ANGLICAN HIGH SCHOOL
END OF YEAR EXAMINATION 2022

S1

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GEOGRAPHY

Secondary 1 **29 September 2022**

Section A and B

Candidates answer on the Question Paper **1 hour 15 minutes**

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READ THESE INSTRUCTIONS FIRST

Follow the instructions on the front cover of the question paper.
Write your index number and name on all the work you hand in.
Write in **dark blue** or **black pen** for all the answers.
Do not use paper clips, glue or correction fluid.

Answer **all** questions.
Write all answers on the lines provided in the question paper.

At the end of the examination hand in **Section A and B together**.
Hand in Section C separately. Do not staple them together.

The number of marks is given in brackets [ ] at the end of each question or part question.

Section A	Question 1		6 marks
Section B	Question 2		15 marks
Section C	Question 3		15 marks
TOTAL:			36 marks

Parent's Name:	

Parent's Signature:	
Date:	

This document consists of **7** printed pages and **1** blank page.

Section A

[Turn over

Answer **all** questions in this section

1. A class of secondary 1 students from ABC school tested the water quality at MacRitchie Reservoir. Water samples were taken at the Kayak Platform and the Zig Zag Bridge.
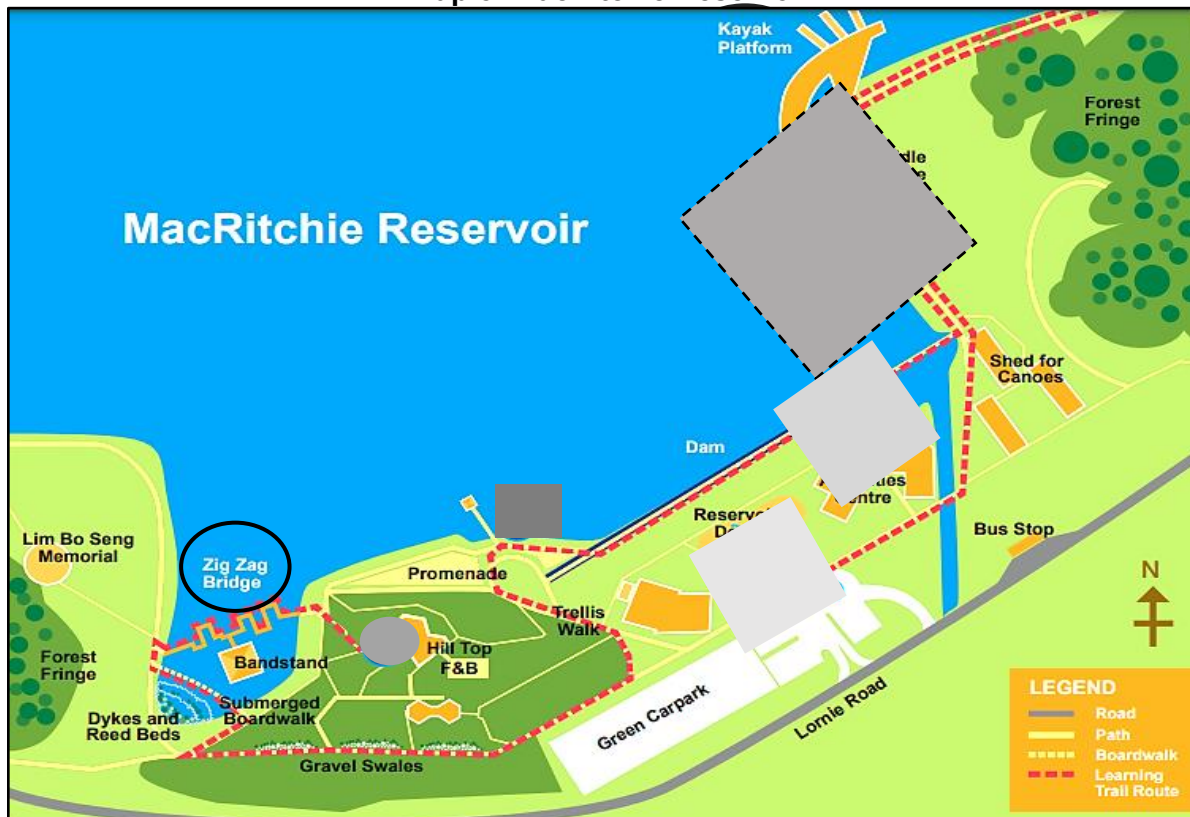
Map of MacRitchie Reservoir

Fig.1

Table 1 below shows the results of their water quality test at both locations.

Table 1

Testing sites	Dissolved Oxygen* (ppm)			Turbidity* (JTU)		
	1st Reading	2nd Reading	Average	1st Reading	2nd Reading	Average
Kayak Platform	6	8	?	20	10	15
Zig Zag Bridge	3	3	3	70	80	75

*Healthy levels of the following:
   Dissolved oxygen-4ppm and
   above

Use information from Table 1 for questions 1(a) and 1(b)

(a) Calculate the average amount of dissolved oxygen at the Kayak Platform.

……..[1]

(b) Which testing site has a less healthy water quality? Explain your answer.

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(c) Students collected readings from the two sites on a weekday from between 3.00-5.30pm. Describe and justify a limitation of the data collection method for this investigation.

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Section B

Answer **all** questions in this section

2 **(a)** Complete Table 2 by providing **one** category of water stores for the different examples of water in our environment.

Table 2

	Examples of water	**Category of water stores on Earth**
Example	Soil moisture	Soil or ground
i.	Salt water	
ii.	Ice masses	

[2]

(b) Study Fig. 2, which shows the total amount of water extracted from water bodies, mainly for personal use in the Philippines, from 2014 to 2020.

