

2260/02/O/N/25

1 (a) (i) Using Fig. 1.1, describe how HDB Community Week can promote greater community involvement and a sense of place. [3]

- The HDB Community Week allows residents to **gather and participate in block parties and communal art activities**, such as wall mural painting. [1] These events allow residents to express **shared identity, strengthen neighbourly ties, and build a collective sense of belonging**. [Additional 1 mark]
- The HDB Community Week creates the opportunity for residents to participate **community gardening**, where they **work together** to maintain a shared green space. [1] This promotes teamwork and **environmental ownership**, helping residents feel proud of their **shared environment**. [Additional 1 mark]
- The HDB Community Week also encourages residents to step out of their homes and **interact in public spaces and recreational areas** in the estate like playgrounds and parks. [1] Such interactions **encourage intergenerational bonding**, and **enhance familiarity and emotional attachment** with the surroundings. [Additional 1 mark]

(ii) State one other type of media that could be used to express people's sense of place. [1]

- **Social media platforms**, such as Instagram and TikTok, [1] *can be used by residents to showcase their daily life or memories in the neighbourhood.*
- **Online media**, such as blog posts, vlogs or podcasts, [1] *can be used by residents to showcase their daily life or feature interesting neighbourhood stories.*
- **Broadcast media**, such as television documentaries or news features [1] *can be used to feature interviews of residents within the neighbourhood.*

Accept other plausible answers.

(b) (i) Using Fig. 1.2, describe the distribution of bus stops. [2]

- Bus stops are **evenly spaced** at intervals of approximately **200 to 250 metres** along the main roads, [1] *ensuring that residents across the neighbourhood have convenient access.*
- They are **strategically located near key land-use features and amenities** such as the primary school, community hub, and residential blocks, [1] *supporting residents' mobility needs and access to essential services.*

(ii) Explain the benefits of locating bus stops and LRT stations close to each other. [2]

- It allows for **convenient and fast/ seamless transfers** between bus and LRT services, improving transport efficiency and commuter experience. [1]
- This **promotes greater use of public transport**, reducing car dependency and traffic congestion, supporting sustainable travel. [1]

(c) (i) With reference to Fig. 1.3, evaluate the success of reducing fire incidents in Singapore. [4]

Successful

- From 2016 to 2021, the total number of fire calls **decreased significantly** from around 4200 to under 2000, showing a clear **downward trend** and demonstrating significant success in reducing overall fire incidents. [1]
- This decline suggests that **fire safety campaigns**, stricter regulations, and **public education** on fire prevention have been effective in improving household safety, have been **largely effective**. [1]

Unsuccessful

- However, **fires caused by electrical sources and household contents** rose slightly between 2020 and 2021, showing that **specific household fire hazards are emerging even as overall figures decline**. [1]
- **In addition**, in 2020 and 2021, **unattended cooking** accounted for nearly **half (47–49%) of all residential fires**, indicating that efforts to reduce household fire is limited as home-based human negligence remains a major cause. [1]

(ii) With reference to Fig. 1.4, assess the impact such drills could have in building people's resilience to fire hazards. [2]

Positive impact

- Fire drills by SCDF improve **community preparedness** by teaching residents how to use fire extinguishers and respond calmly, which increases **resilience to fire hazards** during actual emergencies. [1]

Limited impact

- However, their **overall impact may be limited as these drills are voluntary in nature**. When attendance is low or residents view the activity as routine without taking them seriously, the effectiveness of such drills in raising long-term fire awareness and changing behaviour is reduced. [1]

2 (a) (i) Using Fig. 2.1, describe some tourist interactions with both the natural environment and the local community. [3]

- Tourists interact with the **natural environment** by going on **safari tours** to observe wildlife in their natural habitats, such as open grasslands. [1]
- They engage with the **local community** by purchasing **handcrafted items and souvenirs** from stalls set up by local vendors. [1]
- Tourists also take **photographs** of both the landscape and local wildlife, capturing the rural scenery of Kenya as part of their experience. [1]

(ii) Suggest some negative impacts an economic downturn could have on rural communities involved in tourism. [2]

