

Section A

Answer Question 1 and Question 2.

1 Cluster 1: Geography in Everyday Life

(a) Study Fig. 1.1 (Insert), which shows two neighbourhoods in Bedok New Town.

Using Fig. 1.1, compare the features between the two neighbourhoods. [3]

- Both neighbourhoods have **densely built-up areas**.
- There is a **mixture of private and public housing in Bedok Reservoir** but there is **only public housing in Bedok North**.
- There are **more amenities in Bedok North**, such as shopping malls, a library, swimming complex and hawker centre, while in Bedok Reservoir, other than a school and a neighbourhood park, no other facilities can be seen.

Note: answers must include both similarities and differences to gain the maximum credit.

(b) Study Fig. 1.2 (Insert), which shows a park in an urban neighbourhood in Singapore.

(i) With reference to Fig. 1.2, explain how parks can help in promoting social sustainability in an urban neighbourhood. [2]

- Parks **provide** common shared community **spaces to promote regular social interactions among the residents**.
- Hence, this helps in ensuring that residents **feel included** and **have a sense of shared identity**.

(ii) With reference to Fig. 1.2 (Insert), describe how parks can provide regulating ecosystem services for residents. [3]

- Trees in the park help to **provide shade** and hence **lowers air temperatures** for the residents.
- Trees also help to **cool the areas by generating rainfall**.
- The vegetation cover in the park helps in **regulating water flow** as it **reduces surface runoff by retaining water in the soil**.
- Trees or plants in the park also **regulate air quality by removing pollutants from the atmosphere**.

Note: any 3 points

(c) A group of students investigated the well-being of residents in Tampines. They tested the hypothesis: 'There is variation in the wellness of residents across different age groups.'

They used a closed-ended questionnaire survey to collect information on the well-being of residents. They organised themselves into two groups, with each group conducting the survey at a location shown in Fig. 1.3 (Insert).

Each group of students surveyed 400 participants, and they used quota sampling to select 100 participants from each age group. They ensured that the participants are residents of Tampines before conducting the survey.

[Turn Over]

Fig. 1.3 (Insert) shows the locations where the students conducted their survey and Table 1.1 (Insert) shows the results of the questionnaire survey.

(i) Evaluate the reliability of the students' data collection methods. [3]

Reliable:

- There will be a **higher footfall** at the two train stations where the students had chosen to conduct their survey. This will **ensure that views of residents from different age groups can be included** in the survey.
- As **each age group is equally represented**, this allows an **equal representation of views from each group**, hence it is reliable as a **fair comparison of residents' wellness** can be done effectively.
- The **sample size of 800 participants** surveyed, is **large enough** for the students to draw a reasonable conclusion.

Not reliable:

- The students **only collected data at train stations** and would have **missed out the groups of residents who may not use the train services**.

(ii) Using Table 1.1, evaluate how well the data supports the students' hypothesis.
[3]

There is variation in wellness of residents across different age groups:

- **Residents who are younger, exercise more frequently than those who are older.** For example, there is a total of 174 residents from age groups 'under 20' and '20 to 39' who **exercise at least twice a week**, which is more than the total of 71 of residents from age groups '40 to 59' and '60 and above'.
- **More residents who are in the age groups of '20 to 39' and '40 to 59' eat a balanced diet than those who are younger and as well as those who are older.** This is seen from Table 1.1, where 22 residents from 'under 20' age group and 14 residents from '60 and above' age group, eat a balanced diet. This is fewer compared to 74 residents from '20 to 39' age group and 87 residents from '40 to 59' age group.
- **Residents from '20 to 39' age group have the least number of people sleeping for at least 8 hours a day, at 78, as compared to the rest of the age groups, with an average of about 97 residents.**
- **Residents who are younger have more screen time of more than 3 hours per day than those who are older.** For example, there are a total of 177 residents from age groups 'under 20' and '20 to 39' who **have screen time of more than 3 hours per day**, which is more than the total of 44 residents from age groups '40 to 59' and '60 and above'.