Total amount of water extracted for personal use in Philippines
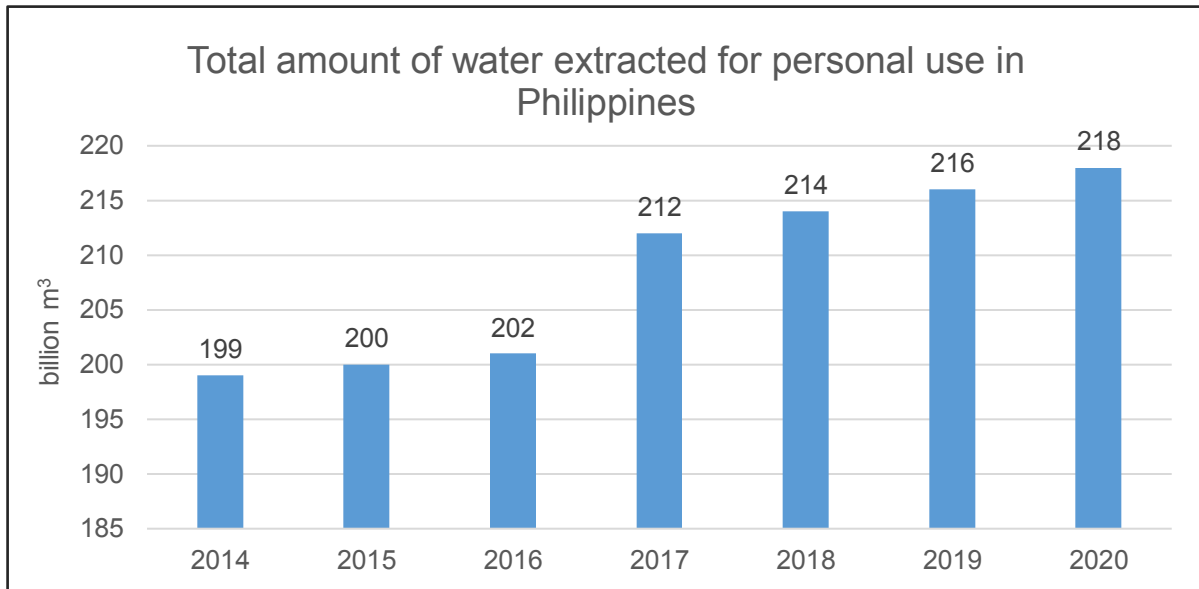
Fig. 2

With reference to Fig. 2, describe the trend of water extracted for personal use in the Philippines from 2014 to 2020.

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(c)

Study Fig. 3, which shows flooding of the banks at A and B due to sustained heavy rainfall in Germany.

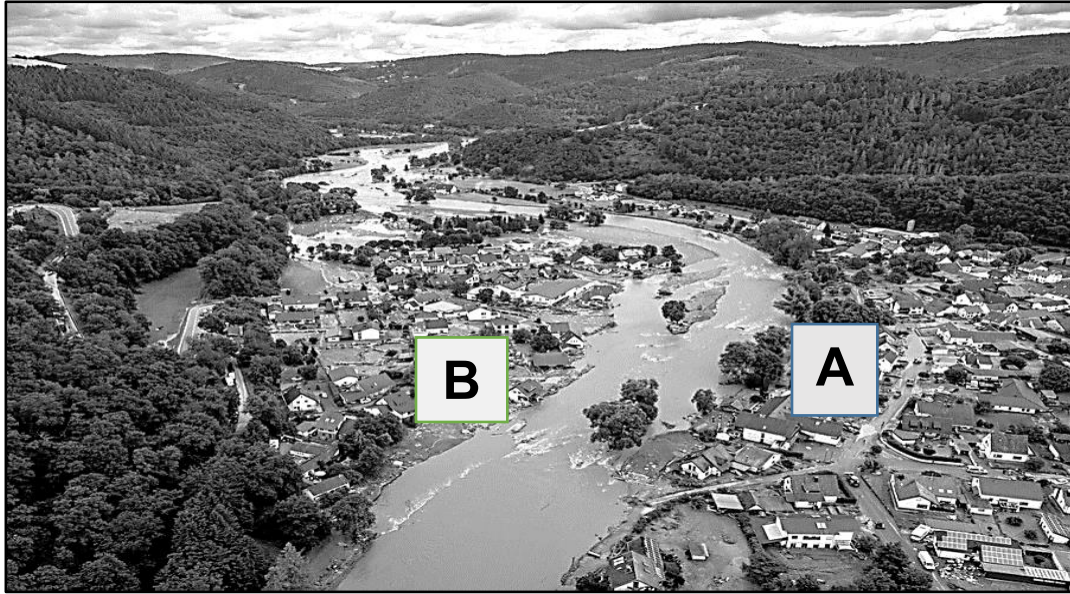**Fig. 3**

With reference to Fig. 3, identify the type of flood and describe how the sustained heavy rainfall caused the flood in Germany.

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(d) Describe the causes and impacts of water pollution by farming activities.

[Turn over

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(e) Explain how countries near the coast can increase water supply using technology and describe a strength and a limitation of the technology.

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ANGLICAN HIGH SCHOOL
END OF YEAR EXAMINATION 2022

S1

GEOGRAPHY

Secondary 1   **29 September 2022**

Section C

Candidates answer on the Question Paper   **1 hour 15 minutes**

READ THESE INSTRUCTIONS FIRST

Follow the instructions on the front cover of the question paper.
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Write in **dark blue** or **black pen** on both sides of the paper.
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Answer **all** questions.
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Hand in Section C separately.

The number of marks is given in brackets [ ] at the end of each question or part question.

Section C	**Question 3**		**15 marks**

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[Turn over

Section C

Answer **all** question in this section.

