2260/02/O/N/24

1 (a) (i) What does a cluster of residential units form in a neighbourhood? [1]

- Precinct

(ii) Using Fig. 1.1, describe how the neighbourhood provides a range of cultural services for its residents. [3]

- The neighbourhood provides cultural services through places of worship (black), which offer **religious and spiritual support**. [1 mark]

- A public library (blue) provides access to books, educational resources, and community activities, **promoting learning and social engagement**. [1 mark]

- A community club (brown) serves as a space for cultural and recreational activities, **fostering community interaction**. [1 mark]

(b) (i) Describe some of the negative consequences of fires in urban neighbourhoods. [3]

- Fires in urban neighbourhoods can result in **fatalities/ loss of lives or severe injuries** due to burns and smoke inhalation. [1 mark]

- **Houses, businesses, and infrastructure may be destroyed**, incurring **high financial costs** for repairs and reconstruction. [1 mark]

- Affected individuals may become temporarily or permanently **displaced from their homes,** leading to disruptions in their daily lives. [1 mark]

(ii) State the cause of one other hazard which is common in urban neighbourhoods. [1]

- One common hazard in urban neighbourhoods is **air pollution**, caused by vehicle emissions, industrial activities, or construction dust**.** [1 mark]

(c) (i) With reference to Table 1.1, evaluate the success of recycling for the different waste types. [3]

Successes:
- Recycling has been highly successful for **ferrous metal** (99%) and **construction and demolition waste** (99%), showing that infrastructure for recycling these materials is well-established and efficient. [1 mark]

- **Horticultural waste** (80%) and **wood** (64%) also have high recycling rates, indicating that organic materials are being effectively repurposed, likely for composting or biofuel. [1 mark]

Limitations:
- **Paper/cardboard** (38%) and **food waste** (19%) have lower recycling rates, suggesting challenges in collection and contamination issues. [1 mark]

- **Plastics** (4%) and **textile/leather** (4%) have the lowest recycling rates, indicating a lack of facilities, poor sorting habits, or limited demand for recycled plastic and textile materials. [1 mark]

(ii) With reference to Fig. 1.2, evaluate the reliability of using closed-ended questionnaire surveys to collect primary data. [3]

Strengths:
- Closed-ended questions **ensure consistency**, making it **easier to analyse and compare** data. [1 mark]
- The survey allows for **efficiency in collecting responses** from a large number of residents, improving the sample size. [1 mark]
- Questions are designed to **directly assess awareness and participation** in the recycling programme, making the data relevant. [1 mark]

Limitations:
- The yes/no format **does not allow respondents to elaborate** on their answers, reducing the richness of the data. [1 mark]
- Those unaware of the recycling programme may not engage in the survey, leading to a biased dataset with the **exclusion of non-participants**. [1 mark]

2   (a)   Describe two motivations for people to travel. [2]

- People travel for **leisure and recreation**, such as visiting beaches, theme parks, or cultural attractions for relaxation and entertainment. [1 mark]

- People travel for **business and work**, attending meetings, conferences, or job-related assignments in different locations. [1 mark]

   (b)   Using Fig. 2.1, describe the trend in mean disposable income in the UK from 1980 to 2020. [3]

- The mean disposable income in the UK **increased steadily from 1980 to 2000**, rising from around £15,000 to approximately £25,000. [1 mark]

- Between 2000 and 2010, the income continued to **increase significantly**, reaching about £35,000. [1 mark]

- From 2010 to 2020, the income showed **slower growth** but remained high, peaking at around £40,000. [1 mark]

(c) Using the data in Table 2.1, complete the pie chart in Fig. 2.2. [2]

- Add a 4% section for **Africa**, using the solid black shading as indicated in the key.
- Add a 3% section for **Middle East**, using the dotted pattern as indicated in the key.