There are similarities in wellness of residents across different age groups:

- Residents from age groups 'under 20', '40 to 59' and '60 and above' have a **similar number** who indicated they **sleep for at least 8 hours a day**; 98 residents from 'under 20', 97 residents from '40 to 59' age group and 96 residents from '60 and above' age group.
- There is a **similarly low number of residents from the age groups 'under 20' and '60 and above' eating a balanced diet**, with 22 residents from 'under 20' age group and 14 residents from '60 and above' age group.

Note: accept other plausible answers but both similarities and differences must be considered to obtain the maximum credit

[Total: 14]

2 Cluster 2: Tourism

- (a) Study Table 2.1, which shows the results of a survey carried out to find out if tourists may revisit tourist destinations. The results of the survey are collated based on income groups and Fig. 2.1 shows a partially completed scatter graph representing the results shown in Table 2.1.

Table 2.1

Results of the survey which are collated based on income groups

income group	<\$2000	\$2000-\$3999	\$4000-\$5999	\$6000-\$7999	\$8000-\$9999	>\$10,000
number of respondents who indicated they may revisit tourist destinations	5	20	28	15	40	55

Relationship between income and revisiting tourist destinations

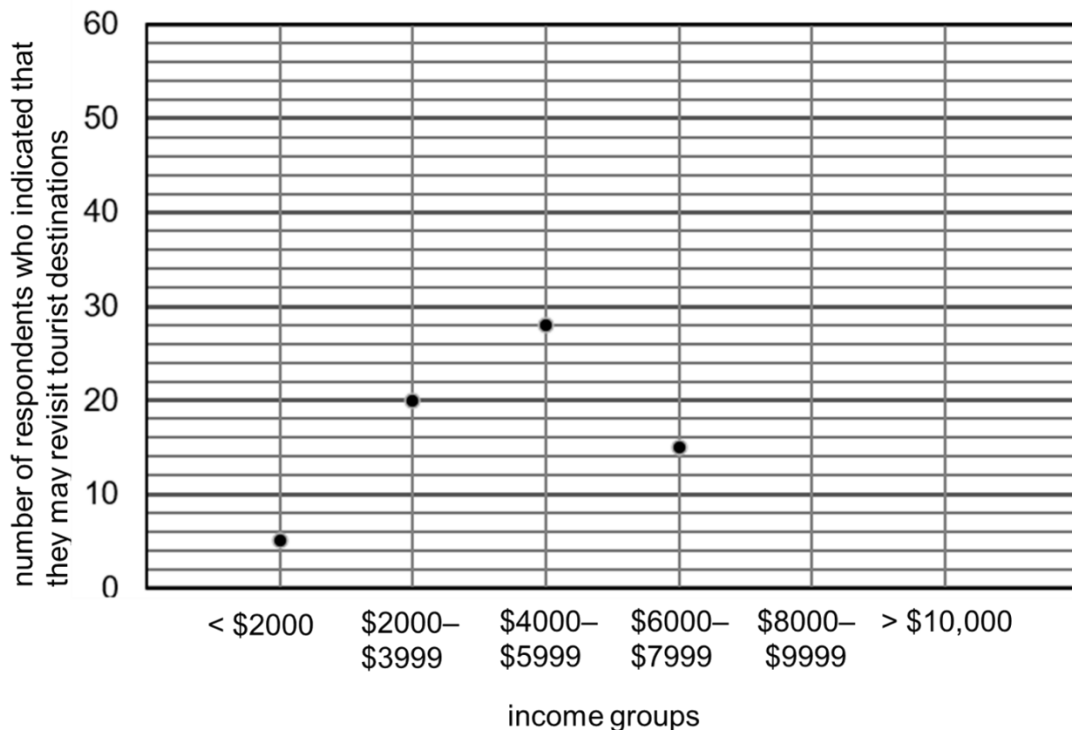
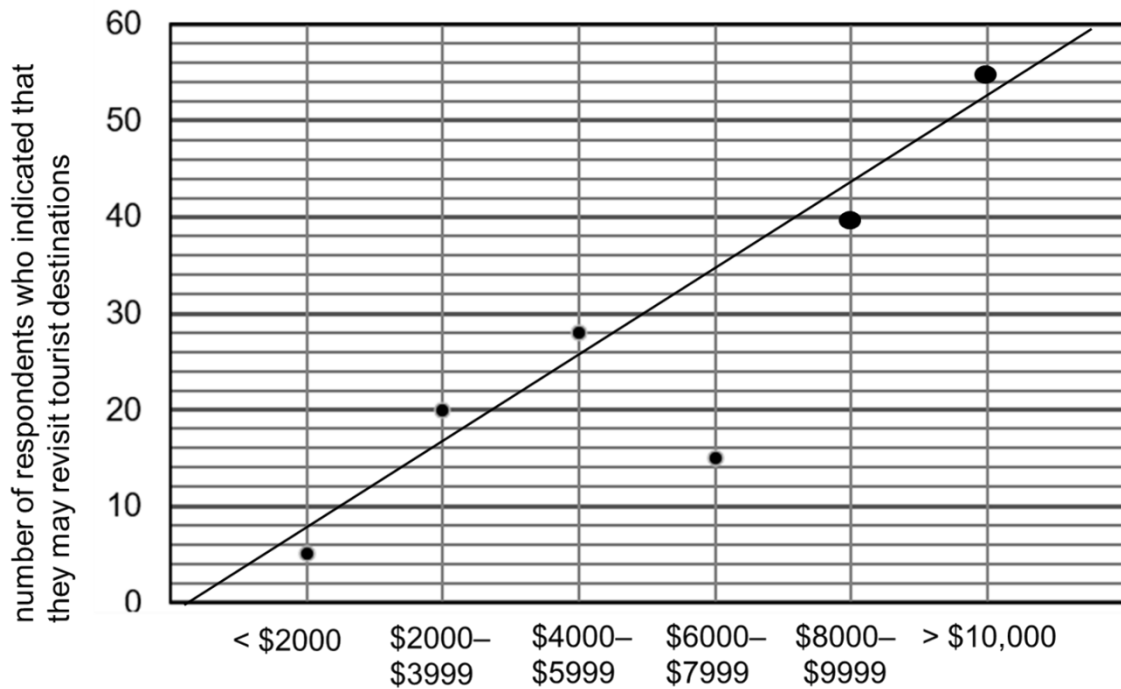