3   Study Fig. 4, which shows the distribution of mangrove forests in the world.
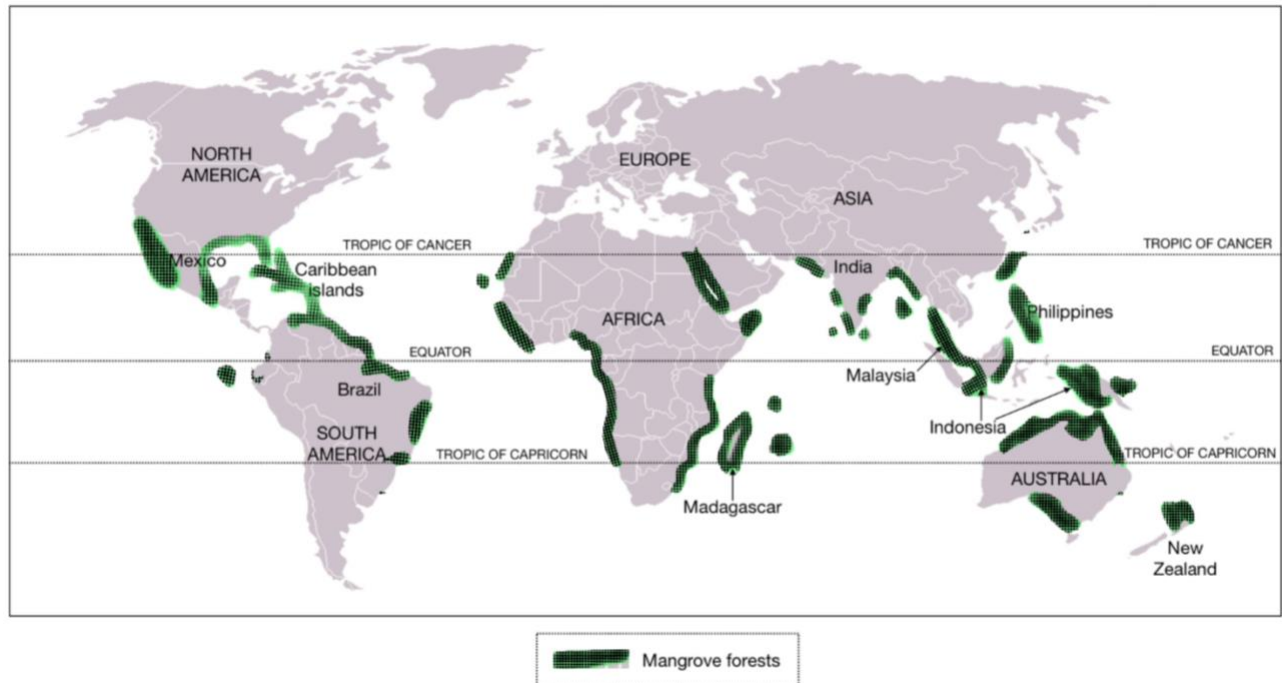
Fig. 4

(a) Using Fig. 4, describe the distribution of mangrove forests in the world.

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(b) Describe how tropical forests serve as recreational sites and bring benefits for people who live in towns and cities.

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(c) Study Fig. 5, which shows the adaptations some mangrove species develop to help them survive in the coastal environment.
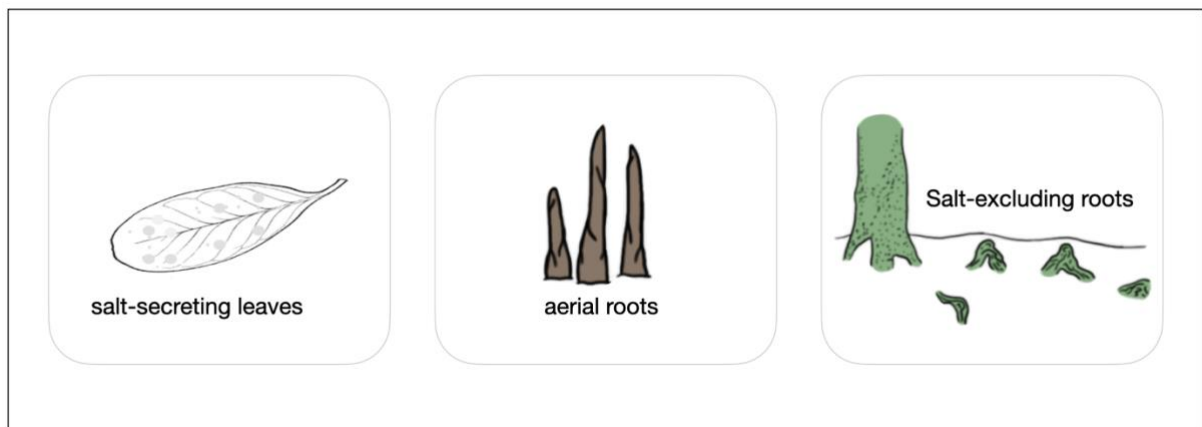
Fig. 5

With reference to Fig. 5, explain how the adaptations enable mangrove plants to survive in the coastal environment.

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……[3]

(d) Study Fig. 6, which shows the concentration of carbon dioxide in the atmosphere before and after deforestation was carried out in tropical forests.

Before deforestation	After deforestation
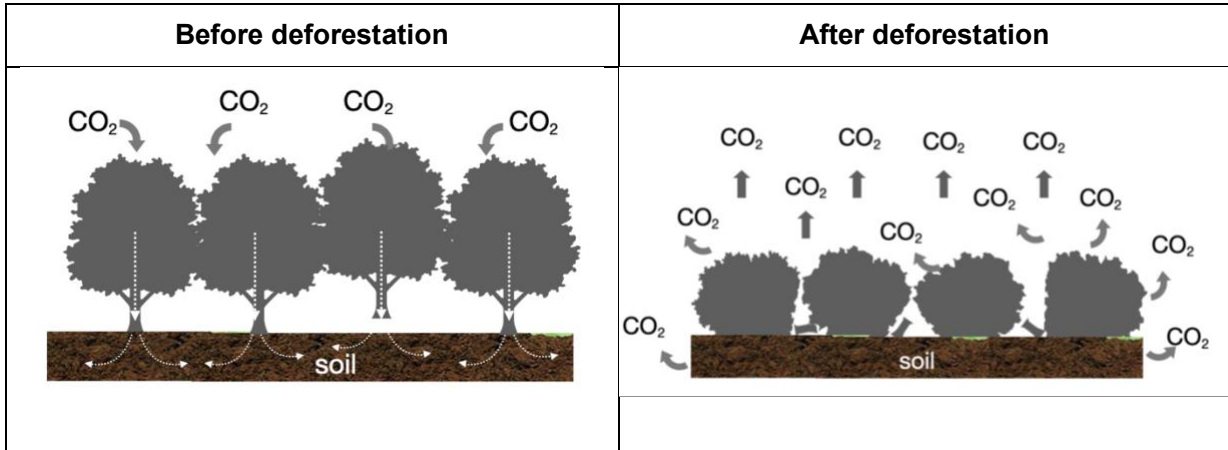
Fig.6

Use information from Fig. 6 to explain how the deforestation of tropical forests can contribute to the enhanced greenhouse effect.

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(e) With the help of an example, explain how controlled logging is a method of extracting resources from tropical forests while conserving them.

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END OF PAPER

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ANGLICAN HIGH SCHOOL
END OF YEAR EXAMINATION 2022

S1

GEOGRAPHY

Secondary 1   **29 September 2022**

Section A and B

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Section C	Question 3		15 marks
TOTAL:			36 marks

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Parent's Signature:	
Date:	

This document consists of **7** printed pages

[Turn over

Section A

Answer **all** questions in this section

1. A class of secondary 1 students from ABC school tested the water quality at MacRitchie Reservoir. Water samples were taken at the Kayak Platform and Zig Zag Bridge.

