ST. MARGARET'S SCHOOL (SECONDARY)

End-of-Year Examinations 2023

CANDIDATE NAME **SUGGESTED ANSWER SCHEME**

CLASS 3 - REGISTER NUMBER

COMBINED HUMANITIES	**2260/02**
Paper 2 Geography Secondary 3 Express Candidates answer on the Question Paper.	**5 October 2023** **1 hour 45 minutes**
Additional Materials: Insert	

READ THESE INSTRUCTIONS FIRST

Do not open this booklet until you are told to do so.

Write your name, register number and class on all the work you hand in.
Write in dark blue or black pen.
You may use a pencil for any diagrams, graphs or rough working.
Do not use staples, paper clips, glue or correction fluid.
The use of an approved calculator and a mathematical set is allowed, where appropriate.

Answer **all** questions.

The Insert contains additional resources referred to in the questions.

The number of marks is given in brackets [ ] at the end of each question or part question.

Question Number	Marks
1	/ 12
2	/ 18
3	/ 20
Total	**/ 50**

[Turn over

This document consists of **19** printed pages.

1	**Geography in Everyday Life**			
	A team of 5 students from a secondary school in Singapore wanted to find out how public transport facilities (e.g. bus interchanges, bus stops, LRT stations, MRT stations) would affect residents' satisfaction of neighbourhood. This led the students to develop the following research question: *How does the convenience of public transport facilities in a neighbourhood influence residents' level of satisfaction?* The students decided to compare the public transport facilities of a neighbourhood in Punggol and Queenstown, which their team members live in. Punggol is considered a younger, non-mature housing estate and Queenstown is an older, mature estate. To investigate their research question, they intend to collect the following sets of data from the two neighbourhoods: ● Google maps showing the location of public transport facilities available in the HDB estates. ● Results from a questionnaire survey completed by 50 residents from each neighbourhood.			
	(a)		The students plan to conduct the questionnaire survey on a Monday at 8am in the two neighbourhoods. Explain a limitation in their data collection process.	[1]
			Award 1 mark for each limitation in the design of the fieldwork explained. Possible responses include: ● [Timing] As it is a weekday and 8am is the rush hour, people commuting to work or school may not be willing to respond to their survey, hence limiting the number of survey responses they can get. [1] ● [Manpower and data to be collected] As they intend to gather 50 survey responses from each neighbourhood and there are only five members in the team, allocating only a day to collect 100 responses in total may not be sufficient. [1] *Accept other plausible responses.* **AO1**	

	(b)		To collect data for the questionnaire survey, the students decided that their team members who live in the two neighbourhoods should ask their friends and neighbours to complete the questionnaire. They would also be asking people walking down the street during their physical walkaround of the neighbourhoods to respond to the questionnaire.	
		(i)	Identify the sampling method used by the students.	[1]
			Award 1 mark for the sampling method identified. ● Sampling method: Convenience sampling [1] **AO1**	
		(ii)	Explain an advantage and a disadvantage of the method identified in 1(b)(i).	[2]
			Award 1 mark for each explanation of advantage and disadvantage of the students' sampling method, to a maximum of 2 marks. Advantages: ● Collecting responses from friends, neighbours and people walking down the street are sources of data which are accessible to the students. [1] ● The survey responses can be collected quickly by the students due to time limitation. [1] Disadvantages: ● As the samples are subjectively selected by the students (friends, neighbours and people walking down the street), this selection will be biased. [1] ● This sample is unlikely to be representative as they are subjectively selected, making it hard to make generalisations about the population. [1] *Accept other plausible responses.* **AO1**	
	(c)		From Google maps, the students counted the different types of public transport facilities within a 500m buffer zone around two target blocks of flats in the two neighbourhoods: Block A, Punggol and Block B Tanglin Halt Road, Queenstown.	

The results of their observation are shown in Table 1.1.

