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1 (a) With reference to Fig. 1.1, describe the advantages and disadvantages of nature areas to local people. [4]

Advantages

- **Nature areas such as a public city park can provide a social and recreational space** for park-goers to engage in activities such as picnic, exercise, and socialise, which can **promote social cohesion**. [1 mark]

- Green spaces allow residents to **escape from urban stress and enjoy nature**. In Fig. 1.1, people are sitting on the grass, indicating that parks provide a peaceful environment for relaxation, which can **reduce stress and improve mental health.** [1 mark]

- Trees and vegetation in nature areas absorb pollutants and provide shade, reducing the urban heat island effect. The presence of greenery in nature areas suggests that such parks help **regulate temperature and provide fresh air for the local people.** [1 mark]

Disadvantages

- Fig. 1.1 clearly shows a significant amount of litter scattered across the park. This suggests that heavy usage of nature areas can **lead to poor waste management,** making the environment unpleasant for the local people and increasing the workload for maintenance workers. [1 mark]

- The park in Fig. 1.1 is densely packed with visitors, which can lead to **overcrowding**. Large crowds can create **noise pollution**, making it difficult for those seeking a peaceful experience to enjoy the park. [1 mark]

- Overuse of nature areas, as seen in Fig. 1.1, can lead to **trampling of grass, soil erosion, and disruption of local wildlife.** If people do not respect the environment, the natural beauty of the park may degrade over time. [1 mark]

(b) Explain how town planning in Singapore serves the residents' needs at the neighbourhood and town levels. [4]

- Singapore's town planning ensures that **amenities** such as supermarkets, hawker centres, and playgrounds are **located within walking distance of residential areas within each neighbourhood.** [1 mark] This **reduces travel time** for residents and enhances **convenience**, allowing them to **meet daily needs efficiently**. [1 additional mark]

- Town planning in Singapore **integrates MRT stations and bus interchanges** within each town, making commuting easy and efficient. [1 mark] This **reduces reliance on private vehicles**, alleviates traffic congestion, and **promotes environmental sustainability**. [1 additional mark]

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(c) With reference to Fig. 1.2, suggest how neighbourhood shops provide economic and social sustainability for the neighbourhood. [3]

- Neighbourhood shops under the residential blocks **create job opportunities for local residents, reducing unemployment and boosting the local economy**. [1 mark] The presence of these small businesses also encourages entrepreneurship and allows residents to **generate income** by working as retail assistants, chefs and cashiers. [1 additional mark]

- Neighbourhood shops can help to **reduce economic leakages** when residents shop at neighbourhood stores instead of travelling to malls or other districts, money stays within the community, benefitting local businesses. [1 mark] The presence of essential services (e.g., grocery stores, bakeries) in Fig. 1.2 shows that residents can meet their needs locally, **minimising the need to shop elsewhere**. [1 additional mark]

- Regular visits to neighbourhood shops allow residents to **interact with shop owners and neighbours, fostering a sense of place and belonging**. [1 mark] The open public space of the neighbourhood shopping street in Fig. 1.2 encourages people to **gather and socialize, strengthening community ties**. [1 additional mark]

(d) With reference to Fig. 1.3, explain how such infrastructure contributes to sustainable development in urban neighbourhoods. [4]

- The cycling bridge in Fig. 1.3 encourages the use of bicycles instead of cars, **reducing carbon emissions and traffic congestion**. [1 mark] This supports **environmental sustainability** by lowering pollution levels and contributing to cleaner air in urban areas. [1 additional mark]

- The bridge provides a **dedicated cycling path**, separating cyclists from motor vehicles and pedestrians. This **reduces the risk of road accidents**, ensuring a **safer and more inclusive urban environment**. [1 mark] By encouraging **safe and accessible transportation**, the bridge improves mobility for all residents, including those who may not own cars, fostering a more **equitable and liveable city**. [1 additional mark]

- The construction of cycling bridge encourages residents to adopt cycling, which is a **low-cost mode of transport.** This allows residents to save money on fuel, car maintenance, and public transport fares. This makes living in the neighbourhood more **financially sustainable**. [1 mark] By **reducing financial burdens on residents**, the neighbourhood becomes more attractive for long-term settlement, supporting stable economic development without excessive resource consumption. [1 additional mark]

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2 (a) (i) Using Fig. 2.1, identify the landform marked X. [1]

- Volcanic island

(ii) Explain the processes which occur at a convergent plate boundary. [4]

- At a convergent boundary, the **denser oceanic plate is forced beneath the less dense plate** into the mantle, forming a subduction zone. [1 mark]