Map of MacRitchie Reservoir

Fig.1

Table 1 below shows the results of the water quality test at both locations.

Table 1

Testing sites	Dissolved Oxygen* (ppm)			Turbidity* (JTU)		
	1st Reading	2nd Reading	Average	1st Reading	2nd Reading	Average
Kayak platform	6	8	**7**	20	10	15
Zig Zag Bridge	3	3	3	70	80	75

*Healthy levels of the following:
  Dissolved oxygen-4ppm and above
  Turbidity-40JTU and less

Use information from Table 1 for questions 1(a) and 1(

(a) Calculate the average dissolved oxygen at the Kayak Platform. [1]

- **7ppm [1]**

Answers without units will be penalised (-1m from the paper's overall score)

(b) Which testing site has a less healthy water quality? Explain your answer. [3]

Identification [1]
- **The station at Zig zag Bridge has a less healthy water quality than the one at the Kayak Platform.**

Interpretation of DO or Turbidity [1]
- **Both the DO and turbidity levels are in the unhealthy range. [1]**
- **The average turbidity level exceeds the recommended healthy range. [1]**
- **The average amount of DO is lower than the recommended healthy range. [1]**

Answers must explicitly compare the DO or Turbidity levels of the Zig Zag Bridge to the healthy range of DO or Turbidity respectively.

Quoted data [1]

- **Average reading for DO is 3ppm.**
- **Average reading for Turbidity is 75JTU.**

[1] for quoted data will only be awarded if the interpretation of DO or Turbidity is valid.

No marks awarded for incorrect identification.

Answers without units will be penalised (-1m from the paper's overall score)

(c) **Students collected readings from two sites on a weekday from between 3.00-5.30 pm. Describe and justify a limitation of the data collection method for this investigation. [2]**

Limitation [1] + Justification [1]

- **[Frequency] → Collecting data on one day is <u>not reliable</u> [1] because water quality changes over time due to changes in weather or changes in human activity [1].**

- **[Time] → Collecting data at only a specific time is <u>unreliable</u> [1] as the water conditions may vary at different times of the day based on the different human activities or temperature change [1].**

- **[Scope] → Collecting data at 2 locations may <u>not be accurate</u> [1] as there is insufficient coverage of such a big area with various activities at different sites [1].**

- **[Scope] → Recording only two water quality indicators is <u>unreliable</u> [1] because it may not be as accurate as there are more water quality indicators [1].**

Description of Limitation must be linked to Accuracy/Reliability/Representativeness (implication on data collected). Accept paraphrasing of terms.

Limitation must be clearly described. Do not accept implied limitations.

Justification must link to water quality or implications on the results collected. Do not accept answers which do not make the link to water quality or implications on the results collected.

Section B (15m)
Answer **all** questions in this section

2   (a)   Complete Table 2 by providing one area of water stores for the different examples of water in our environment. [2]

Table 2

	Examples of water	Category of water stores
Example	Ground water	Soil or ground
i.	Salt water	**Oceans [1]** **OR Seas [1]** **OR Lakes [1]**
ii.	Ice masses	**Glaciers [1]**

NO marks if the words are spelt wrongly.

[2]

Study Fig. 2, which shows the total amount of water extracted from water bodies, mainly for personal use in the Philippines, from 2014 to 2020.

(b)
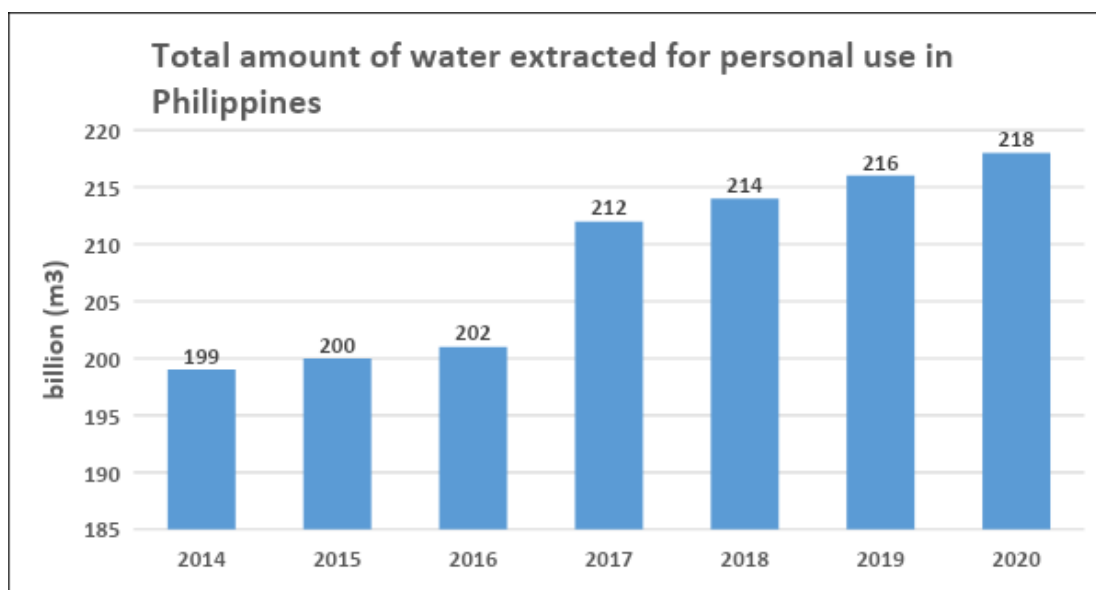
Fig. 2

With reference to Fig. 2, describe the trend of water extracted for personal use in the Philippines from 2014 to 2020. [2]

Overall [1]

- Generally, the trend shows an **increase** in water extraction for personal use in the Philippines by **19 billion cubic metres** from **2014-2020.**

Significant [1]

- The **highest** increase in water extraction for personal use is **10 billion cubic metres from 2016-2017. [1]**

- The **highest** increase in water extraction for personal use is **13 billion cubic metres** of water from **2014-2017. [1]**

- The **lowest increase** of water extraction for personal use is **1 billion cubic metre from 2014-2015. [1]**

Accept answers which do not include calculated data but merely state the years and figures.