Table 1.1

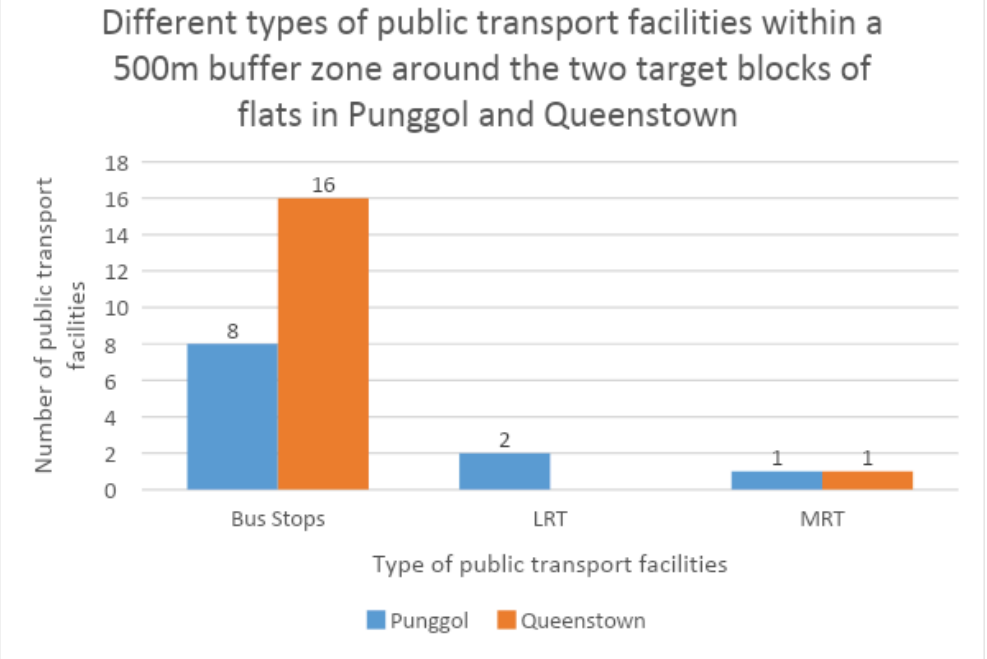
Different types of public transport facilities within a 500m buffer zone around the two target blocks of flats

Distance zones from target HDB blocks [metres]	Punggol Block A			Queenstown Block B		
	Bus stops	LRT stations	MRT stations	Bus stops	LRT stations	MRT stations
0 – 100 m	0	0	0	1	0	1
100 – 200 m	1	0	0	4	0	0
200 – 300 m	2	1	0	5	0	0
300 – 400 m	3	1	0	3	0	0
400 – 500 m	2	0	1	3	0	0
Total	**8**	**2**	**1**	**16**	**0**	**1**

Using Table 1.1, construct a suitable graph to represent the different types of public transport facilities found in the two target blocks of flats in Punggol and Queenstown. [3]

Award maximum of 2 marks if wrong type of graph drawn.

- Legend to represent 2 different neighbourhoods [1]
- Labelling of both X-axis and Y-axis [1]
- Accurate plotting using a scale [1]



[AO2]

(d) The results of one of the questions from the questionnaire are shown in Table 1.2.

Table 1.2

Question: How would you rate your level of satisfaction with the accessibility to various transportation points (e.g., bus stops, LRT stations, MRT stations)?

Responses from residents at Block A, Punggol					
Accessibility to various transportation points	**Level of satisfaction**				
	Very dissatisfied	**Somewhat satisfied**	**Neither satisfied nor dissatisfied**	**Somewhat satisfied**	**Very satisfied**
Distance from your block to the nearest bus stop	2	6	19	12	11
Distance from your block to the nearest MRT station	1	7	14	15	13

Mean	1.5	6.5	16.5	13.5	12	

Responses from residents at Block B, Queenstown					
Accessibility to various transportation points	**Level of satisfaction**				
	Very dissatisfied	**Somewhat satisfied**	**Neither satisfied nor dissatisfied**	**Somewhat satisfied**	**Very satisfied**
Distance from your block to the nearest bus stop	1	2	8	23	16
Distance from your block to the nearest MRT station	1	5	10	19	15
Mean	1	3.5	9	21	15.5

(i) Complete the empty cell in Table 1.2 by calculating the mean for 'Somewhat satisfied' for the responses from residents at Block B, Queenstown. [1]

Award 1 mark for calculation of mean.