Fig. 2.1

- (i) Use the information from Table 2.1 to complete the scatter graph in Fig. 2.1 and draw a best-fit line. [2]

Ans:



(ii) Using Table 2.1 and Fig. 2.1, describe how income may affect the decision of tourists to revisit tourist destinations. [3]

- Generally, when **income** is **high**, the number of tourists who may **revisit** tourist destinations is **high**.
- For example, a high number of tourists, at **55**, from the **highest income** group of **> \$10,000** may **revisit** tourist destinations.
- In contrast, **few** tourists, at **5**, from the **lowest income** group of **< \$2000**, may **revisit** tourist destinations.
- However, there is an **anomaly**. Few tourists, at **15**, from relatively **high income** group of **\$6000–\$7900**, may **revisit** tourist destinations.

Note: 1st point is compulsory and accept any two other points.

- (b) Study Fig. 2.2A (Insert), which shows Gross National Product (GNP) per capita of countries in Asia and Fig. 2.2B (Insert), which shows tourist departures from countries in Asia.

Using Figs. 2.2A and 2.2B, to what extent does the data show that GNP per capita of countries and tourist departures have a positive relationship? [4]

- The data shows that GNP per capita and tourist departures largely have a positive relationship. **OR** Generally, when **GNP per capita** is **high**, **tourist departures** are also **high**.
- For example, **China**, with the **highest** GNP per capita of **\$10 to 20 trillion**, has a **high tourist departures** of **16.8 million to 30.8 million**.
- In contrast, **Cambodia**, which has a **low GNP per capita** of **\$25 to 50 billion**, has a **low tourist departures** of **less than 1 million**.
- However, there are anomalies. Turkey has a high **GNP per capita** of **\$5 to 10 trillion**, but a **low tourist departures** of **5 to 9.1 million**.

Note: 1st point is compulsory and to include at least one anomaly. Accept other plausible evidence supported.

- (c) Study Fig. 2.3, which shows tourists participating in an ecotourism activity.