- During an economic downturn, there may be a **sharp decline in international and domestic tourist arrivals**, which leads to a **significant drop in revenue** for rural communities that heavily depend on tourism as their primary source of income. [1]
- With reduced tourist spending, businesses such as local handicraft stalls, homestays, and food vendors may experience financial losses, increasing the community's **economic vulnerability**. [1]
- With reduced tourist arrivals, there is a **loss of tourism-related jobs**, such as those in guiding, transport, and hospitality services. [1] This **reduced household income** may in turn **limit the community's access to basic needs** like education and healthcare. [1]

(b) (i) Describe two personality characteristics of Dependables as tourists. [2]

- Dependables are routine-oriented where they prefer **familiarity and safety**, often returning to the same destination and choosing package holidays that offer predictability and comfort. [1]
- They tend to avoid risks and prefer **structured packages**, such as guided tours and all-inclusive holidays. [1]

(ii) With reference to Fig. 2.2, describe how Venturers' personality characteristics determine the appeal of particular tourist activities. [3]

- Venturers are **adventurous and curious**, so they are drawn to **activities involving physical challenge**, such as mountain climbing or water sports. [1]
- They seek **novel experiences**, making them more likely to choose **multi-day trekking trips** or holidays in remote natural areas. [1]

- Due to their **independent nature**, Venturers may avoid packaged tours and instead opt for **self-organised exploration** such as countryside or train holidays. [1]

(c) (i) Using the data in Table 2.1, complete the line graph in Fig. 2.3. [1]

Award [1 mark] for correct plotting and neat line joining.

*Maker's note: Candidate must **accurately plot a point for the year 2023 at 69%** on the vertical axis and draw a line joining the previous point (2022, 68%) to the new one.*

(iii) With reference to Fig. 2.4, explain how the use of online media platforms helps tourists. [3]

- Online platforms such as the one shown in Fig. 2.4 help tourists by allowing them to **easily compare different tour packages, prices, and customer reviews**, enabling them to make **informed travel decisions**. [1]
- These online platforms offer **customisable options** such as trip duration, destinations, and types of experiences, which allow tourists to **tailor their itineraries** based on personal interests or budgets. [1]
- Online platforms increase accessibility for international tourists to **book trips anytime, anywhere**, especially when platforms are available in multiple languages and currencies. [1]

(d) With reference to Fig. 2.5, suggest the effectiveness of these plans in achieving sustainable tourism. [4]

Malaysia's effectiveness and ineffectiveness:

- Malaysia's plan to create **Special Tourism Zones** can be effective in promoting **economic sustainability**, as these zones attract investors, generate jobs for locals, and stimulate growth in related industries such as transport and retail. [1]
- However, if development in these zones is not carefully managed, it may lead to **overcrowding, environmental degradation, and loss of cultural authenticity**, which would compromise long-term sustainability. [1]

Bhutan's effectiveness and ineffectiveness:

- Bhutan's approach of charging a **Sustainable Development Fee** is likely effective in achieving **environmental and cultural sustainability**, as it controls the number of tourists and generates funds for conservation and community development. [1]
- Despite its benefits, Bhutan's strategy may be less effective in making tourism **socially inclusive**, as the high cost limits access to only wealthier travellers, **reducing opportunities for cultural learning, interaction, and mutual understanding** between tourists and locals. [1]

- 3 (a) (i) Using Fig. 3.1, identify the surface which reflects back the most amount of solar radiation and a surface which reflects back the least amount of solar radiation. [2]

- The surface which reflects back the **most** amount of solar radiation is **snow**, with a reflectivity of **80–85%**. [1]
- The surface which reflects back the **least** amount is **forest**, with a reflectivity of only **5–10%**. [1]

- (ii) With reference to Fig. 3.1, suggest why urban areas tend to have higher temperatures than rural areas. [2]

- Surfaces in **urban areas** such as asphalt (5–10%) and dark roofs (10–15%), **reflect less solar radiation and absorb more heat**, leading to higher surface temperatures. [1]
- In contrast, surfaces in **rural areas** like grass (20–25%) or wet ploughed fields (15–25%) **reflect more radiation**, resulting in cooler temperatures.
- In addition, **urban areas lack vegetation**, which **reduces evapotranspiration and increases heat retention**. [1]

- (b) (i) Using Fig. 3.2, describe the trend in carbon dioxide emissions from burning fossil fuels. [2]

- Overall, global carbon dioxide emissions from fossil fuels have **increased steadily** from approximately **5 billion tonnes in 1950** to nearly **37 billion tonnes in 2020**. [1]
- Emissions from **oil and gas** rose gradually, while **emissions from coal** and **total global emissions** increased more sharply, from around **6 billion tonnes in 2000** to about **15 billion tonnes by 2020**. [1]