Mean for 'somewhat satisfied': 21 [1]
AO2

(ii) Using Table 1.2, compare the levels of satisfaction made by the residents from the two target blocks in Punggol and Queenstown on the accessibility to various transportation points. [2]

Award 1 mark for each comparison of levels of satisfaction supported with evidence from Table 2.

Possible responses include:
- [Difference] The **majority** of residents of Block A are 'neither satisfied nor dissatisfied' with the accessibility to various transportation points, while the majority of residents of Block B are 'somewhat satisfied' with the accessibility to various transportation points.

			○ Evidence: The mean values for 'neither satisfied nor dissatisfied' at Block A is 16.5, while the mean values for 'somewhat satisfied' at Block B is 21. [1] ● [Similarity] In both Block A and B, the **least** number of residents are 'very dissatisfied' with the accessibility to various transportation points. ○ Evidence: The mean values for 'very dissatisfied' at Block A and B are 1.5 and 1 respectively. [1] *Accept other plausible responses.* **AO2**	
	(e)		Evaluate the reliability of the data collected by the students.	[2]
			Award 1 mark for each well-explained point. Answers can be one-sided and still achieve 2 marks. <u>Reliable</u> ● For a student survey, the sample size of 50 was a good representation of the residents' level of satisfaction. [1] ● The students covered 2 locations that had a different range of public transport facilities based on the age of the estates, and this gives a good coverage of the different areas. [1] ● The students used google maps to do a count of the different transport facilities in the 2 study areas, and this is a reliable source of secondary data as they may have missed out on certain facilities if they did a physical count. [1] <u>Not reliable</u> ● The students only conducted their investigation on a Monday morning at 8am and may have missed out interviewing people who were rushing for work during peak hour. [1] ● The sample size of 50 was insufficient to fully represent the everyone's' opinions on their level of satisfaction. [1] ● The students selected only 2 neighbourhoods to carry out their questionnaire surveys, and this may not fully represent the opinions of other residents in other neighbourhoods.[1] *Accept other plausible responses.* **[AO3]**	

2			**Geography in Everyday Life**	
	(a)		Study Fig. 1.1 (Insert), which shows the difference in distance, travel time and project cost between the two proposed alignments of the Cross Island MRT Line. Alignment Option 1 proposed by Land Transport Authority cuts through the Central Catchment Nature Reserve, while Alignment Option 2, proposed by Nature Society (Singapore) goes around the nature reserve to protect our largest primary forest.	

Difference in distance, travel time and project cost between the two proposed alignments of the Cross Island MRT Line