‘Ecotourism is the most effective approach in achieving sustainable tourism development.’

With reference to Fig. 2.3, to what extent do you consider this statement to be true? Explain your answer. [9]

Ecotourism is an effective approach of sustainable tourism development that often takes place in natural areas which are scenic and allow tourists to experience nature. From Fig. 2.3, eco-tourism can be carried out when tourists view wildlife in their natural habitat from a safe and respectful distance or when they tour national parks. Through such activities, tourists can **see a wide range of biodiversity** and **learn about local cultures and traditional ways of life**. This is an effective strategy as it **increases tourists’ knowledge and appreciation of nature and culture, which can then encourage tourists to take actions to conserve and minimise damage to the environment**. Moreover, **measures can be put in place to minimise the negative impacts on the environment**. **Tourism revenue is channelled into conservation of the natural environment** such as **hiring local park rangers**. Park rangers ensure that **laws set up to protect the environment are adhered to**. This ensures environmental sustainability. For example, **the Galapagos Islands in Ecuador** attract many tourists for their unique flora and fauna. To conserve this unique biodiversity, **97% of the islands’ total area was declared a national park**. The authorities implemented regulations such as only allowing a **limited number of visitors in the park on any given day to minimise disturbances to wildlife**. Tourists are required to pay an **entrance fee of US\$100** when visiting the park, and the revenue earned is used to **fund conservation projects**. **Tourists are also not allowed to explore the islands on their own**. A **guide who educates tourists is required** at each site. This helps to **ensure environmental sustainability**. **Locals** at Galapagos Islands are also involved in the ecotourism industry, whereby they **offer day tours and homestays** to small groups of tourists. This also helps to **ensure economic sustainability** as the locals can earn an income.

Community-based tourism is another effective approach of sustainable tourism development. It involves **innovative small-scale tourism experience** such as **homestays and agricultural tourism** that is **managed by local communities**. Community-based tourism aims to **maximise local communities' involvement in tourism** by **working in close partnerships** with them through **encouraging them to participate in decision-making process** on tourism development in their community. **Local communities have greater knowledge of their economic, social and environmental needs**. Hence, **their decisions can help to ensure their needs are met in a sustainable way**. Local communities can **suggest cultural and nature-based experiences** that can be developed **without disrespecting their heritage and damaging the local environment**. This ensures that **locals continue to support and be involved** in the tourism industry and the **environment continues to thrive** and attract tourists, ensuring sustainable tourism development. Local communities are encouraged to **innovate and set up businesses** such as restaurants and **offer tourism experiences** such as **homestays** to cater to the needs of tourists. This helps to **provide employment to locals**, **provide economic benefits to the locals** and **minimises leakages**. **Tourists can visit local farms to purchase local produce and participate in activities for education and enjoyment purposes such as farming using local techniques, harvesting crops and cooking them**. Such tourism experiences benefit local farmers economically and sustainable tourism development can be ensured. **Revenue generated can be directed to community development such as funding schools and clinics**. This **improves both the economic and social well-being of the local community**. Through **interactions between locals and tourists**, **learning exchange and sharing** takes place, and **tourists will be more appreciative of local cultures and environment**. For example, tourists can stay with a local host family in the **Binsar Wildlife Sanctuary in India** and participate in daily activities related to local cultures and traditions. With **greater appreciation of the local culture and environment**, **locals are more motivated to preserve their heritage and environment** which helps ensure cultural and environmental sustainability.

Pro-poor tourism is another effective approach to sustainable tourism development. It is aimed at **achieving economic, environmental and social sustainability and improving the livelihood and well-being of the poor**. It focuses on **improving the livelihoods of the poor through training and providing access to micro-financing**. Both community-based tourism and ecotourism can be considered as pro-poor tourism if they focus on improving the livelihoods of the poor and reducing poverty. **With training provided, locals will be able to learn new skills** which they can then use to **gain employment in the tourism sector**. For example, locals can train to be **local guides** or **set up tourism businesses**. With **access to micro-financing, the poor can set up businesses** such as **homestays and restaurants**, thereby benefitting economically from tourism. An example of pro-poor tourism is found in the villages around **China's Three Parallel Rivers Region**, a **UNESCO World Natural Heritage site**. Tourists are attracted to **the scenic views of the mountains and rivers**, as well as to **experience village life**. With the **financial assistance offered by the authorities**, many villagers have **set up businesses** such as **homestays and restaurants**. Some **put up cultural performances** for tourists for a living. As a result, the local community has experienced **an increase in income and standard of living**.