(c) Study Fig. 3, which shows flooding of the banks at A and B due to sustained heavy rainfall in Germany.
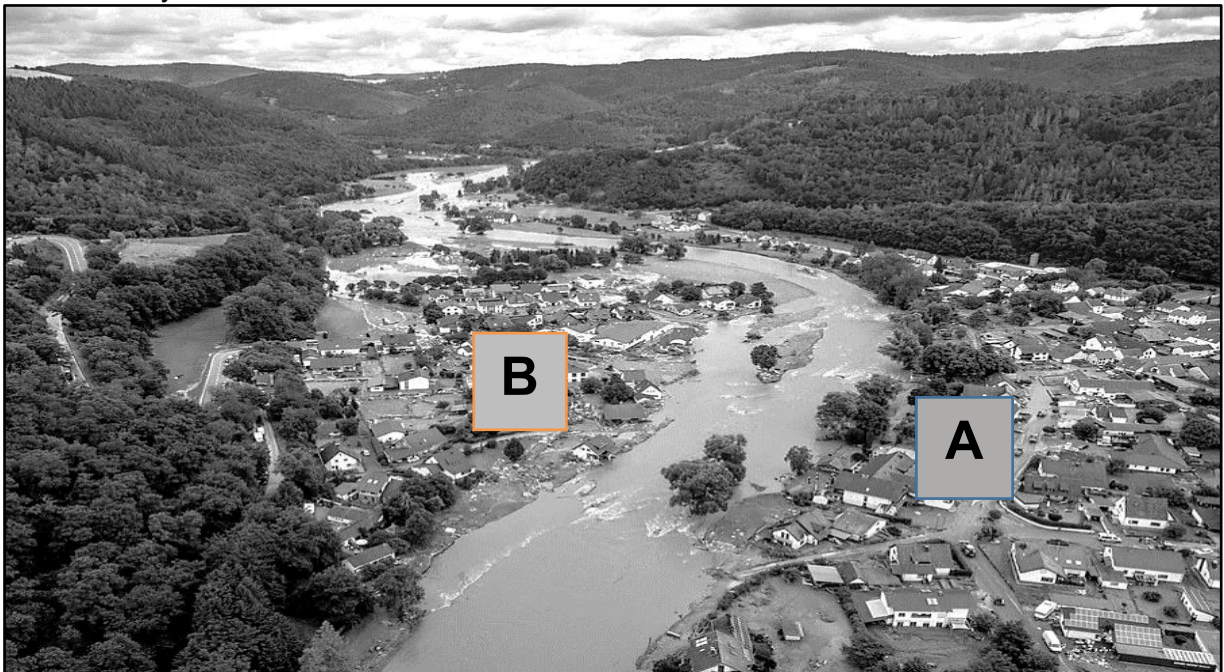
Fig. 3

With reference to Fig.3, identify the type of flooding and describe how the sustained heavy caused the flood in Germany. [3]

Identification [1]

- **River flood**

Description [2]

- **Huge volumes/amounts of water from sustained heavy rainfall enters streams and tributaries, which flows into the rivers. [1]**

  Accept answers which describe this as "excessive rainfall"

- **Water level in the river rises rapidly and overflows its banks flooding the surrounding areas. [1]**

  Accept answers which do not include "rapidly"
  Accept answers which describe this as "water surplus" instead, IF the answer demonstrates an understanding of the concept of "too much water".

  OR

  River exceeds its carrying capacity and water overflows its banks flooding the surrounding areas. [1]

  Accept answers which describe this as "there is too much water"

The outcome of sustained heavy rainfall must be clearly described/stated.

No marks will be awarded for answers which identify the type of flood incorrectly UNLESS "sustained heavy rainfall" is described.

Summary
[1] Identification
[1] increase in water input as a consequence of sustained heavy rainfall
[1] river capacity exceeded resulting in overflowing of river banks

(d) Describe the causes and impacts of water pollution by farming activities. [4]

<u>Causes [2]</u>

- **Farmers apply (excess/too much) <u>fertiliser</u> to the soil for their crops. [1]**
- **The (excess) fertilisers may be washed into rivers by rain/surface runoff/groundwater. [1]**

  OR

- **Farmers may use pesticides with toxic chemicals to protect their crops from pests. [1]**
- **The toxic chemicals may be washed into rivers by rain or surface runoff. [1]**

Answers must be related to FARMING activities and water pollution. Littering is not acceptable as an answer.

<u>Impacts [2]</u>

- **The (excess) fertilisers will lead to algae bloom. When algae dies, they are decomposed by bacteria, which uses up oxygen. [1]**

  OR

  The (excess) fertilisers will lead to algae bloom, which will reduce the amount of sunlight received by aquatic plants (such as phytoplanktons) which produce oxygen for aquatic animals.[1]

- **[Outcome of Impact] As a result, there is less oxygen in the water, causing fish and other aquatic animals to die. [1]**

  OR

- **The toxic chemicals washed into the rivers will contaminate the water, reducing its water quality. [1]**
- **[Outcome of Impact] As a result, it may cause aquatic animals in the river to die. [1]**

  OR

- **It will be more difficult to obtain clean potable water that is suitable for consumption/domestic/recreation purposes. [1]**
- **[Outcome of Impact] As a result, it may cause humans to face a water shortage OR suffer from water-borne diseases if they were to consume the contaminated water. [1]**

Summary:
Causes
    [1] <u>USE</u> of <u>fertilisers</u> or <u>pesticides</u>
    [1] washed into/entered <u>rivers</u> by <u>rain/surface runoff/groundwater</u>
Impacts
    [1] algae bloom using up oxygen →[1] DO decreases causing aquatic animals to die

    [1] algae bloom blocking out sunlight → [1] aquatic plants unable to make food

    [1] toxic chemicals contaminating water → [1] poisoned and killed aquatic animals OR

                       [1] shortage of potable water for human
                               consumption

No marks to be awarded for impacts IF the causes identified are not related to farming activities, e.g. soil erosion. Otherwise, award up to 2m for impacts.

(e) Explain how countries near the coast can increase water supply using technology and describe a strength and a limitation of the technology.

