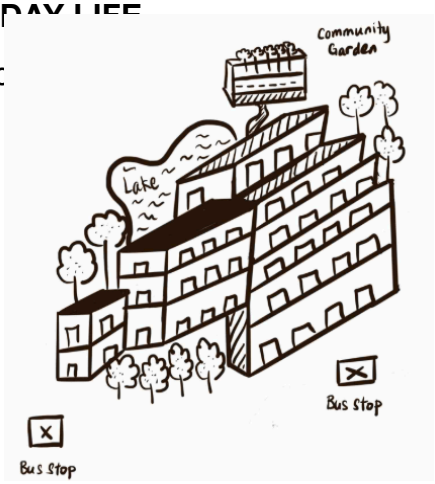
ANSWER SHEET
4NA PRELIMINARY EXAMINATION 2024

Section A

This question is compulsory.

CLUSTER 1: GEOGRAPHY IN EVERYDAY LIFE

1 a) Study Fig. 1.1, which shows a spatial hierarc



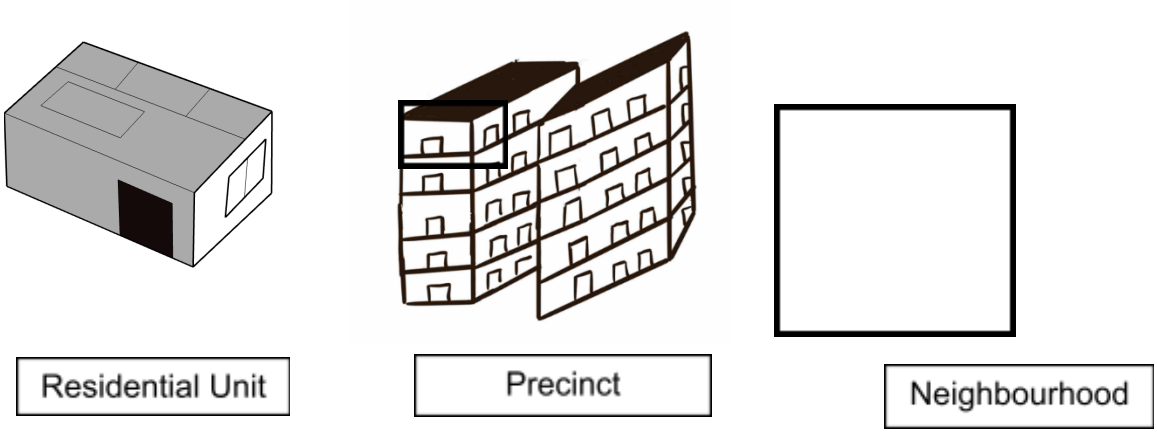


Fig. 1.1

Describe the characteristics of each level of the hierarchy shown in Fig. 1.1. [3] AO 1

1. [Characteristic of *residential unit*]: The spatial hierarchy begins with a **single residential unit**. Each of these **residential unit is part of a precinct, which is a part of a neighbourhood**, located within a town. [1]

2. [Characteristics of *neighbourhoods*]: A neighbourhood serves between **4000 – 6000 residents**. [1] **OR**
3. [Characteristics of *neighbourhoods*]: Each neighbourhood **consists of a few precincts.** [1]

4. [Characteristics of *precincts*]: Between **400 and 800 residential units** form a precinct. [1] **OR**
5. [Characteristics of *precincts*]: Facilities **are often within close proximity, serving residents' everyday needs.** [1]

At least one characteristic to be stated for each level of the hierarchy to be awarded full 3m.

b) Table 1.1, is a list of facilities available to citizens living in a new town in Singapore.

Facility	Characteristics
Park	Large green space with trees, playground and a fitness area.
Integrated sports hub	A sports centre with several sports facilities such as a public swimming pool, table tennis tables and a badminton court.
Bus stop	Bus stops are spread out in regular intervals such that there is a bus stop near every apartment block.
Covered linkway	Covered linkways are located near each other, across different blocks for greater accessibility.