I agree with the statement to a **small extent**. While ecotourism is an effective approach to sustainable tourism development due to its focus on environmental education and conservation, its popularity can ironically lead to overcrowding and negative impacts which are similar to mass tourism. Moreover, it primarily targets environmental sustainability and may not always address the social or economic needs of local communities. In comparison, community-based tourism focuses more on social sustainability by involving locals in planning and offering them economic benefits, though its effectiveness may be limited by the community's lack of resources and expertise. Pro-poor tourism, on the other hand, is broader in scope as it can encompass elements of both ecotourism and community-based tourism. However, its impact can be uneven if it does not effectively reach the most disadvantaged groups. As each tourist destination has its unique characteristics and needs, sustainable tourism strategies will only be effective if these are being considered. Therefore, while ecotourism is valuable, it may not be the most effective approach because it has limitations and a combination of different approaches will be necessary to achieve sustainable tourism development.

Level	Marks	Generic Level Descriptors for 9-Mark AO3 Questions
3	7 - 9	Develops arguments that supports both sides of the discussion clearly using a range of points with good elaboration. Examples used demonstrate a comprehensive understanding of the issue or phenomenon. Evaluation is derived from a well-reasoned consideration of the arguments.
2	4 - 6	Develops arguments that support one side of the discussion well using one or two points with some elaboration. Example(s) used demonstrate a good understanding of the issue or phenomenon. Evaluation is well supported by arguments.
1	1 - 3	Arguments are unclear with limited description or may be listed. No examples provided or examples are generic, demonstrating a basic understanding of the issue or phenomenon. Evaluation is simple, missing or unclear.
0	0	No creditworthy response

[Total: 18]

Section B

Answer **either** Question 3 **or** Question 4.

3 Cluster 3: Climate

(a) Study Fig. 3.1A (Insert) which shows the location of two cities in Canada, Winnipeg and Halifax, and Fig. 3.1B (Insert), which shows the average temperature of these two cities.

(i) Use information from Fig. 3.1B, describe differences in the average temperature between Winnipeg and Halifax. [4]

- Winnipeg has a **lower average temperature of 2°C** but Halifax has a **higher average temperature of 7°C**.
- Winnipeg has a **larger annual temperature range of 38°C** but Halifax has a **smaller temperature range of 22°C**.
- **Summer temperature is higher in Winnipeg**, with the **highest temperature at 21°C**, while **summer temperature is lower in Halifax**, with the **highest temperature at 18°C**.
- **Winter temperature is colder in Winnipeg**, with the **lowest temperature at -17°C**, while **winter temperature is higher in Halifax**, with the **lowest temperature at -4°C**.

Note: Any 4 points

(ii) Using Figs. 3.1A and 3.1B, account for the variation in average temperature between Winnipeg and Halifax. [4]

- **Halifax** is located close to **Atlantic Ocean** and experiences the **maritime effect**, which causes it to have a **smaller annual temperature range**.
- During **summer**, **land heats up quickly while the sea heats up more slowly**. The **cooler air over the sea helps lower the temperature of the coastal areas**, hence **Halifax is cooler during summer months**.
- During **winter**, the air over the sea remains warmer than the air over the land because the **sea cools more slowly than the land**. The **warmer air over the sea increases the temperature of Halifax, resulting in a milder winter which is less cold**.
- **Winnipeg is further inland** which experiences the **continental effect**, which causes it to have a **larger annual temperature range**. As Winnipeg's temperature is **not influenced by the moderating effects of the sea**, it experiences **warmer summers and colder winters**.

(b) Explain how higher sunspot activity results in higher temperatures on Earth. [3]

- Generally, **periods of maximum sunspot activity** correspond to **periods of high annual surface temperatures on the Earth**.
- **Higher sunspot activity is linked to higher amounts of solar radiation emitted from the Sun**.

