Name:	Class:	Register Number:

CHUNG CHENG HIGH SCHOOL (MAIN)

END-OF-YEAR EXAMINATION 2023
SECONDARY 3

Geography **2279**

3 October 2023

Candidates answer on the Question Paper. **1 hour 45 minutes**

Additional materials: Insert

Suggested Answers

This document consists of **13** printed pages..

[Turn Over

Answer **all** questions.

1 Cluster 1: Geography in Everyday Life

(a) A class of students wanted to compare residents' level of satisfaction of the amenities offered in two neighbourhood shopping malls in two different parts of Singapore. Photographs of the two malls are shown in Figs. 1.1 and 1.2 (Insert). The students decided to survey 50 people.

The results of the question on levels of satisfaction in the questionnaire are shown in Table 1.1.

Table 1.1

Results for Question 1

Question 1: Please indicate your level of satisfaction with the following amenities in this shopping mall.

The shopping mall in Fig. 1.1

Amenities in the mall	Level of satisfaction				
	very dissatisfied	somewhat dissatisfied	neither dissatisfied nor satisfied	somewhat satisfied	very satisfied
availability of nursing room & handicapped toilets	2	4	20	15	9
variety of food eateries	2	8	3	15	22
prices of food	18	12	3	13	4
variety of retail outlets	2	7	8	9	24
cleanliness	2	4	15	10	19
mean	5.2	7.0		12.4	15.6

The shopping mall in Fig. 1.2

Amenities in the mall	Level of satisfaction				
	very dissatisfied	somewhat dissatisfied	neither dissatisfied nor satisfied	somewhat satisfied	very satisfied
availability of nursing room & handicapped toilets	3	5	5	14	23
variety of food eateries	16	23	2	4	5
prices of food	20	10	5	9	6
variety of retail outlets	13	14	5	13	5
cleanliness	3	5	15	9	18
mean	11	11.4	6.4	9.8	11.4

(i) What type of rating scale is used in the questionnaire shown in Table 1.1? [1]

- **Likert** scale.

(ii) Complete the empty cell in Table 1.1 by calculating the mean for 'neither satisfied nor dissatisfied' for the neighbourhood in Fig. 1.1. [1]

- 9.8

(iii) With reference to Figs. 1.1 and Fig. 1.2 (Insert), explain how the students could sample visitors to collect the data needed for their investigation. [3]

Describe a suitable sampling method:

- Students could use **simple random sampling**, using a **random number generator/table/using a dice**.
  OR
- Students could use **convenience sampling**, where respondents are selected because they are **convenience sources of data**.
  OR
- Students could use **stratified random sampling**, where respondents are selected **based on a proportionate makeup to the population** such as **age/gender**. **Probability sampling** such as random sampling is **used to select the sample**.
  OR
- Students could use **quota sampling**, where respondents are selected **based on a proportionate makeup to the population** such as **age/gender**. **Non-probability sampling** such as convenience sampling **is used to select the sample**.

- The students could divide themselves into 2 groups and **station themselves at the entrance of the two malls**, where there will be a **high volume of visitors**. *[idea on where to collect]*

Any 1 of the following points:[idea on when to collect]

- Each group should **collect data** for an hour each, **3 times within a day** as it **ensures representation of the visitors sampled** within a day
- They should also consider **collecting data every day at the same time and location for a week** as it **ensures representation of visitors sampled** during **weekdays** and **weekends**.

(iv) Compare residents' level of satisfaction of amenities offered by the two shopping malls. [4]

Overall trend:

Either

- The **residents' level of satisfaction of the amenities offered in shopping mall in Fig. 1.1 is generally higher than that of the shopping mall in Fig. 1.2**. This can be seen from the **mean value of 'very satisfied' for the shopping mall in Fig. 1.1**, which is **higher**, at **15.6**, **compared to the shopping mall in Fig. 1.2**, at **11.4**.