Table 1.1

(i) Identify a facility from **Table 1.1** for each of the spatial hierarchy listed below. Each facility should only be used once. [3] AO 1

- Town: Integrated sports hub [1]
- Neighbourhood: Park/ Integrated sports hub [1]
- Precinct: Bus stops/ Covered linkways [1]

(ii) Using **Table 1.1**, explain how town planning is carried out in Singapore. [4] AO 2

1. [Feature 1 of Town Planning]: Facilities at the precinct, neighbourhood and town levels should enable each town to be **self-sufficient and provide employment opportunities**. [1]
2. *Additional Point* [Elaboration]: Facilities at the various spatial scales should **complement one another.** [1]

3. [Feature 2 of Town Planning]: Singapore's town planning should also **create connections and synergies across precints, neighbourhoods and towns**. [1]
4. **[Elaboration]** Long-term plans at the national level should seek to achieve this **by ensuring that towns are able to optimise scarce land resources to cater to a diversity of needs**. **[1]**

5. Compulsory Point [Data]: According to the features of the new town seen in Table 1, the town is self-sufficient with facilities, such as an **Integrated Sports Hub where town residents can keep fit together, with access to multiple sports facilities.** OR The park at the neighbourhood level can also **enable bonds amongst neighbours of different age groups to be built and a sense of belonging to be created as they engage in various sports, while feeling at home with nature**. [1]

Reserve 1m for use of data.

Both features of town planning should be awarded to be given full 4m.
Students can write points from 1-4 to be awarded 3m.

c) Explain how environmental stewardship can help to build sustainable neighbourhoods. [4] AO 1

1. Environmental stewardship can be promoted by **encouraging volunteerism among neighbourhoods residents to share knowledge with others. [1]**
2. This helps residents **become more aware of what they can and should do to responsibly use and protect the natural environment.** [1]
3. Environmental stewardship can also be promoted by **partnering with public and private sectors** to contribute to environmental stewardship efforts. [1]
4. Different stakeholders may have **different perspectives, resources and expertise to enhance the environmental stewardship efforts,** hence it **is crucial for them to come together to steward the environment. [1]**

d) A class of 20 students wanted to compare the level of satisfaction of residents and frequency of use of neighbourhood facilities in Neighbourhood ABC and Neighbourhood XYZ.

The students wanted to investigate the following hypothesis:

"*The level of satisfaction of residents in a neighbourhood affected by the facilities present in a neighbourhood.*"

They decided to conduct a questionnaire on Saturday evening. The students divided themselves into 2 groups of 10 students each. One group of 10 students went to Neighbourhood ABC to carry out the survey, while the other group of 10 students went to Neighbourhood XYZ to carry out the survey. Each group of students stood at the entrance of the neighbourhood and surveyed the first 20 people they saw. Both neighbourhoods have the same type of facilities.

The results of the questionnaire for Neighbourhood ABC and Neighbourhood XYZ are shown in Tables 1.2, 1.3 and 1.4 respectively.

Question 1: How satisfied are you with your neighbourhood?

Table 1.2 shows the overall levels of satisfaction of the residents in Neighbourhood ABC and XYZ.

Neighbourhood	Extremely Dissatisfied	Dissatisfied	Satisfied	Extremely Satisfied
Neighbourhood ABC	3	3	6	8
Neighbourhood XYZ	7	8	3	2

Table 1.2

Question 2: How satisfied are you with the facilities present in your neighbourhood?
Table 1.3 shows the levels of satisfaction with the facilities present in Neighbourhood ABC.
Neighbourhood ABC

Facilities	Level of Satisfaction			
	Extremely Dissatisfied	Dissatisfied	Satisfied	Extremely Satisfied
Healthcare facilities	1	5	6	8
Eating areas	2	4	7	7
Recreation facilities	2	7	6	5
Retail shops	5	9	4	2
Education facilities	1	1	9	9
Mean	2.2	5.2	6.4	6.2

Table 1.3

Table 1.3 shows the levels of satisfaction with the facilities present in Neighbourhood XYZ.