- This is because **areas surrounding the sunspots radiate more energy**, to compensate for **lower temperatures of the sunspots**. This leads to more solar radiation emitted from the sun, resulting in higher temperatures on the Earth.

(c) Explain the impact of climate change on terrestrial ecosystems.

[3]

- There will be **changes in geographic distribution of terrestrial species** as they **migrate towards the higher latitudes and altitudes where temperatures are cooler**. Some bird species in North America are migrating northwards, while temperate forests are advancing northwards replacing boreal forests and boreal forests are replacing the tundra.
- There could be **changes to the composition of terrestrial ecosystems as some species may decline if they cannot find new suitable habitats to migrate to**. Plants species may decline if they cannot adapt fast enough. Some species may flourish at new habitats. E.g wallabies in Australia flourished when they migrate to higher altitudes.
- **Droughts caused by climate change resulted in plants becoming drier and weakened**, making them **more vulnerable to diseases and insect attacks**. When trees die, habitats are damaged and terrestrial species which cannot adapt may become extinct.
- In the case of droughts, **animals may migrate** in search of water. This may result in **spread of diseases** such as cholera.

Note: any 3 points

(d) Study Fig. 3.2 (Insert), which shows the aftermath of a tropical storm on the southern coastal region of Bangladesh in 2016.

With reference to Fig. 3.2, suggest how the tropical storm might have affected the economy of Bangladesh.

[4]

- From Fig. 3.2, the cyclone had caused severe damages to properties and infrastructure. The **cost of repairs of damaged properties and infrastructure** is a **huge financial burden** to Bangladesh. Being a developing country, its **economy may take a long time to recover**.
- There could also be a **loss of potential income from business opportunities**, as the damages could limit economic opportunities and hence **revenue generated** by the country could **decrease**.
- **People and vehicles cannot access the roads and tourists are discouraged from visiting the country**. This will have a negative effect on the economy.
- There are **many damaged buildings** which means that **shops and other businesses are destroyed**. This means that **people lose their jobs** and **cannot contribute to the country's economy**.

[Total: 18]

4 Cluster 4: Tectonics

(a) Study Fig. 4.1, which shows a divergent plate boundary.

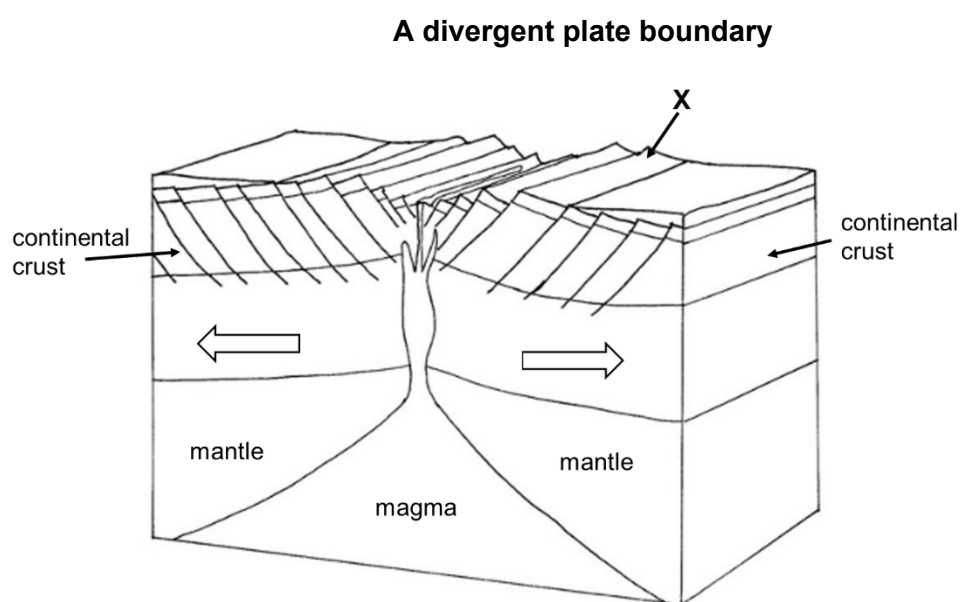


Fig. 4.1

With reference to Fig. 4.1, explain the processes which occur at a divergent plate boundary. [4]

- When **two continental plates diverge**, rocks eventually **fracture** to form **parallel faults**. The **rock between these faults collapses** to form a deep **rift valley** with steep sides.
- As the plates diverge, the **decrease in overlying pressure causes parts of the underlying mantle to melt**, forming **magma**.
- Magma **rises through fractures**, as **lava**, onto the Earth's surface, **forming volcanoes**.
- **Earthquakes** can also occur here due to the **friction** and **release of stress** and tension when plates move.