(d) (i) With reference to Fig. 2.3, suggest how this form of tourism can have a positive impact on the environment. [3]

- Tourism in Antarctica is conducted in **small groups**, which helps **minimise human impact on the fragile ecosystem** by reducing overcrowding and environmental degradation. [1 mark]

- Revenue generated from these controlled visits, such as entrance fees and permits, can be used to **fund conservation projects and scientific research**, supporting efforts to protect Antarctica's environment. [1 mark]

- **Strict regulations**, such as limiting visitor numbers and ensuring that tourists follow environmental guidelines, help to **preserve the natural habitat** and prevent disruption to wildlife. [1 mark]

(ii) Explain the growing popularity of lesser-known tourist destinations such as Antarctica. [3]

- Many tourists seek **unique and remote destinations** like Antarctica for adventure and exclusivity. These locations offer experiences different from traditional holiday spots, allowing visitors to explore pristine landscapes and see rare wildlife. [1 mark] As mass tourism grows in popular locations, more travellers are looking for **less crowded and untouched places**, further increasing demand for such destinations. [1 mark]

- **Improvements in transportation** have made it easier for people to access previously difficult-to-reach destinations. Specialised **cruise ships and chartered flights** now provide safer and more convenient travel options to places like Antarctica. [1 mark] With technological advancements, tourists can visit remote locations **with greater comfort and reliability**, encouraging more people to consider these destinations. [1 mark]

- There is a **rising interest in nature and environmental tourism**, with more people wanting to explore pristine landscapes and learn about climate change and conservation. [1 mark] Many travellers are drawn to destinations like Antarctica because they offer an opportunity to witness the effects of global warming first-hand, creating a deeper appreciation for environmental protection. [1 mark]

(e) (i) With reference to Fig. 2.4, explain how tourism can lead to economic sustainability. [3]

- Tourism creates **employment opportunities** in various sectors, such as hotels, transportation, and retail. This provides **stable income** for workers and supports livelihoods. [1 mark] As more people gain jobs, their spending increases, **stimulating local businesses and sustaining economic growth**. [1 mark]

- The tourism industry generates **revenue through taxes**, such as those on accommodations and tourist attractions. [1 mark] These **funds can be reinvested** into infrastructure, education, and public services, ensuring long-term economic benefits. [1 mark]

- Tourism **supports local businesses** by increasing demand for goods and services, such as food, souvenirs, and entertainment. [1 mark] This **encourages entrepreneurship and strengthens the local economy** by **reducing reliance on a single industry**. [1 mark]

(ii) Explain two ways in which tourism can have a negative economic impact. [2]

- Tourism can cause **economic leakage**, where profits generated by tourism are not retained within the local economy but instead go to foreign-owned businesses, such as international hotel chains and airlines. [1 mark]

- Over-reliance on tourism can make economies **vulnerable to external shocks**, such as pandemics, natural disasters, or political instability, which can lead to a sudden decline in tourist arrivals. [1 mark]

3 (a) (i) Name the type of rainfall that is formed in Fig. 3.1. [1]

- Relief rain

(ii) With reference to Fig. 3.1, explain why the amount of rainfall received differs at X and Y. [3]

- At **X (windward side)**, warm, moist air from the ocean is **forced to rise** over the mountain, **cooling and condensing** to form clouds and rain. **[1 mark]**

- As the air descends on the **leeward side (Y)**, it becomes drier and warms up, preventing condensation and reducing rainfall. **[1 mark]**

- This results in **more rainfall at X and significantly less at Y**, where a r**elief rain is deposited on X** while dry winds blow across Y. **[1 mark]**

(b) With reference to Fig. 3.2, suggest how climate change affects the coral reef ecosystem. [3]

- **Rising sea temperatures** cause **coral bleaching**, where corals expel the symbiotic algae living in their tissues, turning white and becoming more **vulnerable to disease and death**. [1 mark] This **weakens the entire reef ecosystem** as many **marine species depend on corals for food and shelter**. [1 mark]

- **Increased carbon dioxide levels** lead to **ocean acidification**, which lowers the pH of seawater, **reducing the ability of corals to build their calcium carbonate skeletons**. [1 mark] This makes corals **more fragile** and **susceptible to erosion**, decreasing reef biodiversity. [1 mark]

- **More frequent and intense storms** caused by climate change can **physically damage coral reefs** by breaking coral structures and increasing sedimentation. [1 mark] This **disrupts the habitat for marine life** and slows down coral recovery, leading to **long-term reef degradation**. [1 mark]

(c) Describe two ways in which terrestrial ecosystems are affected by droughts. [2]

- Droughts reduce water availability, leading to plant death and loss of vegetation, which disrupts the food chain. [1 mark]