Neighbourhood XYZ

Facilities	Level of Satisfaction			
	Extremely Dissatisfied	**Dissatisfied**	**Satisfied**	**Extremely Satisfied**
Healthcare facilities	1	2	9	8
Eating areas	6	7	3	4
Recreation facilities	3	4	6	7
Retail shops	8	9	2	1
Education facilities	8	8	2	2
Mean	5.2	6.0	4.4	4.4

Table 1.4

(i) Identify the type of sampling method used. [1] AO 1

1. **Convenience sampling.**

(ii) Using Tables 1.3 and 1.4, contrast the level of satisfaction which residents have towards the education facilities in Neighbourhood ABC and Neighbourhood XYZ respectively. [2] AO 2

- [State the difference] There is a **greater level of satisfaction** towards the education facilities in Neighbourhood ABC as compared to Neighbourhood XYZ.
- [Use data]: In neighbourhood ABC, the **majority of 18 respondents who mentioned that they were 'satisfied' and 'extremely satisfied' with the education facilities in neighbourhood ABC.** On the other hand, the majority of **16 respondents mentioned that they were 'dissatisifed' and**

'extremely dissatisfied' with the education facilities in neighbourhood XYZ.

(iii) Using Tables 1.2, 1.3 and 1.4, explain the relationship between the overall level of satisfaction towards one's neighbourhood and the facilities present in the neighbourhood. [4] AO 2

1. [State the relationship]: **The higher the level of satisfaction towards the facilities present in the neighbourhood, the higher the overall level of satisfaction towards one's neighbourhood**. [1]
2. **[Support with data - Highest]: *[Overall satisfaction]*** According to Table 2, Neighbourhood **ABC has the most number of respondents of 14 respondents stating that they are generally satisfied/ extremely satisfied with their neighbourhood**. [1]

- *[Satisfaction with facilities]* This is supported with the levels of satisfaction that Neighbourhood ABC has with the facilities present in their neighbourhood. **Most of the respondents are generally satisfied with all 5 categories of facilities, with the highest mean of 6.4 respondents in the 'Satisfied' category**. [1]

OR

3. **[Support with data – Lowest*]: [Overall satisfaction]*** According to Table 2, Neighbourhood **XYZ has the least number of respondents of 5 respondents stating that they are generally satisfied/ extremely satisfied with their neighbourhood.**

   - *[Satisfaction with facilities]* This is supported with the levels of satisfaction that Neighbourhood XYC has with the facilities present in the neighbourhood. **Most of the respondents has stated that they are generally 'Dissatisfied' with all 5 categories of the facilities, with the highest mean of 6.0 respondents in the 'Dissatisfied' category. [1]**

4. **[Anomaly]:** One anomaly found is in the levels of satisfaction with the facilities found in Neighbourhood XYZ. While residents are **generally dissatisfied with the facilities found in Neighbourhood XYZ, they are generally satisfied with healthcare facilities and/or recreation facilities, with most of the residents falling within the 'satisfied' and 'extremely satisfied' categories for these 2 groups of facilities. [1]**

(iv) Evaluate the ease of data collection and the reliability of the data used in this investigation. [4] AO 3

FOR

1. Since convenience sampling was carried out, it would **be fairly convenient** to carry out the survey since the students do not have to select the respondents by segregating them into different

groups. [1] – *Could be justified to be biased/ unreliable to (dependent on the justification of the student)*

AGAINST

2. The sample size **of 20 people is too small, which may not be representative of the entire neighbourhood**. [1]
3. As students only **stood at one location of the neighbourhood to collect survey**, it **did not ensure that the responses may be representative of the entire neighbourhood**. [1]
4. There is **no indication/ question in the survey** that ensures that the resident lives in either one of those 2 neighbourhoods, which **may not ensure a representative data set collected across both neighbourhoods**. [1]

Accept any other plausible answers. Justification of each pointer must be given.

ANSWER SHEET
4NA PRELIMINARY EXAMINATION 2024

Section B

CLUSTER 3: TECTONICS

2 a) Study Fig. 2.1 which shows the cross-section of an earthquake zone.