OR

- **Residents' level of satisfaction of the amenities offered in shopping mall in Fig. 1.2 is generally lower than that of the shopping mall in Fig. 1.1**. This can be seen from the **mean value of 'very dissatisfied' for the shopping mall in Fig. 1.2, which is higher**, at **11, compared to the shopping mall** in **Fig. 1.1**, at **5.2**.

Similarities:

- Residents' **level of satisfaction** of the **cleanliness for both shopping malls is generally high**, under the scale of 'very satisfied', for the shopping mall in Fig. 1.1, the value is at 19 and for the shopping mall in Fig. 1.2, the value is at 18.

- Residents' **level of satisfaction** of the **prices of food** in **both shopping malls is generally low**, under the scale of '**very dissatisfied', both the value is high**. For the shopping mall in Fig. 1.1, the value is at **18** and for the shopping mall in Fig. 1.2, the value is at **20**.

Differences:

- Residents' **level of satisfaction** for variety of **retail outlets in the shopping mall in Fig. 1.1 is much higher than that of Fig. 1.2.** Fig 1.1 has **a higher value** at **24** for 'very satisfied', whereas for the shopping mall in Fig. 1.2, the **value is lower**, at **5**.

- Residents' **level of satisfaction** for **availability of nursing room & handicapped toilets in the shopping mall in Fig. 1.1 is much lower than that of Fig. 1.2**. Fig 1.1 has a lower value at 9 for 'very satisfied', whereas for the shopping mall in Fig. 1.2, the value is higher, at 23.

Note:
- Must have an overall trend and its supporting evidence.
- Accept 3 other plausible points with supporting evidence – at least one answer on similarity.

(v) Evaluate the reliability of the data collection method used in this investigation. [3]

For:
- The data collection method is reliable because in total, 50 people were interviewed. This **sample size is sufficient to conduct a reasonable analysis** of data.
- The **5-point Likert scale**, as compared to a 'yes/no' option, **provides a wide range of responses which are anchored by two extreme opposing positions**. This allows respondents to **give their insights more accurately**.
- The survey included **a wide range of amenities** for respondents to rate their level of satisfaction. This enables **a more accurate comparison** of the level of satisfaction between the two malls.

Against:

- The data collection method is not reliable because there is **no indication** in the survey to check **if those interviewed are residents** in the neighbourhood
- Students might also have **interviewed the same person more than once**.

(b) Study Fig. 1.3 (Insert), which shows a photograph of part of Bishan Park, Singapore.

With reference to Fig. 1.3, explain how people acquire a sense of place in their neighourhood. [2]

- Repeated encounters with objects and people help us recall the character and features of places that we come across and **create meanings and memories** of them.*[compulsory point]*
- We may acquire a sense of place from significant or memorable events at local landmarks and gathering places.
  [Any one of the following ideas] These places include:
  - landmarks which are highly visible and easy for most people to remember
  - serve symbolic or historical purposes
  - hold positive and or negative memories
  - shops which we develop an attachment to
  - open lawns where people gather at community events

(c) Evaluate the role of people in their interaction with nature. [3]

For:

- People can **collectively raise awareness** about the **value of nature areas** through encouraging positive behaviour that does not damage nature. E.g the Dragonfly Watch initiative by NParks, had raised awareness of their importance in the environment.
- People can also **organize or participate in conservation efforts**. E.g the waterways clean-up programmes organized by the Waterways Watch Society create opportunities for schools to pick up trash from the Marina Reservoir.

Against:

- However, people may **cause soil erosion and damage vegetation**, when they visit nature areas for recreational activities such as hiking. This is particularly so **when people do not hike along designated trails** in nature areas. This may result in **soil compaction**, which **prevents rainwater from infiltrating** the surface. This leads to higher surface flows and **soil erosion** as the flowing water washes away the soil particles.
- People may **trample on vegetation**, damaging plants and affecting their growth too.
- People may **litter** and worsen **pollution** in natural areas. Animals may be injured by being cut by metals cans or become entangled with plastic containers and bags.
- Some animals may **mistake the litter for food and consume** them. This may either injure or kill them.
- People may **feed wild animals**, resulting in **changes in the habits and behaviours of wildlife**. When animals associate food with people, this may **increase human-wildlife conflict**.

