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- 1 (a) With reference to Figs. 1.1 and 1.2, suggest how these built environments affect the local people's sense of place. [3]

- The **sports stadium** in Fig. 1.1 fosters community identity and pride by **serving as a venue for national and school events**, which helps residents feel connected to their town. [1]
- The **presence of high-rise housing** around the stadium gives a **sense of familiarity and belonging for residents**, as residents associate their daily routines and memories with the built environment, enhancing their belonging to the area. [1]
- The **local walkway and recreation area** in Fig. 1.2 **promotes regular social interaction and active living**, which not only improves residents' well-being but also helps **build strong community bonds**, fostering a sense of safety and comfort in the neighbourhood. [1]

Accept other plausible answers.

- (b) (i) Using Fig. 1.3, describe the distribution of the main towns in Singapore. [2]

- The main towns are **widely distributed across the island**, with clusters seen in the **northern, southern, eastern**, and **western** parts of Singapore, showing a deliberate effort to decentralise urban development. [1]
- Many main towns are located in **close proximity to major roads and expressways**, such as the Pan-Island Expressway (PIE) and Central Expressway (CTE), allowing for efficient transport connectivity across the island. [1]
- There are **fewer main towns in the northern region** of Singapore, as compared to the rest of Singapore. [1]

- (ii) Explain the spatial hierarchy within a town in Singapore. [2]

- At the top of the spatial hierarchy is the **town centre**, which offers a wide range of services, such as shopping malls, healthcare facilities, and entertainment options, to cater to the needs of residents within the entire town. [1]
- This is followed by **neighbourhood and precincts**, which offer lower-order services like convenience stores, coffee shops, and playgrounds, catering to the day-to-day needs of residents within walking distance. [1]

- (c) Using Figs. 1.4 and 1.5, compare the changes in deaths and injuries caused by traffic accidents from 2008 to 2018. [4]

Similarities

- **Both deaths and injuries show a slight decline between 2008 and 2010**, indicating an overall improvement in road safety during that period. [1]
- **From 2009 to 2012, both deaths and injuries remained relatively stable**, with minor fluctuations, suggesting a plateau in traffic safety outcomes. [1]

Differences

- **Overall, deaths showed a significant decreasing trend**, from approximately 170 in 2008 to around 120 in 2018, while **injuries remained mostly constant**, hovering around 8,700 to 8,900. [1]
- **Deaths experienced a sharp drop between 2010 and 2013**, whereas **injuries showed slight increases during the same period**, showing contrasting directions in the data. [1]

- (d) Describe the negative consequences of air pollution to local residents. [4]

- Air pollution causes **respiratory problems** such as asthma and bronchitis, especially affecting children and the elderly. [1]
- **Long-term exposure** can lead to **chronic health conditions** like cardiovascular diseases, increasing healthcare costs for families. [1]
- It **reduces quality of life** by making outdoor activities uncomfortable or unsafe during periods of haze or high pollutant levels. [1]
- It can also **reduce visibility and damage buildings** over time due to acid rain, creating a **less pleasant living environment**. [1]

Accept other plausible answers.

- 2 (a) Using Fig. 2.1, explain how slab-pull force results in plate movement. [3]

- The slab-pull force occurs when a **denser oceanic plate subducts beneath a less dense continental plate** at a convergent boundary, as shown in Fig. 2.1. [1]
- As the oceanic plate subducts into the mantle, **gravity pulls and drags the rest of the subducting plate further into the mantle**. [1]
- This **gravitational pull at the subduction zone** is the main driver of plate movement away from the mid-ocean ridge, contributing to the **continued convergence and subduction** of tectonic plates. [1]

(b) Suggest how physical processes cause earthquakes at transform plate boundaries. [3]

- At transform plate boundaries, tectonic plates **move laterally/ slide past one another**. [1]
- Due to **friction** between the plates, **stress accumulates** because the plates are not able to slide smoothly. [1]
- When the stress exceeds the frictional force, **it is released suddenly as seismic energy**, resulting in an earthquake along the fault line. [1]

(c) Using Fig. 2.2, describe the spread of volcanic ash following the eruption. [3]

- The ash from the Eyjafjallajökull eruption in 2010 **spread primarily eastwards from Iceland**, covering extensive areas of Northern and Central Europe. [1]
- **Countries like the United Kingdom, Germany, Norway, Sweden, and Poland** were significantly affected, with ash clouds reaching heights of 6000 to 9000 metres. [1]
- The ash cloud covered a distance of **more than 3000 km**, reaching as far east as western Russia and as far south as northern Italy. [1]

(d) With reference to Fig. 2.3, evaluate the effectiveness of the strategies used to increase the preparedness of people living near active volcanoes. [6]

Effectiveness

- **Installing early warning systems** such as sirens and mobile alerts ensures timely communication of eruption threats, giving residents more time to evacuate. [1] This is **effective in reducing casualties** and has been successful in volcanic-prone countries like Indonesia. [1]
- **Encouraging locals to prepare a 72-hour emergency kit** increases preparedness as it ensures that residents have access to essential supplies such as food, water, and medicine in the aftermath of an eruption. [1] This **reduces reliance on delayed emergency relief** and increases their ability to survive independently for a short period. [1]
- Having a **family emergency plan** improves preparedness by **reducing panic and confusion** during an eruption, as households are aware of evacuation routes and procedures. [1] This **strengthens community resilience** by allowing families to reunite safely and respond more quickly. [1]

Ineffectiveness

- **Expecting the general public to read hazard maps without proper guidance may reduce preparedness**, as residents may misinterpret danger zones. [1] For example, during the 2018 Fuego eruption in Guatemala, **misreading of hazard zones delayed evacuations** and contributed to loss of life. [1]

- **Evacuation plans that assume all residents can leave danger zones may be ineffective**, as some people lack access to vehicles or refuse to leave due to economic reasons. [1] This limits the overall preparedness of the community, especially in rural or low-income areas. [1]
- However, relying on television and radio broadcasts may not be fully effective, as power outages during eruptions can prevent residents from receiving important updates. [1] This reduces the effectiveness of the strategy since people may miss critical evacuation information. [1]

Accept other plausible answers.