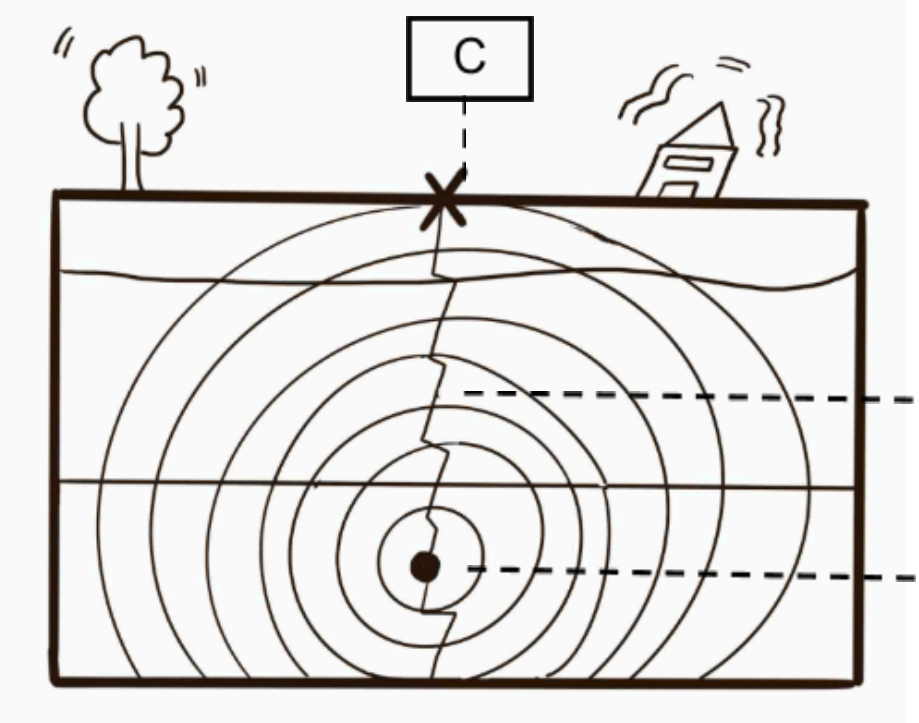


Fig. 2.1

Identify the parts of the earthquake zone labelled above. [3] AO1

- **A: Focus**
- **B: Fault**
- **C: Epicentre**

b) Study Fig. 2.2 which shows the relationship between the distance from the epicentre and number of deaths in Japan.

Relationship between distance from epicentre and number of deaths from earthquakes in Japan

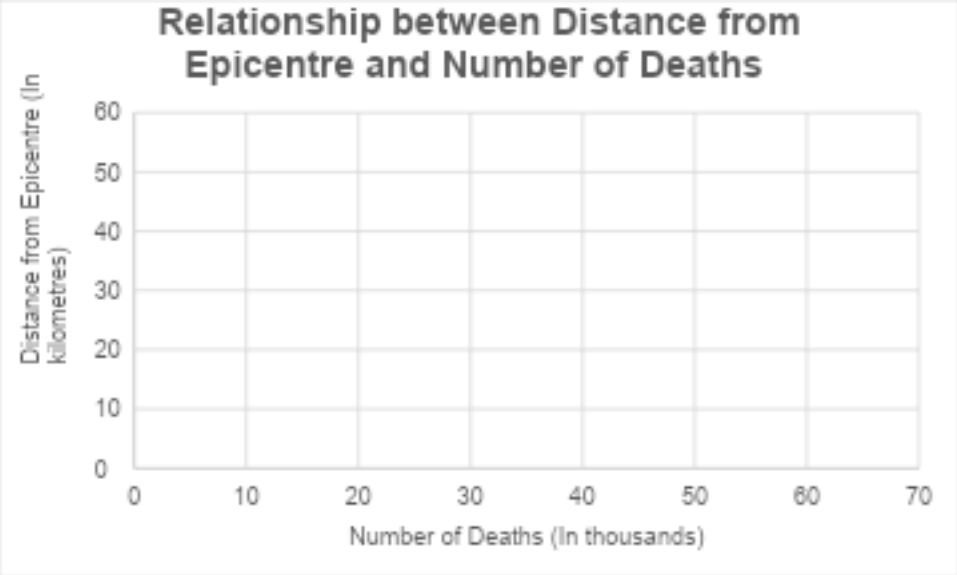


Fig. 2.2

i) Using Fig. 2.2., describe and explain the relationship between the distance of epicentre of earthquakes and the number of deaths caused. [4] AO2