Note:

- Answer has to cover both sides, max of 3 points.

(d) Describe some measures on how neighbourhoods can be sustained environmentally. [3]

- Biodiversity in urban neighbourhoods can also be maximised by having a wide variety of habitats including **street trees, pocket parks and roof gardens** in the neighborhood, instead of just having large uniform areas of grass.
- The types of plants and trees planted in an area should be of **different varieties and species**. This will provide adequate shelter and food for **a wider variety of wildlife to thrive, thus maximising biodiversity** in an urban neighborhood.
- Having a **high population density in a neighourhood** means that **adequate waste can be collected and recycled** in an economically viable manner.
- Waste recycling can also be encouraged through neighbourhood-scale **recycling activities organised** by either the residents or the town council. E.g an informal exchange of goods like furniture or pre-loved clothes can be organised to minimise waste. Recycling bins and banners may be made readily available in the neighbourhood to encourage residents to recycle their household items.
- **Buildings and landscaping** may be **designed to be energy and water-efficient to minimise the use of resources.** This is achieved through embracing smart technology and eco-friendly features in the neighbourhood.

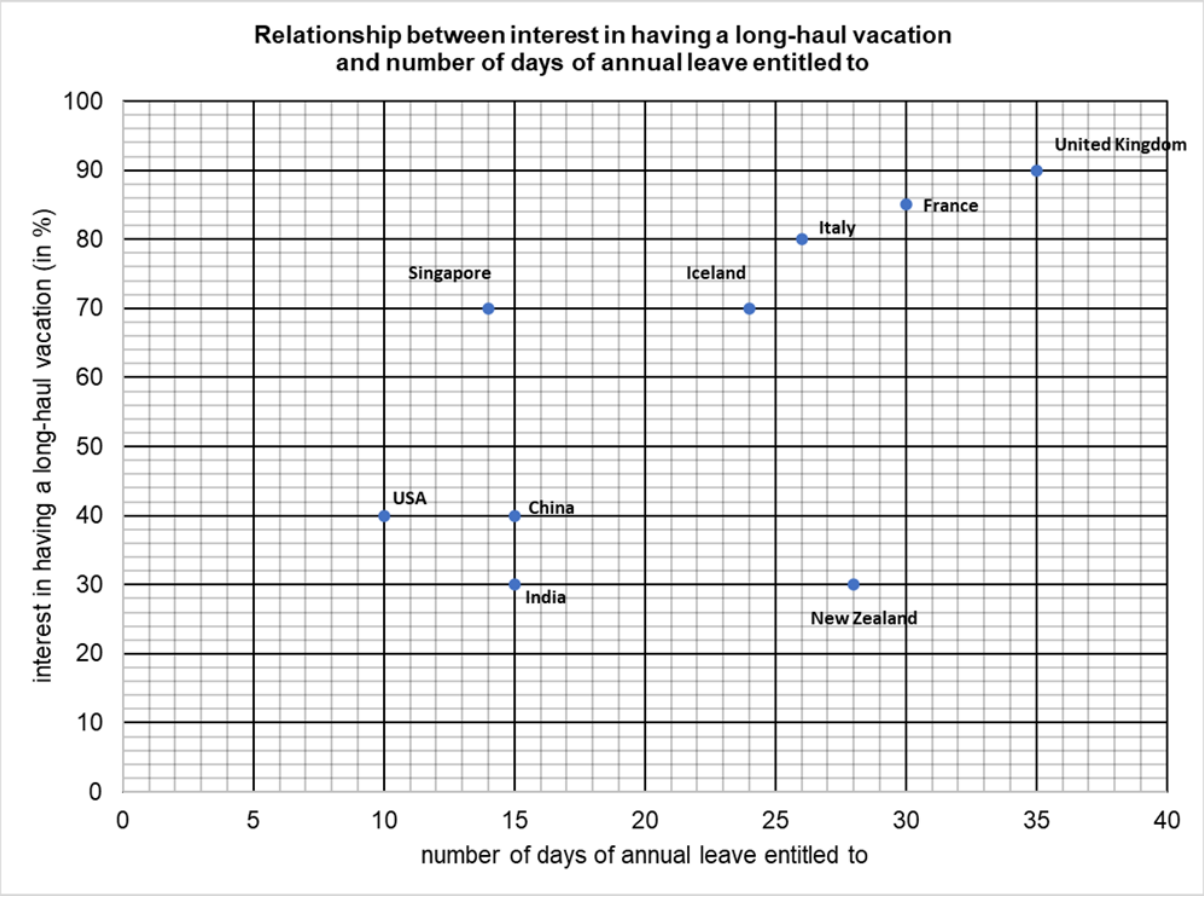
Note:
Accept other plausible answers, max of 3 points