3 (a) (i) Using Table 3.1, how does the data suggest that Singapore experiences monsoons? [1]

- There are distinct periods of high rainfall such as in January (246 mm) and December (287 mm), and lower rainfall in months like February (108 mm), indicating the **presence of distinct wet and dry seasons** typical of monsoon influence. [1]

(ii) Using Table 3.1, describe the relationship between monthly mean temperature and total rainfall. [4]

- There is generally an **inverse relationship** between temperature and rainfall, where months with higher temperatures tend to have lower rainfall. [1]
- For example, **June** has the **highest mean temperature** of 31.9°C but only 126 mm of rainfall, while **December** has the **lowest mean temperature** of 26.4°C and the **highest rainfall** at 287 mm. [1]
- Similarly, August has a high temperature of 31.6°C but low rainfall at 148 mm, while January, with a lower temperature of 28.5°C, receives much more rainfall at 246 mm. [1]
- However, there is an **anomaly in March**, the temperature is high 29.5°C and total rainfall is also relatively high at 184 mm. [1]

(iii) Explain why the relative humidity is high throughout the year in Singapore. [2]

- Singapore is **located near the equator**, resulting in **high year-round temperatures** which enhance **evaporation**. [1]
- Additionally, Singapore **receives consistent rainfall throughout the year**, **contributing moisture to the air** and maintaining high relative humidity levels between 82% and 86%. [1]

(b) With reference to Fig. 3.1, explain how Singapore is adapting to such challenges. [4]

- To **address flooding**, Singapore has invested in a **comprehensive drainage system** like Stamford Detention Tank and the Stamford Diversion Canal to control stormwater flow during intense rainfall events. [1]
- To combat **poor harvests and ensure food security**, the government **promotes urban farming** and aims to produce 30% of its nutritional needs locally by 2030 under the “**30 by 30**” **strategy**. [1]
- To **preserve biodiversity**, Singapore **designates nature reserves and parks**, such as the Sungei Buloh Wetland Reserve, and implements habitat restoration projects. [1]
- **Public education and awareness campaigns** are also conducted to **encourage sustainable lifestyles and reduce environmental impact**, which helps mitigate biodiversity threats and climate-related issues. [1]

Accept other plausible answers.

(c) ‘Environmental considerations are Singapore’s main priority in continuing to develop sustainably.’

How far do you agree with this statement? Explain your answer. [9]

Agree: Environmental considerations are an important priority

- Singapore has made **environmental protection a key pillar in its pursuit of sustainable development**.
- The government **integrates environmental goals into national strategies** to mitigate climate change and ensure long-term ecological health.
- Initiatives such as the **Singapore Green Plan 2030** highlight the country’s commitment to reducing carbon emissions, planting one million trees, and expanding solar energy usage.
- For example, the development of **Tengah**, Singapore’s first “Forest Town,” features car-free town centres, smart energy grids, and an extensive park network, all designed to reduce environmental impact.
- These efforts show that **environmental considerations are deeply embedded in urban planning and national policy**, indicating that they are a top priority in Singapore’s sustainability agenda.

Counterpoint: Economic considerations are also important

- However, **economic development remains a strong and sometimes overriding priority** in Singapore’s sustainability efforts.
- The **need to maintain economic competitiveness** often leads to trade-offs that compromise environmental objectives.
- Singapore’s **reliance on industries** such as shipping, oil refining, and petrochemicals continues to contribute significantly to its GDP, even though these industries are environmentally intensive.

- The **creation of Jurong Island**, a hub for petrochemical industries, involved **extensive land reclamation, which destroyed natural coastal habitats**.
- This illustrates that economic imperatives can sometimes outweigh environmental goals, especially when job creation and GDP growth are at stake.

Counterpoint: Social considerations are also important

- Additionally, **social needs also influence Singapore's development priorities** and sometimes take precedence over environmental concerns.
- As a small city-state with a **dense population**, housing and transport infrastructure are essential to maintaining quality of life.
- To meet these demands, large-scale housing projects and MRT expansions have occasionally led to the clearance of green spaces.
- For example, **parts of the Cross Island MRT Line are planned to tunnel under the Central Catchment Nature Reserve**, sparking environmental concerns but justified as necessary for social connectivity.
- This demonstrates how social development, such as accessibility and housing, sometimes competes with environmental preservation, suggesting that the latter is not always the main focus.

Conclusion

- In conclusion, I **agree to a small extent** that environmental considerations are Singapore's main priority in continuing to develop sustainably.
- While Singapore places high importance on environmental considerations, it is not always the **main** priority.
- Sustainable development in Singapore is shaped by the environmental, economic, and social goals and the government often adopts a **balanced approach** that weighs all three dimensions.
- While efforts like the Green Plan 2030 and eco-town developments prove strong environmental intent, **economic growth and social wellbeing often influence decisions more directly** due to Singapore's limited land and resource constraints.
- Hence, I believe environmental considerations are **a key pillar**, but **not necessarily the most important**, in Singapore's sustainable development framework.