used for Industrial purposes with 25%.

[3]

(ii) Describe two ways water is used for industrial purposes...

Accept any of the following.

- Water is used to cool equipment (or make products).

- Water is used to generate electricity through hydropower (dams).

- Water is used as a cleaning agent in wafer fabrication.

(e) Using examples, describe two ways by which Singapore has managed water sustainably.

Cap @ 2 if no examples are used.

Accept any two of the following with their relevant examples.

- Improve water quality: Water quality can be monitored by considering temperature, dissolved oxygen, turbidity and pH (needs to state at least 2)

- To maintain this, industries in Singapore are monitored and not allowed to released wastewater into waterbodies without permission from the National Environment Agency (NEA)

- Reduce water consumption: This is where a country's government will encourage its people to decrease the amount of water used or reduce wastage of water.

- To do this, the Singapore Public Utilities Board (PUB) aims to lower Singapore's per capita average household water consumption to 130 litres by 2030 | Singapore has made us of various campaigns such as Water Wally (or use of thimbles) to reduce water use

- Improve water technology: This refers to using technology to develop new ways of producing and conserving water.

- In Singapore, we use desalination to turn seawater into water that can be used by industries or households OR NeWater is used where wastewater is treated with technology to make it safe for consumption again.

- Import water: Water can be imported from other places where countries with more abundant water resources allow neighbours to import from them.

- Singapore currently imports water from the Johor River in Malaysia (to boost its own supply).

[4]

3 (a) Study Fig. 4, which shows a map of mangrove areas around the world.

Mangroves areas around the world

Fig. 4

Using Fig. 4, describe the distribution of mangroves around the world.

- Mangroves are located in coastal areas (of continental landmasses).

- Examples of such places are: southwestern and southeastern coasts of North America | eastern coast of South America | western and eastern coasts of Africa | southern coast of Asia, with Southeast Asia | northern and southern coasts of Australia

[2]

(b) Describe how tropical rainforests and/or mangroves can be sources of food.

Accept any two of the following.

- Many common types of food such as fruit, vegetables and nuts come from plants that grow in tropical rainforests.

- Indigenous people who live in tropical rainforests also obtain food by hunting wild animals.

Some mangroves have been converted into farms to rear fish and shrimp (a practice known as aquaculture).

[2]

(c) Study Fig. 5, which shows the amount of forest lost in Columbia from 2002 to 2020.

Amount of forest lost in Columbia Fig. 5

Use evidence from Fig. 5 to describe the changes in the amount of forest lost in Columbia from 2002 to 2020.

Reserve 1 mark for reference to figure. Reserve 1 mark for general trend.

- [General trend] Amount of forest lost in Columbia has been increasing

- [Data for general trend] from 62,000 hectares in 2002 to 165,000 hectares in 2020.

- [Anomaly] There was a sudden drop in 2015 (or any drop)

- [Data for anomaly] from 80,000 hectares in 2014 to 49,000 hectares in 2015 (or corresponding data for another drop). *OR*

- [Change in rate] There was a sudden steep increase in 2016 / 2015 to 2018

- [Data for change in rate] where forest loss surpassed 100,000 hectares (or when primary forest lost increased dramatically from 49,000 hectares to 110,000 hectares). [4]

(d) Explain how deforestation leads to the enhanced greenhouse effect.

- Burning or cutting down tropical forests causes the stored carbon in plants and soil to be released as carbon dioxide.

- There will be fewer plants left to absorb carbon dioxide through photosynthesis.

- As such, there will be greater amount of carbon dioxide in the air, which will trap more heat, causing enhanced greenhouse effect.

[3]

(e) Using examples, describe two strategies that countries can adopt to manage tropical rainforests and/or mangroves sustainably.

Cap @ 2 if no examples are used.

Accept any two of the following with their relevant examples.

- Establishing protected areas: Remaining forests in a country can be set aside as protected areas where human activity within it is restricted.

- Singapore has established four nature reserves, including Sungei Buloh Wetland Reserve (need to name at least one).

- Regulating forestry activities: Governments use controlled logging as some forests still have high economic value.

- In Malaysia, companies can cut down older trees or selected species | In Columbia, companies are allowed to only cut down small patches of forests each time.

- Rehabilitating disturbed areas: Countries can carry out reforestation to plant new trees in areas that have been deforested.

- Singapore has replanted mangrove forests in Pulau Semakau, Pulau Tekong and Pulau Ubin (need to name at least one)

- Promoting public education: Countries can raise the awareness of its citizens about the value of tropical rainforests and the issue of deforestation.

- Singapore's National Parks Board regularly organises exhibitions and talks which people can take part in to learn more about tropical forests.

[4]

End of paper

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 Question 1
 Figure 1
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 Question 2
 Figure 2
 Adapted from https://www.kissclipart.com/prevent-water-pollution-drawing-clipart-water-poll-zlvdvq/

 Question 2
 Figure 3
 Adapted from https://rdmc.nottingham.ac.uk/bitstream/handle/internal/112/Engineering%20Sustailability/45_global_use_of_water.html

 Question 3
 Figure 4
 Adapted from https://racetozero.unfccc.int/wp-content/uploads/2021/07/World_map_mangrove_distribution.png

 Question 3
 Figure 5
 Adapted from https://content.globalforestwatch.org/wp-content/uploads/2021/03/21.03.08_-GFW-Tree-Loss-v3_Colombia-Primary-Forest-Loss.png