[Total = 20]

2 Cluster 2: Tourism

(a) A survey was carried out on people from different countries to find out their level of interest in having a long-haul vacation and the number of days of annual leave they are entitled to.

Study Fig. 2.1, which shows the relationship between the number of days of annual leave entitled to and percentage of people surveyed who indicated their interest in taking a long-haul vacation.

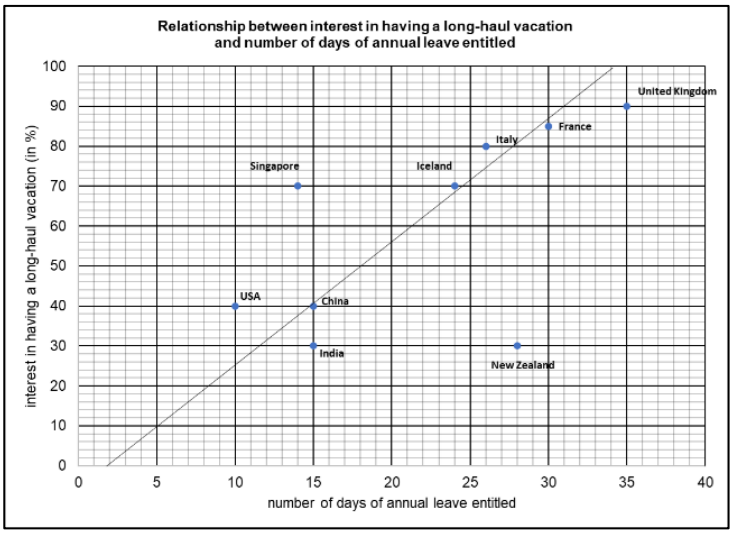


Note: Long-haul vacation are trips which typically require more than 6 hours of travelling time.

Fig. 2.1

(i) Draw a best fit line on Fig. 2.1 to indicate the relationship observed between the number of days of annual leave entitled to and percentage of people who indicated their interest in taking a long-haul vacation. [1]

- Ans



(ii) Using information from Fig. 2.1, to what extent does the percentage of people who indicated their interest in having a long-haul vacation appear to be influenced by the number of days of annual leave they are entitled to? Support your answer with evidence. [5]