(b) Study Figs. 4.2A (Insert) and 4.2B (Insert).

Fig. 4.2A is a map showing tectonic plates and plate boundaries. Fig. 4.2B is a map showing the distribution of ocean trenches and fold mountains.

Using Figs. 4.2A and 4.2B, describe similarities and differences in the distribution of oceanic trenches and fold mountains in relation to plate boundaries. [4]

- Both landforms are **similar** in their distribution **along converging oceanic-continental plate boundaries**. For example, when the **oceanic Nazca Plate converges with the continental South American Plate**, the **oceanic trench, Peru-Chile trench** and the **fold mountains, The Andes**, can be found.
- They are **different** in their distribution **along ocean-oceanic converging plate boundaries**. Along the converging plate boundaries between **oceanic Philippine Plate and oceanic Pacific plate**, only the **oceanic trench, the Mariana trench** is found.
- In addition, along **converging plate boundaries of two continental plates**, **only fold mountains are found**. For example, along the converging plate boundaries of **Indian Plate and Eurasian Plate**, only the **fold mountains, The Himalayas** is found.

Note: Award an additional 1 mark for at least one fold mountain and one oceanic trench named, in relation to the plate boundaries.

(c) Study Figs. 4.3A (Insert) and 4.3B (Insert).

Fig. 4.3A is a map showing the plate boundaries where Nepal is located and Fig. 4.3B is a map showing information about an earthquake which occurred in the country in 2015.

(i) With reference to Fig. 4.3A, explain why the earthquake occurred. [3]

- When the two continental plates, **Indian Plate** and **Eurasian Plate** converge,
- Rock masses on either side of a fault are pushed by tectonic forces. **Friction** causes them to get locked, and **stress** builds up.
- When the **stress exceeds the strength of the fault**, the **rocks snap** or suddenly move to a new position. This sudden movement **causes seismic waves** to be released, resulting in ground shaking.

(ii) Using Fig. 4.3B, explain why many areas in Nepal suffered serious damage as a result of the earthquake. [4]

- The **main shock** has a **high magnitude of 7.8**, which is likely to result in **stronger ground shaking**, leading to more buildings collapsing, more casualties and homes being destroyed.

- The most significant **aftershock** has a **high magnitude of 7.3**. **Infrastructure which was weakened by the main shock could collapse** and **rescue work could also be hindered by the threat of collapsing buildings**, hence resulting in more lives lost.
- The **epicentre is near to capital city, Kathmandu**, which has a **high population density**, hence **more people were exposed to the hazard**.
- The **strong ground shaking** could have **triggered landslides** at **Mount Everest**, resulting in **people and houses being buried**.

Note: any 4 points.

(d) Explain how tectonic disasters can result in economic losses. [3]

- Tectonic disasters can cause **the destruction of homes and properties**. It will be a financial burden on people in **rebuilding their damaged homes**.
- **Business owners** can **lose their source of income** when their **business properties** are **damaged**, and they may have to **suspend their business operations**.
- **Government** will need to **spend money to repair and rebuild infrastructure** damaged by tectonic disasters.
- **Farmers may not be able to irrigate their fields** when their **water sources are polluted**. This may result in **less crop yields** and **less revenue generated** from the sale of crops.
- **Fishermen** may not be able to fish if **their boats are destroyed by tsunamis**. Hence, **locals may lose their livelihoods and source of income**.
- **Tourist infrastructure and facilities** may be **damaged**, hence **resulting in loss of tourists and tourism revenue**, which will be a **huge economic loss** for the country.

Note: any 3 plausible economic impacts.

[Total: 18]