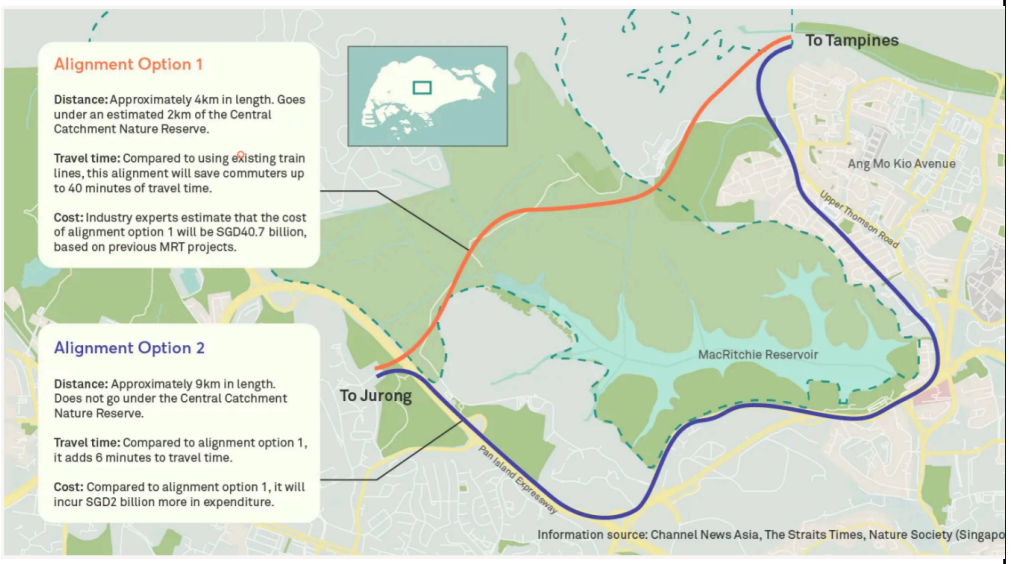


Fig. 1.1

With reference to Fig. 1.1, explain why environmental protection may be seen to be limiting development. [3]

Award 1 mark for each explanation of how environmental protection may be perceived to be limiting development, to a maximum of 3 marks.

Possible responses include:

- Some people in local communities may feel that the protection of nature is done at the expense of their needs. [1]
    - (From Fig. 1.1) Compared to Alignment Option 1, Alignment Option 2 adds 6 minutes to travel time of commuters, bringing them inconvenience. [1]
    - Residents were afraid that this development would damage their properties or result in their homes being acquired to make way for the construction. [1]
- (From Fig. 1.1) Compared to Alignment Option 1, Alignment Option 2 will also result in the government incurring SGD 2 billion more in expenditure. [1]

AO2

(b) Study Fig. 1.2 (Insert), which shows a sign put up by National Parks Board (NParks), Singapore, in a local park where wild boars are sighted frequently.

Sign put up by National Parks Board, Singapore

Fig. 1.2

With reference to Fig. 1.2, explain the impacts of people on nature areas. [4]

Award 1 mark for each well-explained positive and/or negative impact to nature areas, up to a maximum of 4 marks.
Award 1 additional mark for elaboration or example given to support positive and/or negative impact to nature areas.

Positive impacts

- Local communities and the government can raise awareness about the value of nature areas through encouraging positive behaviour that does not damage nature.[1]
    - For example, signs put up by Nparks help to educate park visitors on how to behave when encountering wildlife such as wild boars, reducing human-animal conflict.[1]
- Local communities can organise or participate in conservation efforts for the environment, helping to restore natural habitats and provide a healthy environment for species to thrive.[1]

Negative impacts

- People who visit nature areas may litter; animals may get cut by metal cans or become entangled with plastic containers and bags. [1]
- Some animals may mistake litter for food and consume them, causing animals to get hurt or suffer. [1]
- Feeding wild animals may lead to changes in the habits and behaviours of wildlife.
    - Human-wildlife conflict can increase when animals associate food with people. [1]

AO3

(c) Study Fig. 1.3 (Insert) which shows the location of 5 large childcare centres that opened between 2019 and 2020 in two housing estates, Sengkang and Punggol. These large childcare centres, with about 300 to 550 vacancies each, have intakes three to five times larger than centres at Housing Development Board (HDB) void decks.

Location of 5 large childcare centres in two housing estates, Sengkang and Punggol

Legend	
	Large childcare centre
	MRT station
	LRT station
	Roads

Fig. 1.3

With reference to Fig. 1.3, account for the locations of the large childcare centres in Sengkang and Punggol. [2]

Award 1 mark for each explanation of the spatial association of large childcare centres in the housing estates, supported with evidence from Fig. 1.3.