- Generally, **the % of people who indicated their interest in having a long-haul vacation appeared to be influenced by the number of paid leave to a large extent**.
- E.g **United Kingdom**, with the **highest number of days of annual leave**, at 35 days, has the **highest %** of people who indicated their **interest** in taking a long-haul vacation, at 90%.
- In contrast, **India**, with a **low number of days of annual leave**, at 15 days, has a **low %** of people who indicated their **interest** in taking a long-haul vacation, at 30%.
- France also has **high number of days of annual leave**, at 30 days and it also has a **high %** of people who indicated their **interest** in taking a long-haul vacation, at 85%.
- However, there are some exceptions. E.g **New Zealand**, with a **high number of days of annual leave**, at 28 days, has a **low %** of people who indicated their **interest** in taking a long-haul vacation, at 30%.
- Another **anomaly** would be **China and India**, with both countries having the **same number of days of annual leave**, at 15 days, but **China** has a **higher** % of people who indicated their **interest** in taking a long-haul vacation, at 40%, compared to **India**, which is at 30%
- Another **anomaly** would be **Singapore**, which has a **low number of days of annual leave**, at 14 days, but it has a **high %** of people who indicated their **interest** in taking a long-haul vacation, at 70%.

Note: must have 1st point, a pair of contrasting evidence to support general trend and at least 1 one anomaly. 1 other point can be either on evidence supporting general trend or an anomaly.

(b) Study Fig. 2.2 which shows the impacts of tourism on the environment.