1. [Describe relationship]: The **shorter the distance from the epicentre, the higher the number of deaths**. [1]
2. [Data]: At **the epicentre**, the number of deaths was the **highest at 55 000 deaths**. / At **the furthest distance from the epicentre**, of **60km,** the number of deaths was the **lowest at 5000 deaths**. [1]
3. [Explain relationship]: The nearer an area **is to the epicentre of the earthquake, the greater the number of people and buildings exposed to the hazards, which is likely to result in the greater number of deaths.**
4. [Identify anomaly]: However, there is one anomaly. At a distance that is **close to the epicentre, of 5km,** the number of deaths **is low at 20,000 deaths.** [1]

c) Using a named example, explain how soil liquefaction due to earthquakes can affect natural and human systems [3] AO1

1. Liquefaction occurs when the violent ground shaking causes saturated loose soil to lose it soil structure and transform into a thick liquid.

Natural systems

Answers must explain how soil liquefaction can affect the aquatic plants/wildlife/biodiversity.

2. Trees on liquefied soil **may sink in and tip over, damaging wildlife habitats, causing forest and biodiversity loss**. [1] OR
3. Liquefied soil **may enter rivers and smother aquatic plants, causing them to die.** [1] OR
4. Sewage **pipes may be broken and untreated waste materials may pollute rivers, killing aquatic plant species.** [1]

Human systems

Answers must explain how infrastructure damage can affect human lives.

5. Buildings and infrastructure **can sink in and tip over, which may cause the difficulty in the rescue of people/ supply of emergency aid.** [1] OR
6. **Electricity and communication cables and water and gas pipes may sink in and snap, disrupting supply of these services.** [1] OR
7. Roads and railways above liquefied **soil can sink in and get damaged, making it difficult to rescue people or supply emergency aid**. [1] OR
8. People can **get trapped under collapsed buildings and infrastructure, resulting in injuries and loss of lives**. [1]

Named example – *Reserve 1m for named example with elaboration*

9. In **2010 – 2011, Christchurch, New Zealand** experienced and earthquake that triggered severe liquefaction as the city lies on a former swamp area, where soils are loose and saturated.
10. **More than 60,000 residential buildings and infrastructure covering about 1/3 of the city area were damaged**.

Liquefied soil **entered rivers and untreated sewage from broken pipes polluted rivers.**

d) Explain how the disaster risks caused by earthquakes can be influenced by the nature of the hazard. [4] AO1

Duration of shaking

1. [Explanation of factor]: The **longer the duration of the ground shaking, the more damaging the earthquake can be**.
2. [Link to risk]: Structures such as buildings and bridges **may be more likely to collapse**./ People are **more likely to be trapped** in collapsed infrastructure, leading to **more injuries and loss of lives**.

Time of shaking

3. [Explanation of factor]: **The time of the day influences the activities carried out by people and how they respond when the earthquake strikes**. [1]
4. [Link to risk]: If **people are asleep at night, they will be less alert and are unable to evacuate quickly, leading to more injuries and loss of lives**. / If people **are at school or working during the day, they are more alert and are able to evacuate quickly, learning to less injuries and loss of lives.**

Students should share at least 2 ways where earthquakes can be influenced by the nature of the hazard.
Cap at 2m for any one factor given and explained.
Students MUST mention duration or time

e) Study Fig. 2.3 which shows information about the hazards caused by volcanic eruptions.