- Increased dryness increases the risk of wildfires, destroying habitats and threatening wildlife. [1 mark]

(d) 'Structural approaches, such as constructing water and flood management schemes, are the most effective adaptation strategy to build community resilience to climate change.' How far do you agree with this statement? Explain your answer. [9]

Structural approaches are effective in adapting to climate change as they provide **physical protection against extreme weather events** such as floods, droughts, and rising sea levels. **Hard engineering solutions** like seawalls, polders, and water storage tanks protect infrastructure and communities from climate hazards. In Singapore, **the Stamford Detention Tank** helps manage stormwater by temporarily storing excess rainfall before gradually releasing it into drainage systems, reducing the risk of flash floods in urban areas. Similarly, **the East Coast Park seawall** protects Singapore's coastline from erosion and rising sea levels, ensuring that coastal developments remain safe. These **structural solutions offer long-term stability** by preventing economic losses, safeguarding lives, and enhancing resilience against climate change impacts.

Beyond structural approaches, **technological solutions** enhance resilience by improving disaster preparedness and ensuring resource security. **Early warning systems** provide real-time data on extreme weather events, allowing communities to take precautionary measures. In addition, **technological advancements in food production improve resilience against climate-related disruptions**. Singapore's **"30 by 30" plan** focuses on increasing local food production through

high-tech farming, such as automated vegetable farms and precision irrigation, ensuring a stable food supply despite changing climate conditions. These **technological solutions are cost-effective and adaptable**, making them valuable for both urban and rural communities facing climate risks.

Social adaptation strategies further strengthen resilience by raising awareness and educating communities on how to respond to climate change. Public education campaigns teach individuals how to react to extreme weather events, reducing the risk of injuries and fatalities. In Nepal, **farmers are trained to plant drought-resistant crops such as apples** to cope with prolonged dry spells, ensuring food security even in water-scarce conditions. In Singapore, the public is educated on **flash flood responses and heat stress prevention**, helping residents take proactive measures to stay safe during extreme weather. These strategies **empower communities** by equipping them with the knowledge to adapt, making them more resilient to climate challenges.

OR

At the institutional level, **government policies and regional cooperation** play a crucial role in long-term climate adaptation. National agencies coordinate large-scale adaptation efforts and implement policies that enhance resilience. In Singapore, **the Ministry of Sustainability and the Environment (MSE)** oversees national climate action, while **the Centre for Climate Research Singapore (CCRS)** conducts research to support long-term planning. At the regional level, **ASEAN's Climate Outlook Forum** enables Southeast Asian nations to collaborate on climate risk management and adaptation strategies. These **institutional measures provide a structured and coordinated approach**, ensuring that climate resilience efforts are implemented effectively across different levels of society.

In conclusion, I **agree with this statement to a large extent**, as structural approaches provide **immediate and reliable protection** against climate-related hazards, ensuring that communities remain safe and infrastructure is protected. However, structural measures alone are **not sufficient** to address the **long-term and unpredictable** nature of climate change. The geographical concept of **sustainability** highlights the need for a **multi-pronged approach** that balances **economic, social, and environmental considerations**. Therefore, a **combination of structural, technological, and institutional measures** is the most effective way to build community resilience, ensuring that adaptation strategies remain **flexible, cost-effective, and sustainable** in the long term.

4 (a) (i) Name the type of plate boundary shown in Fig. 4.1.   [1]

- Divergent plate boundary. [1 mark]

(ii) With reference to Fig. 4.1, explain why rocks get progressively older further away from feature Y.   [3]

- At feature Y, **magma rises through the cracks and fissures** between diverging plates and **cools to form new oceanic crust**. [1 mark]

- As the plates **continue to move apart** due to convection currents in the mantle, **older crust is pushed further away** from the mid-ocean ridge. [1 mark]

- Over time, the **youngest rocks remain closest to feature Y**, while the **rocks further away are progressively older** due to continuous seafloor spreading. [1 mark]

(b) With reference to Fig. 4.2, suggest how volcanic landslides affect humans living in tectonic environments.   [3]

- Volcanic landslides **destroy homes and infrastructure**, leaving residents to be **displaced from their homes** and forcing them to relocate. This leads to **financial losses and emotional distress** for affected families. [1 mark] In Fig. 4.2, **buildings are buried under thick volcanic debris**, showing how entire communities can be wiped out, making recovery efforts difficult. [1 mark]