Impacts of tourism on the environment

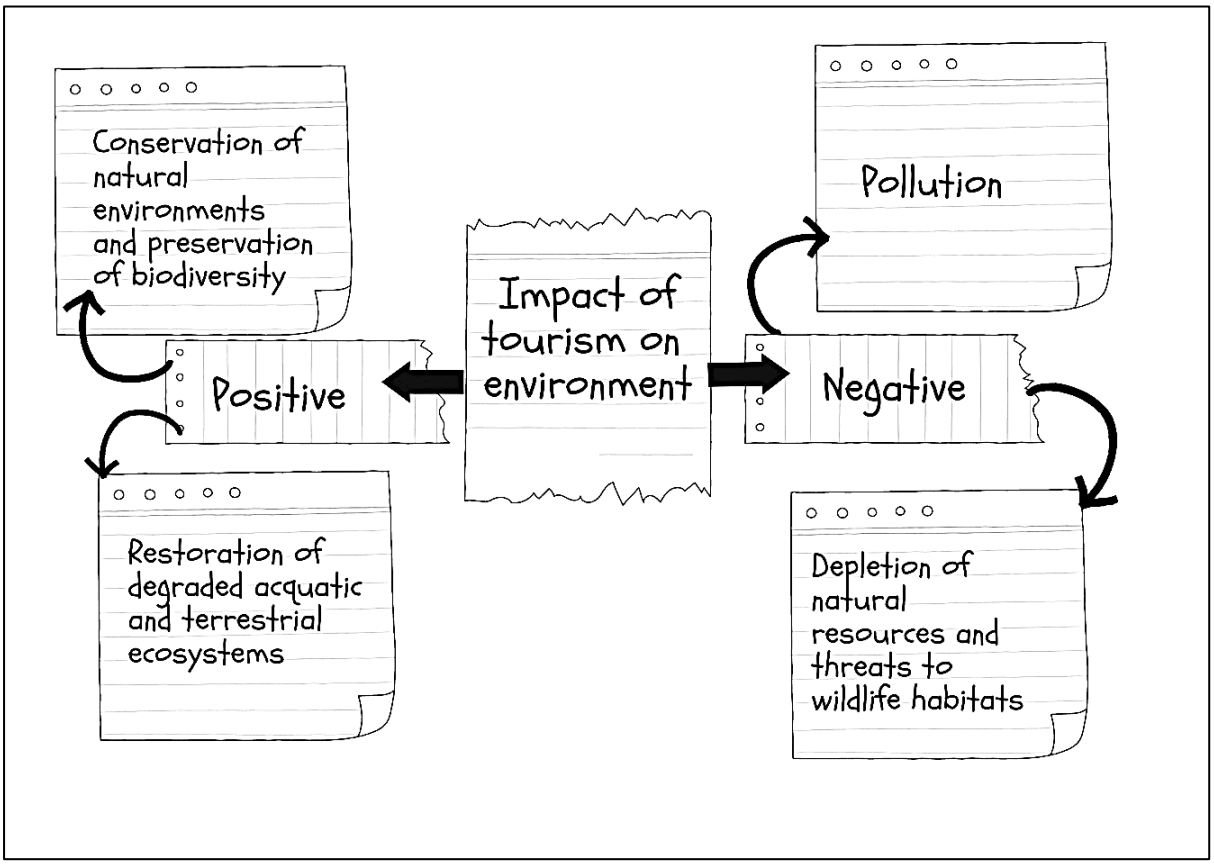


Fig. 2.2

'The environmental advantages of tourism outweigh the environmental disadvantages.'

With reference to Fig. 2.2, to what extent do you consider this statement to be true? Explain your answer. [9]

Tourism can bring about environmental advantages when local communities and governments in destination regions invest in conserving the natural environment and preserving biodiversity. This is because maintaining pristine natural attractions encourages tourists to visit and revisit. **Tourism revenue** in the destination regions may be used to **help fund the protection of the aquatic and terrestrial ecosystems**, protecting biodiversity. For example, **protected areas or national parks can be established**, where developments in the area are restricted **to ensure the habitats and biodiversity are undisturbed**. **Revenue** can also be **used to employ and train specialised staff** to **run these parks and care for these ecosystems**.

Environmental education programmes may also be **set up for tourists to encourage them to show care for these ecosystems**. For example, the **Galapagos Island**, is very popular with tourists for its rich biodiversity and scenic environments. An entrance fee of US$100 is charged to visitors entering the Galapagos National Park in Ecuador. The revenue generated from the fees is channelled to the conservation and upkeep of the park, including the hiring of park rangers.

Natural aquatic and terrestrial sites with rich biodiversity have the potential to be tourist attractions. Hence, there is often a motivation to **restore degraded aquatic and terrestrial ecosystems** to create new natural attractions, such as marine or national parks. This can be done by stopping and reversing degradation to these ecosystems through **reforestation**. For example, in **Mauritius and Seychelles**, coral reefs have been negatively affected by overfishing and unsustainable fishing methods, as well as human activities on land and sea. Careless sea activities and an increase in waste have also harmed the coral reefs. However, the coral reefs are economically significant for local livelihoods, as well as the tourism industry. Hence, a regional project led by the United Nations Development Fund has been initiated to **restore the coral reef ecosystem**, to enhance both local livelihoods and the tourism industry.

However, tourism can also bring about environmental disadvantages. Activities conducted in the tourism industry can cause **air pollution** due to the emissions of greenhouse gases. Travelling by air, sea and land require large amounts of fossil fuels to be burned, which generate a significant amount of greenhouse gases in the atmosphere. Gases such as sulphur dioxide and nitrogen oxides can also cause **respiratory illnesses**, such as asthma. Air pollution can circulate over a large area, and impact areas and people far from where it originates.

The tourism industry **generates a significant amount of** waste. In places with no proper waste disposal systems, some tourists may **leave litter behind**, leading to environmental degradation. For example, some climbers visiting the **Mount Everest camps in Nepal** discard empty oxygen tanks, tents, food containers and even human waste on the slopes and glaciers in the area. This improper waste disposal means that trash is left to degrade out in the open. The **chemicals from the trash can contaminate the soil and even groundwater, thus leading to land and water pollution**. Many accommodations in tourist destination regions may not have the proper sewage systems, such as wastewater treatment facilities. Water pollution occurs when **untreated sewage is disposed of into the sea**. E.g in **Borocay Island, the Philippines**, local businesses, including accommodations, were not connected to the underground sewage line. This meant that sewage was not treated and was dumped directly into the sea, leading to a degradation of the water quality in the sea, threatening aquatic ecosystems.