<u>Identification [1]</u>

- **Using <u>desalination</u> to increase water supply as sea water is available.**
  Accept answers with "desalination" spelt wrongly? (Vera 8, Yee Enn 19, Matthew 26, Justin 27, Caleb 30,

<u>Explanation [1]</u>

- **This technology uses <u>reverse osmosis</u> or <u>advanced membrane technology</u> to remove salts and minerals from salt water to produce potable or drinkable water.**

<u>Strength [1]</u>

- **It is a reliable water source that does not depend on the weather.**

  OR

  It is independent of rainfall and hence is able to supplement water supply during a long dry spell. [1]

- **There is a limitless supply of water from the sea around the coastal countries. [1]**

<u>Limitation [1]</u>

- **It is very <u>costly</u> to construct a desalination plant. [1]**

- **It uses <u>a lot of energy/not energy-efficient</u> which is not environmentally-friendly. [1]**

Summary:
[1] Desalination (accept if spelt wrongly)
[1] How it works - <u>reverse osmosis</u> **or** <u>advanced membrane tech</u> **+** <u>salt removal</u>
(impurities not accepted)
[1] Strength
[1] Limitation

If NEWater is identified, marks could be awarded for relevant strength and limitation

Additional page

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ANGLICAN HIGH SCHOOL
END OF YEAR EXAMINATION 2022

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Secondary 1   29 Sep... 2

Section C

3	Study Fig. 4, which shows the distribution of mangrove forests in the world.
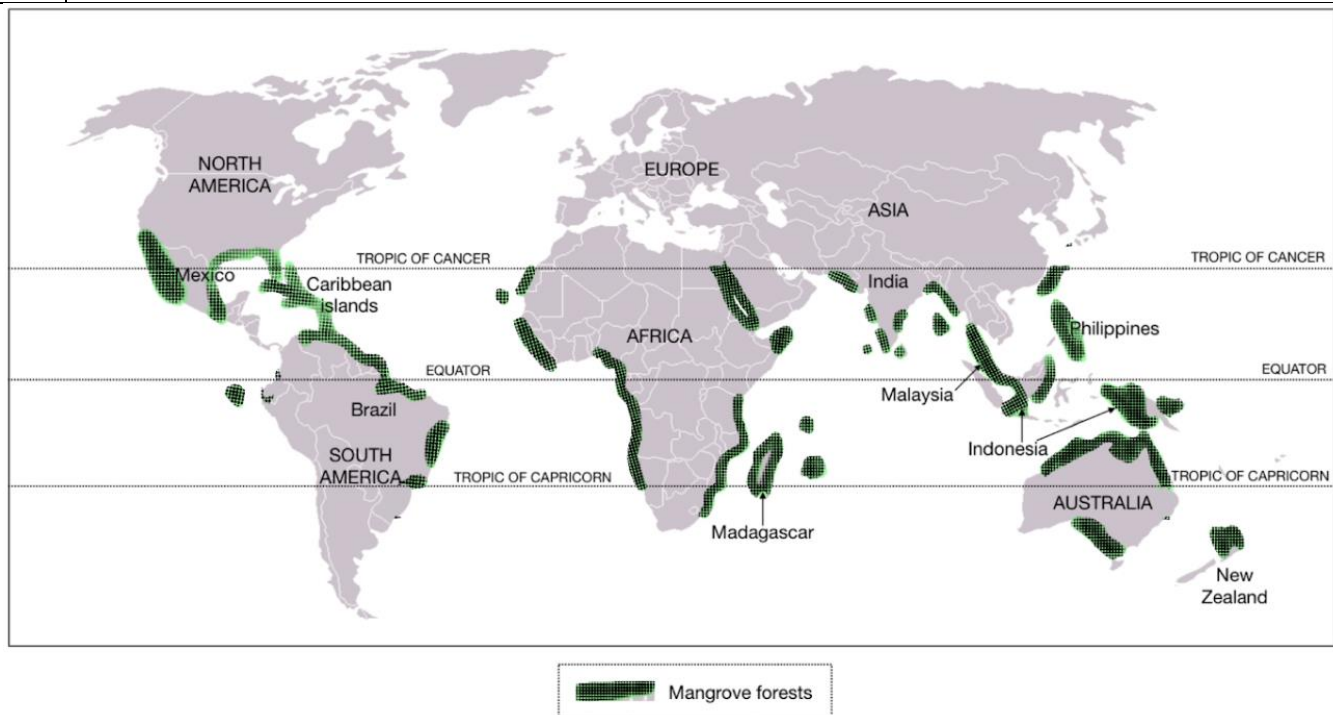
Fig. 4

(a) **Using Fig. 4, describe the distribution of mangrove forests in the world. [3]**

Overall [1]

- Generally, the mangrove forests are found along coastlines near the Equator, between the Tropic of Cancer and Tropic of Capricorn. [1]

Significance [2]

- Mangrove forests are mainly found **along coastlines** of countries (with at least one e.g.) or continents/regions (name at least one) **within the tropics. [1]**

  OR

  able to quote a few of the representative coastlines e.g., bordering most of the coastal countries in **Africa**, lining coastlines of Asian/Southeast Asian countries such as **Malaysia**, **Indonesia** and the **Philippines**, stretches across the northern coastlines of **Australia**, surrounding the Caribbean islands and North American. [1]
- Of all the continents, Africa has the highest concentration of mangrove forests, followed by Asia while it is absent in Europe
- Larger areas of mangroves are found along **coastlines** of **Mexico**, **eastern Indonesia** and **Southwest Australia**
- Smaller areas of mangroves are found along **coastlines** of **Indian Peninsula** and **northwest Africa**
- There is significantly **low concentration** of mangrove forests found **beyond the tropics**, North Island of New Zealand, Southern coastline of Australia and eastern coast of Mexico. [1] (*This can be considered an oddity instead of a 'low'*

Oddity [1] (1m if included, but only award up to 3m in total)

- Although the **western coastline** of South America falls within the tropics, there's **almost an absence** of mangrove forests. [1]

Summary:
[1] Overall
[1] or [2] Significance - 1m for coastlines of countries/continents + 1m for naming of specific countries *If no mention of coastlines - cap at 2m. To be awarded two marks for significance; should highlight high/low*
[1] Oddity (with at least one country named, e.g. Australia, New Zealand, Mexico)

Stronger responses made good use of the given information provided in Fig. 4; latitudinal lines, continents and countries. They were able to provide accurate descriptions of the overall distribution and highlight key significance of the spread of mangrove forests. A large number rightly pointed out the presence of such forests beyond the tropics.