Possible responses include:

- [Evidence from Fig. 1.3] The large childcare centres are located in these housing estates.
    - [Explanation] This is because these estates have high pre-school demand or have many young families with working parents who would require easy access to childcare services that are close to home. [1]
      OR
    - [Explanation] These young families with working parents and young children would not need to travel to another estate to seek childcare services, bringing them convenience. [1]
- [Evidence from Fig. 1.3] The large childcare centres are located near MRT stations and LRTs.
    - [Explanation] This would allow working parents to drop off or pick up their children conveniently before heading to work or home via public transport (MRT/LRT). [1]

AO2

(d) Study Fig. 1.4 (Insert), taken at Bishan-Ang Mo Kio Park.

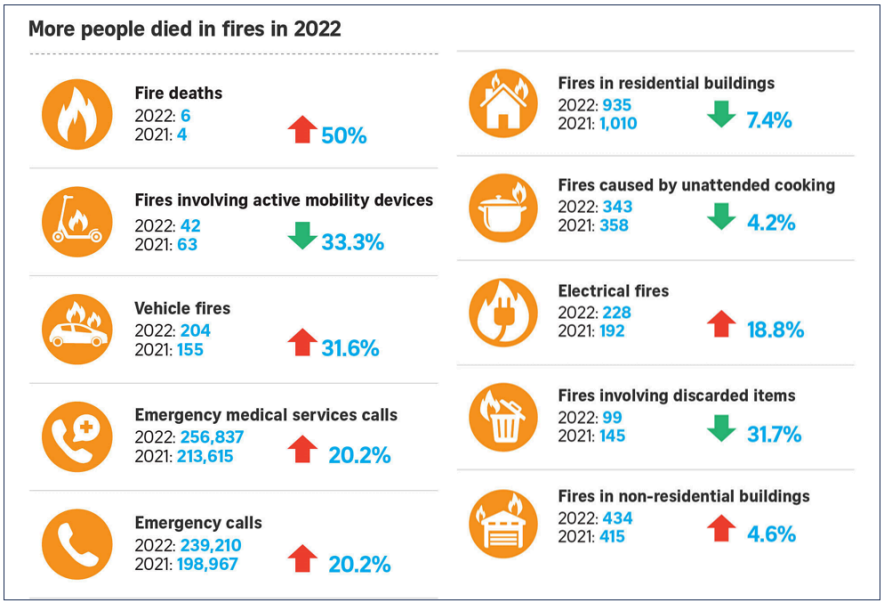
Bishan-Ang Mo Kio Park

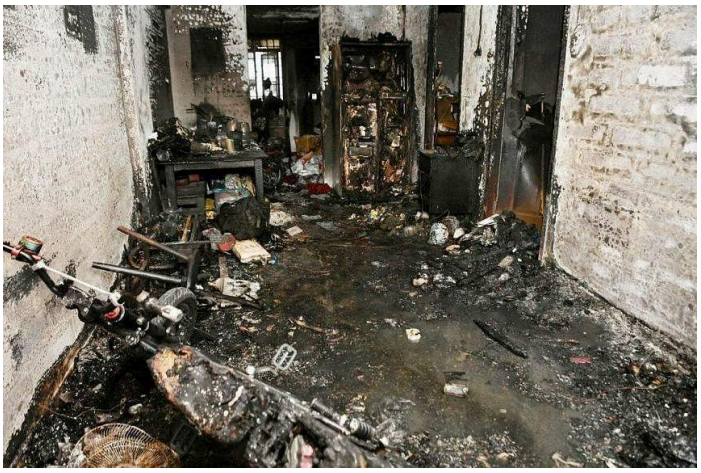
Fig. 1.4

Describe the regulating ecosystem services provided by Bishan-Ang Mo Kio Park to the urban neighbourhood. [3]

Award 1 mark for each description of a regulating ecosystem service.