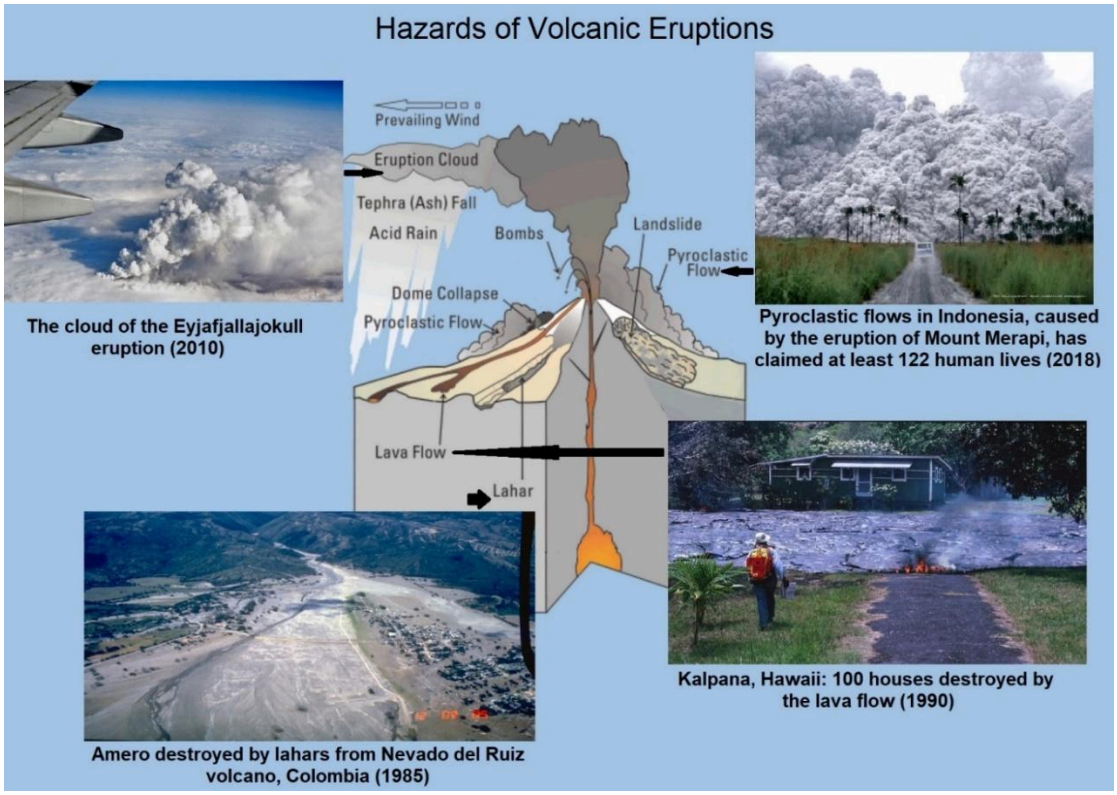


Fig. 2.3

ANSWER SHEET
4NA PRELIMINARY EXAMINATION 2024

Using Fig. 2.3, explain how volcanoes can cause social and economic consequences at an individual and national scale. [5] AO2

Social consequences

1. [Individual scale]: Volcanoes can **result in injuries/ loss of lives** as people can be burned from lava flow, pyroclastic flows, lahars that spews from the volcanoes. [1] OR
2. [Individual scale]: People can **lose their homes as houses** are destroyed from volcanic materials such as pyroclastic flows and lahars. [1] OR
3. [Individual scale]: Individuals may suffer from **psychological trauma from the loss of their homes or loved ones.** [1] OR
4. [Individual scale]: The constant **threat of losing their lives and being physically harmed while living in these areas can affect their mental well-being.** [1]

Economic consequences

5. [National scale]: Governments will have to portion **out national budget to spend money to repair and rebuild** because of the damage from volcanoes. [1] OR
6. [National scale]: Due to **rebuilding works and destruction to properties, the tourism industry will be impacted. People will also be afraid to visit the country**, therefore economic growth in the tourism sector may be stagnant. [1] OR
7. Individual scale]: Individuals may **suffer financially as it is costly to repair or rebuild their damaged homes**. [1] OR
8. [Individual scale]: Individuals in the tourism sector (e.g. tour guides/ tour agencies) may **suffer unemployment due to the lack of tourists entering the country for fear of volcanic eruptions**. [1]

1m for valid pointers
Cap at 2m for social consequences
Cap at 2m for economic consequences
Reserve 1m for data used

ANSWER SHEET
4NA PRELIMINARY EXAMINATION 2024

f) 'Strengthening community resilience by developing monitoring and warning systems is the most effective way to reduce a country's disaster risk.' [6] AO3

To what extent do you agree with this statement? Explain your answer with relevant examples.