Weaker responses missed the key point that mangrove forests are found at coastal areas/along coastlines as they are coastal vegetation. These responses merely described the locations where mangrove forests were found without highlighting the significance of their distribution, e.g. the continent with highest/lowest concentration of mangrove forests is found in Africa/N. America, the country with the highest/lowest concentration of mangrove forests is Mexico/India.

(b) **Describe how tropical forests serve as recreational sites and bring benefits for people who live in towns and cities. [2]**

Ans: Any 2 of the following: (Must include **ONE** ACTIVITY & **ONE** BENEFIT)

Activity [1]
● Tropical forests provide **opportunities** for **people** living in towns and cities to **engage in activitie**s such as **trekking, camping and birdwatching** when they visit; [1]

Benefit [1]
● The natural environment of the tropical forests lends itself well for people to **go there to exercise**, e.g., brisk walking and jogging, and this can **promote their physical well-being** and allow them to **lead an active lifestyle**; [1]
● The natural **sights**, **sounds**, **smells** of tropical forests all culminate to produce a **calming effect** on the visitors, which helps to give them a **sense of overall well-being** [1]
● appreciating the **beauty of nature**/**enjoy** the **greenery** can help them to **relax** and **de-stress**
● Forests have large number of trees that release oxygen during photosynthesis, providing **clean** and **fresh air** for those who **carry out their activities there**

Accept any other plausible answers.

Summary:
[1] Focus on **recreational sites** and how **engaging in activities related** to the **site(s) brings benefits** for people living in towns and cities.
[1] Benefits of tropical forests that are linked to **recreational activities.** No link, no mark.

Stronger responses provided targeted descriptions on the activities that can be carried out at tropical forests such as hiking, jogging, camping,etc as well as the benefits such activities bring to the people who live in urban dwellings.

Weaker responses provided two disconnected descriptions on the two aspects. Moreover, these responses tended to focus on the benefits of tropical forests in general, e.g. carbon storage, oxygen generator, without any link to the people living in urban areas.

(c) Study Fig. 5, which shows the adaptations some mangrove species develop to help them survive in the coastal environment.
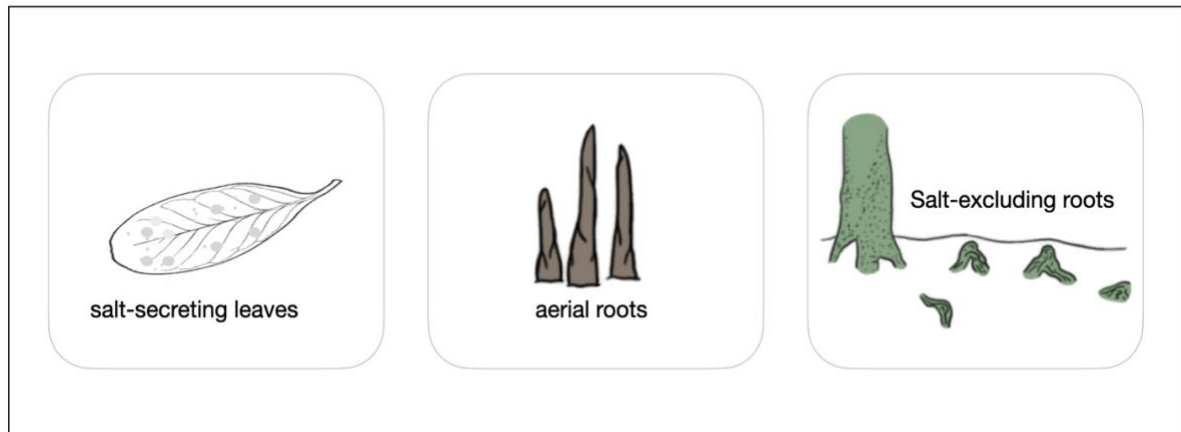
Fig. 5

With reference to Fig. 5, explain how the adaptations enable mangrove plants to survive in the coastal environment. [3]

- Some mangroves species such as Avicennia have leaves that are able to **secrete salt crystals on the leaf surfaces** when the concentrated salt solution evaporates, which subsequently gets removed by rain or wind [1] **OR** some mangroves species such as Sonneratia **deposit excess salt in older leaves** which they eventually **shed** to remove the salt. Such an adaptation prevents salt from building up within the plant and helps the mangrove plants to **survive in the salty water**. [1]

- The **soil** at coastal environment is **oxygen deficient**, so some mangrove species such as Avicennia and Sonneratia develop **aerial roots to take in oxygen directly** from the air when they are exposed **during low tide** [1] **OR** The soil at coastal environment is **waterlogged** for **several hours** of the **day**, so some mangrove species such as Avicennia and Sonneratia develop aerial to **anchor themselves** to the **soft soil** in order **not to be uprooted** and **washed away** by strong waves. [1]

- Bruguiera, which has knee-bend roots, possesses **salt-excluding roots** which **prevent salt** from entering the plant to enable its healthy growth to survive in the **saline** water. [1]

Summary:
[1] Salt -secreting leaves - need to at least **specify** that **salt stored in leaves** are **shed (hence removed)** OR **salt crystals formed on leaf** are **removed** by **rain** or **wind**
[1] Aerial roots - **oxygen** being **absorbed (**to accept even without indicating during **low tide)**
[1] Salt-excluding roots - ability to **prevent/disallow roots** from **taking in salt** or **filter out salt (not accepting reduce)**

Note:
- Accept either aerial roots or salt-excluding roots **anchor** plants on the **soft soil** or **withstand strong waves** or **high tide** (accept only once) NOT soil erosion
- Full marks are awarded even if the answer does not mention the **unfavourable conditions of the coastal** environment **for survival**, e.g. saline water that does not promote healthy growth or oxygen deficient soil.

Not accepting the point on aerial roots increases the surface area of the roots to absorb more water and mineral salt as it does not link to adapting to the coastal environment.

Misconceptions:
- Aerial roots absorb **carbon dioxide**, aerial roots absorb oxygen **during high** tide, aerial roots help mangrove plants to **absorb enough water** even during high tide
- salt-excluding roots help the plants to take in **less** salt or **reduce** intake of salt

Without referring to the adaptations given to Fig. 5, award max 1m

Weaker responses tended to state or describe the adaptations, without referring to how they help the mangrove plants to cope with the conditions found in the coastal environment.

Stronger responses were clear in explaining how each adaptation serves to help the mangrove plant to survive in either oxygen deficient, waterlogged or saline water conditions.

(d)   Study Fig. 6, which shows the concentration of carbon dioxide in the atmosphere before and after deforestation was carried out in tropical forests.