- As the oceanic plate subducts, it creates a **deep linear oceanic trench**, which marks the boundary between the two plates. [1 mark]
- **Part of the subducted plate melts** due to intense heat and pressure in the mantle, forming magma. The magma rises through cracks in the crust, leading to the **formation of submarine volcanoes**. [1 mark]

- **Subsequent volcanic eruptions** will result in the submarine volcanoes growing in size and rising above the surface of the water, **forming volcanic islands**. [1 mark]

- The movement of plates creates **friction and pressure** at the subduction zone. When this pressure is released, it causes **earthquakes**, which are common at convergent plate boundaries. [1 mark]

(b) (i) Using Table 2.1, compare the information for the four volcanoes. [2]

Height of Eruption Cloud:
- Mount Pinatubo had the **highest** eruption cloud at **35 km**, while Nevado del Ruiz had the **lowest** at **2 km**.

Duration of Main Eruption:
- Eyjafjallajökull's eruption lasted the **longest (3 months)**, whereas Nevado del Ruiz had the **shortest eruption (20 minutes)**.

Number of Deaths:
- Nevado del Ruiz caused the **most fatalities (23,000 deaths)**, while Eyjafjallajökull resulted in **no deaths**.

(ii) Using Fig. 2.2, describe two features of this stratovolcano. [2]

- The stratovolcano has a **large caldera** at its summit, which appears to be filled with water, creating a **crater lake**. [1 mark]

- The volcano's **steep and rugged slopes** are uneven, with deep ridges and sharp edges formed by past eruptions and erosion. [1 mark]

- This stratovolcano has ongoing geothermal activity **with thin plume of steam** is rising from the centre of the caldera. [1 mark]

- The lower slopes of the volcano are **partially covered with green vegetation**, contrasting with the barren, rocky upper slopes. [1 mark]

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(c) With reference to Fig. 2.3, evaluate the impacts of earthquakes on local people. [6]

Negative impacts

- Fig. 2.3 shows collapsed buildings, damaged roads, and debris, indicating that **many homes have been destroyed**. [1 mark] This means that many people have been **displaced from their homes** and may be forced to live in temporary housing, **disrupting their daily lives**. [1 additional mark]

- The image depicts severe destruction, suggesting that people may have been **trapped under rubble or injured by falling debris**. [1 mark] This can lead to a **high number of casualties**, putting **pressure on emergency response teams** and medical services. [1 additional mark

- The **destruction of businesses and shops**, as seen in Fig. 2.3, means that many people have **lost their jobs and income sources**. [1 mark] This can lead to **long-term financial struggles** for families, making it difficult for them to recover from the disaster. [1 additional mark]

Positive impacts

- After an earthquake, the government and private sector **invest in rebuilding stronger, earthquake-resistant infrastructure**. [1 mark] This leads to **long-term improvements in urban planning and safety**, ensuring that future earthquakes cause less damage and disruption to people's lives. [1 additional mark]

- **Local and international aid organizations** provide immediate relief such as food, water, and medical assistance to survivors. [1 mark] These efforts help people recover faster and allow communities to rebuild their homes and livelihoods, **improving resilience for future disasters**. [1 additional mark]

3 (a) With reference to Fig. 3.1, suggest how people in Singapore may be affected by the negative impacts of more extreme rainfall. [3]

- Higher-than-average rainfall, especially in months like January and August 2021, can lead to **more frequent flash floods** in low-lying areas. [1 mark] In January 2021, the total rainfall exceeded 450mm, which was significantly higher than the 30-year average of around 200mm. This can **disrupt daily commutes**, causing delays for workers and students, while also damaging vehicles and public transport infrastructure. [1 additional mark]

- **August 2021** saw over **350mm of rainfall**, compared to the historical average of about **200mm**, putting stress on drainage systems, leading to water seepage into homes and businesses, as well as road erosion. [1 mark] This results in **high repair costs for homeowners and the government**, as well as disruptions to businesses that may suffer losses due to flood damage. [1 additional mark]

- Several months in 2021, such as **July and December**, experienced over **300mm of rainfall**, much higher than their respective 30-year averages of around **200mm**. Heavy rainfall increases the likelihood of **water stagnation**, creating ideal breeding grounds for mosquitoes. [1 mark] This can cause a rise

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in **vector-borne diseases such as dengue fever**, placing stress on healthcare facilities and affecting public health. [1 additional mark]

(b) (i) Using Fig. 3.2, describe the changes in the death rate in Singapore from 1950 to 2020. [2]