Tourist activities may result in an **overuse of ecosystem provisioning services such as natural resources.** For example, the booming tourist industry in **Bali, Indonesia**, draws a lot of water per day. In addition to **taking water from the public water supply system**, **hotels** also **draw large amounts of groundwater to meet tourists' demand**. This leads to rivers in the regions drying up, **threatening the survival of terrestrial and aquatic species**. **The construction of tourist facilities may encroach on natural areas**, **destroying natural environments and threatening wildlife habitats.** Careless tourists may **trample on plants**, **make too much noise** which can **disturb and frighten** animals. E.g in **Maldives**, the government built **large-scale facilities for accommodation, food and recreation for tourists**, threatening the coastal environment. **Rock and sand are dumped into the sea during the construction process**, covering and **suffocating corals**, resulting in lack of big corals near the newer resorts. In the long term, animals dependent on the coral reefs for food and shelter, such as reef sharks, may lose their habitats and source of food.

I consider this statement to be true to a small extent. Although tourism revenue can be used as funds to conserve the nature sites, large influx of tourists due to mass tourism led to many nature sites exceeding its carrying capacity, hence resulting in environmental damages. Damage caused to the environment can be irreversible and loss of biodiversity may also become permanent.

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 = 15]

Note:

- L3 must have two sides of the argument and an evaluation with at least two relevant examples
- L2 – if one side of the argument, evaluation and at least 1 example are presented
- L2 – If no evaluation

3 Cluster 3: Climate

(a) Explain why temperature varies at different latitudes. [3]

- Due to the Earth's **spherical shape**, the solar angle at which the sun's rays strike the Earth's surface varies at different parts of the Earth.
- At **lower latitudes**, the **solar angle** is **larger**, and **solar radiation** is **more direct**/ is **concentrated over a smaller surface area**, resulting in **higher temperatures**.
- At **higher latitudes**, the **solar angle is smaller**. This causes **solar radiation** to be **less direct/less concentrated**, as it **spreads over a larger surface area**, hence, resulting in **lower temperatures**.

(b) Study Fig. 3.1 (Insert), which shows the distribution of rainfall in New Zealand and a relief map of the country.

(i) Using information from Fig. 3.1, describe how the distribution of rainfall varies in New Zealand. [2]

- The **southwestern**/**western part** of New Zealand receives a **higher amount of rainfall**. E.g areas such as Westland and Nelson-Marlbourough receive a higher rainfall of about **4000-4500mm.**
- The **central**/**eastern part** of New Zealand receives a **lower amount of rainfall**. E.g areas such as Otago, Wellington, Canterbury have a lower amount of rainfall of about **500-1000 mm**.

(ii) Using information from Fig. 3.1, account for the variation in the distribution of rainfall in New Zealand. [4]

- Prevailing **winds pick up moisture over** the Tasman **sea** and **push** the **moist air up the** windward side of the **mountains**.
- The **rising moist air cools** and **condenses** on **condensation nuclei** at **dew point temperature**, forming clouds.
- **Water droplets** in the clouds collide and **coalesce**, and when they become large and **heavy** enough, they fall to the ground as **relief rain on the windward** side. This explains why the western part of New Zealand receives more rain.
- As **most of the moisture has fallen on the windward side**, the **leeward side** experiences **dry** descending air and is thus dry at the eastern part of New Zealand.

(c) Explain how higher sunspot activity results in higher temperatures on the 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.

(d) With reference to Fig. 3.2 (Insert), explain the impact of ocean acidification caused by climate change. [3]

- **Phytoplanktons** in **oceans** help to **absorb carbon dioxide**. The **increase in carbon dioxide emissions** leads to **oceans absorbing excessive amounts of carbon dioxide**, which leads to formation of **carbonic acids**, thus making oceans acidic.
- Carbonic acids **dissolve calcium carbonate** which is **needed** by some **aquatic organisms** such as corals, mussels and oysters to **form their skeletons and shells**.
- Corals are eroding faster than new corals can form. As **coral skeletons shrink**, species that **depend on them for food, habitat** and **shelter from predators are negatively affected** and **may** potentially go **extinct.**

[Total = 15]