- (ii) Explain how factors other than burning fossil fuels can result in the enhanced greenhouse effect. [3]

- **Widespread deforestation** reduces the capacity of forests to act as natural carbon sinks as **fewer trees will be available to absorb carbon dioxide through photosynthesis**. [1] As the concentration of carbon dioxide increases in the atmosphere, this leads to **greater absorption of longwave radiation**, thereby enhancing the greenhouse effect. [1]
- **Intensive agricultural activities**, especially livestock farming, release large amounts of methane, a greenhouse gas that is over **25 times more potent than carbon dioxide** in trapping heat. [1] By **increasing the retention of outgoing terrestrial radiation**, this significantly intensifies atmospheric warming, contributing to enhanced greenhouse effect. [1]

- **Urbanisation and land-use changes** replace vegetated surfaces with **impervious materials** like asphalt and concrete, which have a **low albedo** and absorb more incoming solar radiation. [1] These surfaces re-radiate heat into the atmosphere, contributing to **localised warming** (urban heat island effect), and thereby intensify the enhanced greenhouse effect on a broader scale. [1]

(c) 'The protection of oceans and forests through land-use change is a more effective strategy to enhance carbon sinks than protecting forests through forest regeneration.'

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

[9]

Agree: Land-use change is more effective

- Land-use change through policy protection of existing forests and oceans can prevent the **immediate release of large quantities of carbon dioxide**, making it an urgent and impactful strategy to enhance carbon sinks.
- For example, **Brazil's Amazon conservation policies**, including protected reserves and enforcement of anti-logging laws, have effectively helped reduce deforestation and preserved large swathes of mature rainforest. These forests act as **highly efficient carbon sinks** due to their dense biomass.
- Likewise, the **protection of mangrove forests in Indonesia**, especially in regions like North Sumatra, contributes significantly to carbon sequestration. Mangroves store **up to 4 times more carbon per hectare** than tropical forests due to their biomass and waterlogged soils.
- **Therefore**, land-use change is an effective strategy as it **immediately halts emissions from ecosystem loss and secures already-functioning carbon sinks**.

Counterpoint: Forest regeneration has long-term benefits

- **Forest regeneration**, through **reforestation and afforestation**, enhances carbon sinks by gradually rebuilding degraded ecosystems and increasing global forest cover over time. As trees grow, they absorb carbon dioxide during photosynthesis and store it as biomass, creating a sustained and renewable form of carbon capture.
- In **China**, the **Great Green Wall Project** has successfully rehabilitated desert margins through large-scale planting, transforming barren land into green corridors that continue to sequester carbon decades after establishment.
- Similarly, in **Kenya**, the **Green Belt Movement** founded by Wangari Maathai has restored deforested watersheds, where maturing trees now support rainfall regulation and soil stability in addition to carbon storage.
- Unlike short-term protection measures, regenerated forests **improve in effectiveness as they mature**, providing enduring carbon absorption while supporting biodiversity and soil fertility. They also create **resilient ecosystems** that adapt to climate variability, offering stability over generations.

- **Therefore**, although regeneration takes longer to produce results, it ensures **long-term sustainability** and strengthens the Earth's capacity to absorb carbon well into the future.

Conclusion: Justify my stand
(Geographical concept used: time scale)

- I agree to a **large extent** that land-use change is the more effective strategy for enhancing carbon sinks, as it provides **immediate protection** to ecosystems that already store vast amounts of carbon.
- **Forest regeneration**, although crucial for future sustainability, is limited by its **time scale of impact**. Newly planted forests require **decades to mature** before they can match the carbon-storage capacity of existing natural forests.
- Hence, while regeneration is essential for long-term resilience, **land-use change remains more effective in the short to medium term** for reducing carbon emissions and mitigating climate change.