Introduction	I agree to a large extent that developing monitoring and warning systems in order to reduce disaster risk will help to strengthen community resilience.
Body Paragraph 1: Addressing Given Factor	**P**: Monitoring and warning systems are a set of devices used to detect seismic waves and ground deformation to help cope with disaster risk. **E:** They can help to make predictions and sent warnings about potential hazards. The warnings enable people to evacuate to a safer place, reducing their susceptibility to tectonic hazards. **E**: For instance, the EEW systems use a network of sensors and monitors. (To elaborate on how the sensors work). During the 2011 Tohoku EQ, monitoring and warning systems detected strong tremors and a signal was sent out to stop the bullet train, saving thousands of lives. **L**: Therefore, reducing vulnerability through monitoring and warning systems can also help to build community resilience, thereby reducing disaster risks.
Body Paragraph 2: Addressing introduced factor	**P**: Increasing preparedness for response and recovery to reduce disaster risk will also help to strengthen community resilience. **E**: This can be done by raising awareness of hazards through education. This is done by providing people with the knowledge of the hazards and how to respond to them. It can also be done through first-aid training and evacuation drills. **E**: For example, during the 2011 Tohoku, Japan Earthquake, nearly 2000 students of Kamaishi city survived the 2011 earthquake and tsunami due to their high level of preparedness, enabling them to respond quickly and evacuate to higher ground, away from the tsunami. **L**: Therefore, increasing preparedness for response and recovery can build community resilience to EQs and volcanic eruptions.
Weighing Paragraph	In my opinion, I **agree to a large extent** that developing monitoring and warning systems in order to reduce disaster risk will help with strengthening community resilience. On a national scale, countries can put in place

	adequate measures to ensure that their citizens are prepared for disasters with the use of nation-wide monitoring and warning systems. However, the efficacy of nation-wide drills and preparation measures are largely dependent on the country's level of development and education to ensure that disaster risk is effectively reduced. The lack of capability of the community to organize themselves due to citizens' level of education and development nation-wide may cause challenges in building resilience. Individuals may therefore continue to limit the country's ability to respond and recover from tectonic disasters.
Conclusion	Therefore, I agree to a large extent that developing monitoring and warning systems in order to reduce disaster risk will help with strengthening community resilience.

Level	Level Descriptor
1 0-2m	• A **basic answer that has little development with no clear stand** • **Acknowledgement of the given factor** – developing monitoring and warning systems. • **Students briefly describe given factor** – developing monitoring and warning systems.
2 3-4m	• Disagreement or agreement of stand **will be supported with appropriate detail.** • **Some examples** or other evidence will be presented to support answers in at **least one factor of the answer.** • Students **explain given factor and describe its benefits** (full and developed PEEL paragraph) (L2/4 max). OR Description of 2 factors to reduce a country's disaster risk – may not be fully developed (L2/4 max). Given factor – Strengthening community resilience by developing monitoring and warning systems must be addressed.
3 5-6m	• **Clear overall stand** on whether development of monitoring and warning systems is indeed the most effective way to reduce country's disaster risk. Factor 2 must also be well-developed and addressed by student. • **Usage of geographical concepts to illustrate evidence of weighing of factors** – E,g, *Level of development* of the country which will affect a country's extent of community resources and capability of the community to organize itself for disasters (address challenges in building community resilience) • **Examples/ Case studies to support answers** MUST be extensive to support PEEL paragraphs for both stated factors.

ANSWER SHEET
4NA PRELIMINARY EXAMINATION 2024

Question no.		AO1	AO2	AO3
1	a)	3		
b)	i)	3		
	ii)		4	
c)	i)	4		
d)	i)	1		
	ii)		2	
	iii)		4	
	iv)			4
Total		11	10	4
		AO1	**AO2**	**AO3**
2	a)	3		
	b)		4	
	c)	3		
	d)	4		
	e)		5	
	f)			6
		10	9	6
Total		50		