Before deforestation	After deforestation
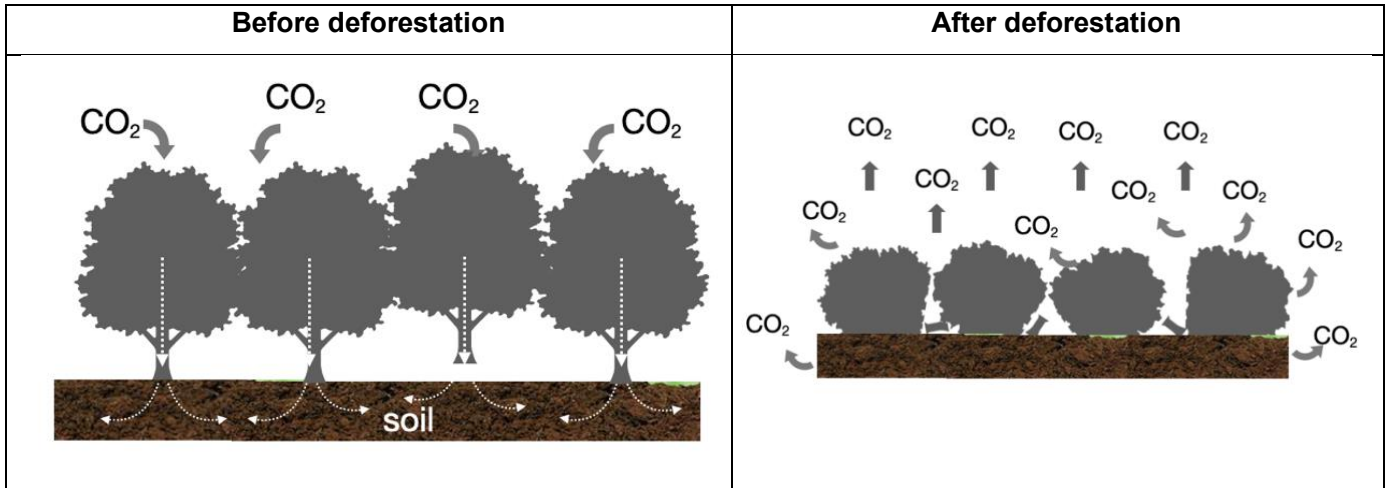
Fig. 7

Use information from Fig. 6 to explain how the deforestation of tropical forests can contribute to the enhanced greenhouse effect. [3]

- **Before deforestation, trees absorb carbon dioxide (CO2) during photosynthesis and store them in their leaves, stems, branches and soil. [1]**
- **Deforestation of tropical forests, which is the permanent removal of tropical trees by burning or cutting down, causes carbon that is stored in the plants and soil to be released as carbon dioxide. [1]**
- **Fewer plants in the tropical forest are left behind to absorb the increased amount of carbon dioxide in the atmosphere. [1]**
- **With more carbon dioxide in the atmosphere, a significant greenhouse gas, <u>more heat will be trapped</u> leading to the <u>enhanced greenhouse effect</u>. [1]**

Summary:
[1] Carbon storage released/escaped and increased CO2
[1] Trees help (OR fewer trees left) to absorb/take in and store CO2 (no mark if only mention trees store carbon or carbon dioxide, unless store CO2 during photosynthesis is mentioned)
[1] CO2 traps heat OR is a greenhouse gas leading to EGE

Misconceptions:
EGE is due to an increase in CO2 and a decrease in O2.
Carbon dioxide is only trapped in the soil.
Greenhouse gases trap heat from the sun.

Stronger responses made good use of Fig. 7 to demonstrate their understanding on how trees in the tropical forests help to absorb CO2 and release CO2 before and after deforestation respectively. They also provided a clear link on how an increase in CO2 leads to EGE.

(e) **With the help of an example, explain how controlled logging serves as a method of extracting resources from tropical forests while conserving them. [4]**

Example: Malaysia or Colombia [4]

- In **Malaysia**, logging companies are allowed to **cut down only older trees or a particular species** of trees which are **economically valuable**. [1]
- This measure helps to **reduce** the **overall damage** cause to the forest as **the other plants**, especially the **younger plants**, are **left untouched**. [1]
- Additionally, the removal of older trees or only selected species of trees **allow the remaining trees** (esp. the younger trees) to have **more space** and **sunlight** to grow, hence **promoting their growth.** [1]
- Over a time period of **several decades**, a forest can be **selectively** logged, given time to regrow, and then **logged again**, achieving a **balance** between **extracting resources for economic gain** and at the same time **conserving them** for **the future generations**. [1]

OR

Example: Malaysia or Colombia [4]

- In **Colombia**, companies are only allowed to **cut down small patches of forest** each time. [1]
- This means that all the trees in the patches are cleared while the **rest of the forest remain untouched**. [1]
- The patch is **small enough** to allow the **vegetation to regrow quickly** from the surrounding untouched forest. [1]
- Patches that have regenerated sufficiently **after several years** are allowed to be logged again. This helps to strike a **balance** between **extracting resources for economic gain** and at the same time **conserving them** for **the future generations; sustainable management**. [1]

Summary:

[1] Malaysia, only **older** (accept older) trees or **particular species** to be cut (accept limits the area of forest logged)
[1] Untouched younger trees or other species have **more space** and **sunlight** (accept time) to **grow OR**
[1] Colombia, small patches are **cut**, the rest remains (accept limits the area of forest logged or designated area)
[1] Logged area is **small** so able to **regenerate quickly**

[1] Process repeats after **several years**
[1] Sustainability - A balance between **economic gain** (or **valuable resources/raw materials** or to **meet people's basic needs**) and **conservation**

-1m if no examples are given.

Weaker responses mistook controlled logging, a management measure to regulate forestry activities, as a strategy to rehabilitate disturbed areas and went about explaining the positive effects of replacing the logged areas by replanting trees. This is likely due to their lack of understanding of the term 'deforestation' as they explained how replanting trees to replace the deforested areas will help to manage the tropical forests in a sustainable manner. Some even equated controlled logging with deforestation.

Stronger responses not only provided a clear explanation of how a specific controlled logging is carried out in a named location but also demonstrated a good grasp of how sustainable management of tropical forests involves striving a fine balance between ensuring economic gains through the extraction of valuable or useful resources while conserving them.

END OF PAPER