- Trees in the park help to regulate the local climate by providing shade to residents, lowering surface and air temperatures. [1]

			• Vegetation cover helps to regulate water flows and mitigate floods by retaining water in the soil and reduce surface run off. [1] • The trees or other plants help to regulate air quality by removing pollutants from the atmosphere. [1] AO1	
	(e)	**(i)**	Study Fig. 1.5, which is an infographic from SCDF showing statistics about fire occurrences in Singapore between 2021 to 2022.	
			Statistics about fire occurrences in Singapore, 2021 to 2022  **Fig. 1.5**	
			Using Fig. 1.5, describe the changes in the causes of fires in Singapore between 2021 to 2022.	[2]
			Award 1 mark for each description of change supported with evidence from Fig. 1.5. • There was an increase in fires caused by vehicles fires and electrical fires from 2021 to 2022. Vehicle fires increased by 31.6%(from 155 cases to 204 cases) and electrical fires increased by 18.8% (from 192 cases to 228 cases). [1] • There was a decrease in fires caused by active mobility devices, unattended cooking and discarded items from 2021 to 2022. Fires due to active mobility devices decreased by 33.3% (from 63 to 42 cases), fires due to unattended cooking decreased by 4.2% (from 358 to 343 cases) and fires involving discarded items decreased by 31.7% (from 145 to 99 cases). [1]	

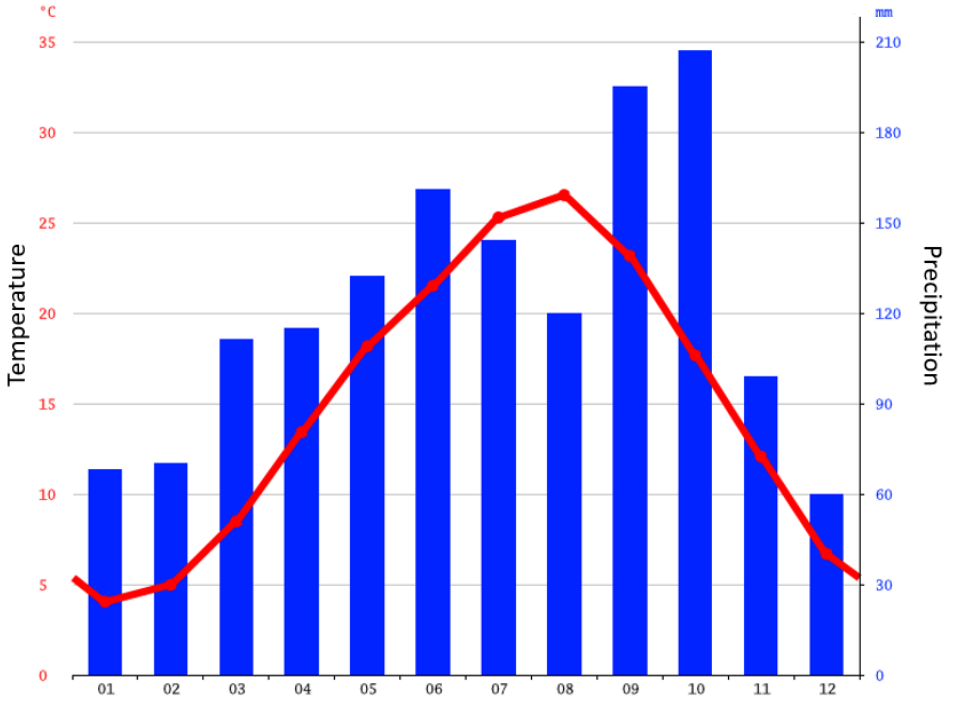
			AO2	
		(ii)	Study Fig. 1.6 and 1.7 (Insert), which show scenes during and after a fire outbreak in Singapore.	
			 **Fig. 1.6**  **Fig. 1.7**	
			Using evidence from Fig. 1.6 and 1.7, explain the social and economic impacts of fire occurrences.	[4]
			Reserve 1 mark for social [health] impact and 1 mark for economic impact. Award 1 mark for explanation of impact supported with evidence.	