- Thick layers of volcanic mud and ash **block roads and damage transportation networks**, limiting accessibility and making it **difficult for emergency responders to reach affected areas**. [1 mark] This **delays rescue operations and prevents the delivery of essential supplies** such as food, water, and medical aid, worsening the impact of the disaster. [1 mark]

- Landslides can **contaminate water supplies** by mixing volcanic debris with rivers and reservoirs, **leading to waterborne diseases and long-term environmental degradation**. [1 mark] Polluted water sources can cause outbreaks of diseases like cholera, and the cost of restoring clean water supplies can **place additional strain on governments and aid agencies**. [1 mark]

(c) Describe two ways in which volcanic activity can offer economic benefits to people living in tectonic environments. [2]

- Volcanic activity creates **fertile soils rich in minerals**, making them **ideal for agriculture**. Farmers in countries like Indonesia and the Philippines benefit from **high crop yields** due to volcanic soils, **supporting food production and local economies**. [1 mark]

- Volcanic landscapes can **attract tourists**, **boosting the local economy** through income from hotels, tour guides, and souvenir shops, while **providing job opportunities for the local communities** within the tourism sector. [1 mark]

(d) 'The restoration and improvement of facilities and living conditions of affected communities is the most important disaster management strategy.' How far do you agree with this statement? Explain your answer. [9]

Restoration and improvement of facilities and living conditions after a disaster are **crucial in ensuring long-term recovery for affected communities**. After a disaster, people are often displaced, infrastructure is damaged, and access to basic services such as electricity, clean water, and healthcare may be disrupted. Rebuilding essential facilities allows communities to **recover economically and socially**, enabling businesses to reopen, schools to function, and daily life to resume. Additionally, **reconstruction efforts can incorporate hazard-resistant designs, reducing vulnerability to future disasters.** In the **2011 Tōhoku earthquake in Japan (Mw 9.0)**, large-scale rebuilding efforts included constructing tsunami-resistant housing and raising land levels in port towns to minimise future risks. **By restoring infrastructure and improving resilience, affected populations are better prepared for future disasters, reducing long-term suffering.**

However, **timely evacuation and immediate disaster response strategies** are just as essential in minimising the impact of disasters. Without an efficient response, casualties increase, and survivors may suffer from injuries, dehydration, or starvation. **Search and rescue efforts are vital in the first hours following a disaster**, ensuring that trapped victims are saved and provided with medical assistance. **Emergency shelters** must be set up quickly to provide basic necessities such as food, water, and healthcare, **preventing further loss of life**. In the **2010 Haiti earthquake (Mw 7.0)**, the lack of ambulances and rescue equipment resulted in delays, increasing fatalities. **An effective emergency response is crucial in preventing immediate deaths and suffering, reducing the scale of post-disaster restoration required.**

Furthermore, **disaster preparedness and mitigation strategies** play a key role in reducing the severity of disasters, thereby **lessening the reliance on post-disaster recovery**. Governments and communities can invest in structural defences such as flood barriers, earthquake-resistant buildings, and drainage systems to **prevent large-scale destruction**. Public education programmes and early warning systems also enhance preparedness, allowing residents to take protective action before a disaster strikes. In **the Philippines, early warning systems and community disaster preparedness drills have significantly reduced casualties from typhoons and earthquakes**. The implementation of

Project NOAH (Nationwide Operational Assessment of Hazards) has improved hazard mapping and risk communication, enabling residents to evacuate in advance of extreme weather events and seismic activity. **By focusing on prevention and preparedness, the damage caused by disasters can be minimised, reducing the need for large-scale recovery efforts.**

In conclusion, I **agree with this statement to a large extent**, as restoring and improving facilities is **essential for rebuilding lives and reducing long-term vulnerability**. However, on its own, recovery is not the most effective disaster management strategy. Disaster risk reduction **requires an integrated approach**, combining immediate response, preparedness, and long-term restoration, to effectively manage disasters. While post-disaster recovery is necessary, **proactive measures such as mitigation and preparedness reduce the scale of destruction in the first place**. Therefore, disaster management should prioritise a balance of strategies to ensure resilience and sustainability in the face of future hazards.