- 4 (a) Using Fig. 4.1, identify the type of plate boundary and describe the plate movement shown. [2]

- This is a **transform (conservative) plate boundary**, [1]
- where two tectonic plates slide **horizontally past each other** along a fault line. The diagram shows opposite directional movement on either side of the road, indicating lateral displacement of land. [1]

- (b) Explain how submarine volcanoes are formed at oceanic–oceanic convergent plate boundaries. [2]

- When **two oceanic plates converge**, the **denser oceanic plate is forced to subduct** beneath the other. As the subducting plate is exposed to **high temperatures and pressure** within the mantle, water is forced out of its crust, lowering the melting point of the overlying mantle, causing it to **melt to form magma**. [1]
- The **magma, being less dense than the surrounding rock**, rises through **cracks and lines of weaknesses** of the overlying plate. Over time, the magma accumulates and solidifies, eventually forming **submarine volcanoes** on the ocean floor. [1]

- (c) (i) Using Fig. 4.2, describe two impacts the earthquake had on properties and infrastructure. [2]

- The buildings in the area have **collapsed**, resulting in extensive **structural damage to residential and commercial properties**. [1]

- Electrical poles and power lines have **fallen onto the streets**, causing damage to public infrastructure and **disrupting utility services** such as electricity and communication. [1]

(ii) Explain how liquefaction increases the impacts of an earthquake on properties and infrastructure. [3]

- Liquefaction can **cause the ground beneath buildings to lose its strength and behave like a liquid**, especially in areas with saturated, loose sediments. [1] As a result, **buildings may tilt, sink, or collapse**, even if they are structurally sound, because their **foundations are no longer stable**. [1]
- Liquefaction can **cause underground and surface infrastructure such as roads, pipelines, and cables to crack or break**. [1] This leads to **disruptions in transport, water supply, electricity, and gas services**, which increases the cost and complexity of recovery efforts after the earthquake. [1]

(d) 'The chemical composition of magma is the main factor affecting the disaster risks caused by a volcanic eruption.'

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

Agree: Chemical composition is a critical factor

- **The chemical composition of magma determines its silica content, which controls its viscosity and explosiveness.** High-silica magma are highly viscous and trap gases more easily, resulting in **violent, explosive eruptions** that produce pyroclastic flows, ashfall, and lahars.
- For example, **Mount Pinatubo's 1991 eruption in the Philippines** was driven by gas-rich high-silica magma, leading to **massive pyroclastic surges** that buried towns and caused long-term displacement. The fine ash cloud even affected global temperatures.
- In contrast, **low-silica basaltic magma**, such as that from **Mauna Loa in Hawaii**, is more fluid and flows easily. Its eruptions tend to be **less explosive and more predictable**, giving residents time to evacuate. This results in **lower disaster risk**, despite frequent activity.
- **Therefore, magma composition is a strong determinant of the hazard type and intensity**, making it a key factor in assessing the level of disaster risk posed by volcanoes.

Counterpoint: Human and geographical factors are equally or more important

- **Disaster risk is shaped not only by the hazard itself, but also by human vulnerability and capacity to respond.** Even the most explosive eruptions may cause limited damage if preparedness is high, while milder eruptions can become disastrous in vulnerable contexts.
- For instance, **Japan**, located along subduction zones with high-silica magma, has **early warning systems, evacuation plans, and hazard**

maps that significantly reduce casualties during eruptions, despite the explosive nature of their volcanoes.

- Meanwhile, in the **Democratic Republic of Congo**, the 2021 eruption of **Mount Nyiragongo**, with basaltic magma, caused significant loss of life and property due to **high population density, limited infrastructure, and slow emergency response**.
- **Additionally, the topography, climate, and proximity to settlements** influence the scale of disaster. Heavy rainfall, for example, can turn volcanic ash into deadly lahars, increasing impacts regardless of magma composition.
- **Therefore, disaster risk is also a function of exposure and preparedness**, and cannot be explained by magma chemistry alone.

Conclusion: Justify my stand

(Geographical concept used: direct vs indirect impact)

- I agree to a **large extent** that the chemical composition of magma is the main factor influencing the disaster risks caused by a volcanic eruption, as it **directly** determines the **viscosity, explosiveness, and types of hazards produced**. These physical characteristics shape how destructive and life-threatening an eruption can be.
- However, the **extent of disaster impact ultimately depends on human factors** such as population density, land-use planning, and preparedness measures. Even with highly explosive magma, well-prepared regions like Japan experience fewer casualties compared to less-prepared areas facing milder eruptions.
- Therefore, while **magma composition governs the potential hazard**, it is the **degree of human vulnerability and resilience** that determines the true scale of disaster. The chemical composition is thus a **primary but not exclusive factor** influencing volcanic disaster risk.