- The **overall trend** shows a **decline in the death rate** from **1950 to the early 2000s**, before experiencing a **slight increase towards 2020**. [1 mark]
- The death rate in Singapore was around 10 per 1,000 people in **1950** and showed a **sharp decline** until the **early 1970s**, reaching approximately 5 per 1,000 people. [1 mark]
- From the **1970s to 2020**, the death rate continued to **decline gradually**, reaching its lowest point at about 4 per 1,000 people in the early 2000s, before **slightly increasing again** towards **2020**. [1 mark]

(ii) Explain the challenges for Singapore as a result of the changes in the death rate shown in Fig. 3.2. [3]

- The death rate has slightly increased in recent decade, indicating an **aging population** in Singapore. [1 mark] This suggests **greater demand for healthcare services**, elderly care facilities, and medical professionals, placing a strain on healthcare resources. [1 additional mark]
- With more elderly individuals, there are **fewer working-age citizens to support them financially** through taxes and social security. [1 mark] This **increases the dependency ratio**, requiring the government to spend more on pensions and elderly welfare schemes, affecting long-term economic sustainability. [1 additional mark]
- An increasing elderly population requires **more elderly-friendly infrastructure**, such as wheelchair-accessible public transport and healthcare facilities. [1 mark] This **raises government expenditure on urban planning and social support programs**, requiring careful resource allocation to ensure sustainability. [1 additional mark]

(c) Sketch the community space shown in Fig. 3.3. Annotate the sketch to show two features that will help to foster community spirit. [3]

Suggested annotations:

- Seating areas: These benches allow residents to sit, relax, and **interact** with one another, **encouraging social bonding**.
- **Open communal space** with greenery**:** The open layout and trees create a welcoming environment where people can **gather for activities** such as group exercises, small community events, and casual conversations.

*Note: **Sketch the key elements** from Fig. 3.3, including benches, trees, open spaces, and activity areas. [1 mark]*

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(d) 'Singapore's efforts to develop the tourist industry have had more positive than negative impacts on the environment.' To what extent do you agree with this statement? [9]

Singapore's tourism industry has contributed positively to the environment by integrating **sustainability into urban planning and eco-tourism initiatives**. As a small island nation with limited land, Singapore has adopted a **green tourism strategy** that balances development with environmental conservation. This includes **energy-efficient technologies, large-scale reforestation, and urban greening projects**, which help to mitigate the environmental impact of tourism growth. Sustainable tourism sites contribute to **improving air quality, regulating urban temperatures, and preserving biodiversity**, ensuring a high-quality visitor experience while protecting the natural environment. For example, **Gardens by the Bay (Fig. 3.4)** was designed not only as a tourist attraction but also as an **eco-friendly urban space**. The **solar-powered Supertrees** generate renewable energy, while the **climate-controlled conservatories** reduce excessive water and energy consumption. Similarly, **The Southern Ridges (Fig. 3.5)** provides access to Singapore's natural landscapes through elevated walkways that **minimise direct human impact on forest ecosystems**, allowing visitors to experience nature without disturbing wildlife. By ensuring that tourism sites contribute to environmental sustainability, Singapore has **mitigated the negative effects of urban expansion and enhanced the overall quality of its environment**.

However, despite these sustainability efforts, tourism development in Singapore has led to **negative environmental consequences, particularly through land reclamation and increased resource consumption**. The construction of large-scale tourism infrastructure requires extensive land use changes, often at the expense of **natural habitats and biodiversity**. Additionally, the expansion of tourism leads to **higher carbon emissions from transportation, increased water and energy consumption, and greater waste production**. For example, **Gardens by the Bay was built on reclaimed land**, which involved dredging and filling coastal areas, leading to **the destruction of marine habitats** and alterations to coastal ecosystems. Even nature-based attractions like **The Southern Ridges experience challenges due to high visitor numbers, which can result in soil erosion, littering, and disturbances to native wildlife**. Furthermore, while Singapore has made efforts to promote eco-friendly transportation, the tourism industry still relies heavily on **international air travel**, which significantly contributes to global carbon emissions. These negative effects highlight the environmental trade-offs that come with tourism development, as even the most sustainable initiatives cannot entirely eliminate human impact on the environment.

Overall, I agree to a **large extent** that the positives outweigh the negatives. This is because Singapore has implemented **strict environmental regulations, rigorous urban planning policies, and eco-tourism strategies** that help to mitigate the negative effects of tourism. The country has also focused on **long-term sustainability**, incorporating green spaces into urban areas and utilising advanced technology to **reduce energy consumption, manage waste efficiently, and conserve biodiversity**. By continuously refining its sustainability strategies, Singapore has demonstrated that economic growth through tourism does not have to come at the cost of environmental degradation.