			Award 1 additional mark for further elaboration of each impact, up to 2 marks. Maximum of 2 marks if no reference made to the photographs. ● In Fig. 1.6, it shows fire fighters carrying a victim of a fire out from her home. The victim may suffer from burn injuries as she was unable to evacuate in time, which may lead to death or disabilities. [1] o High levels of carbon monoxide and carbon dioxide released during the fire may cause carbon monoxide poisoning leading to headache, dizziness, weakness and confusion.[1] o Smoke inhalation from being in the fire can cause breathing difficulties and suffocation.[1] o Irritants from a fire, such as acid gases, can permanently damage a person's respiratory system.[1] ● In Fig. 1.7, it shows a home that has been destroyed by a residential fire. This means an economic loss as goods, furniture and important documents may be destroyed. [1] **o** Further costs may be incurred after the fire is over as money is required to repair and rebuild the property/home that has been damaged. [1] **AO2**	

3 Climate

(a) Study Fig. 1.8 (Insert), which shows a climograph of Tokyo, Japan.

Climograph of Tokyo, Japan



Month	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Average temperature (°C)	4	5	8.5	13.4	18.2	21.5	25.3	26.5	23.2	17.7	12.1	6.7
Precipitation (mm)	68	70	111	115	132	161	144	120	195	207	99	60

Fig. 1.8

Using Fig. 1.8, describe the climatic characteristics of Tokyo, Japan. [3]

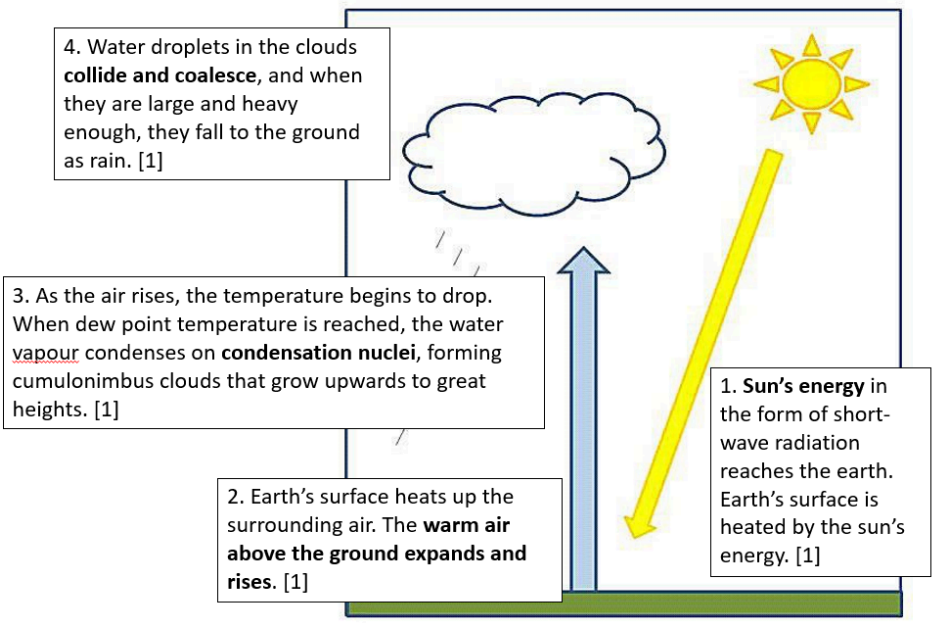
Award 1 mark for each description supported with evidence.
There is no need to identify climatic type.

- Tokyo experiences a moderate mean annual temperature of 15.2°C. [1]
- Tokyo has a large annual temperature range of 22.5°C. [1]
- Tokyo has a moderate/high total annual precipitation of 1482mm (High > 1500mm) [1]
- Precipitation is evenly distributed over the year, with 60mm in the lowest month(Dec) and up to 207mm in the highest month (Oct). [1]

AO2

(b) Using a well-annotated diagram, explain the formation of convectional rain. [4]

Reserve 1 mark for accurate diagram showing correct directional arrows with SW radiation from sun and rising warm air.
Award 1 mark for each correct annotation that explains formation of convectional rain, up to a maximum of 3 marks.



AO1

(c) Fig. 1.9 shows a local wind being experienced at a coastal location.

Local wind at coastal location

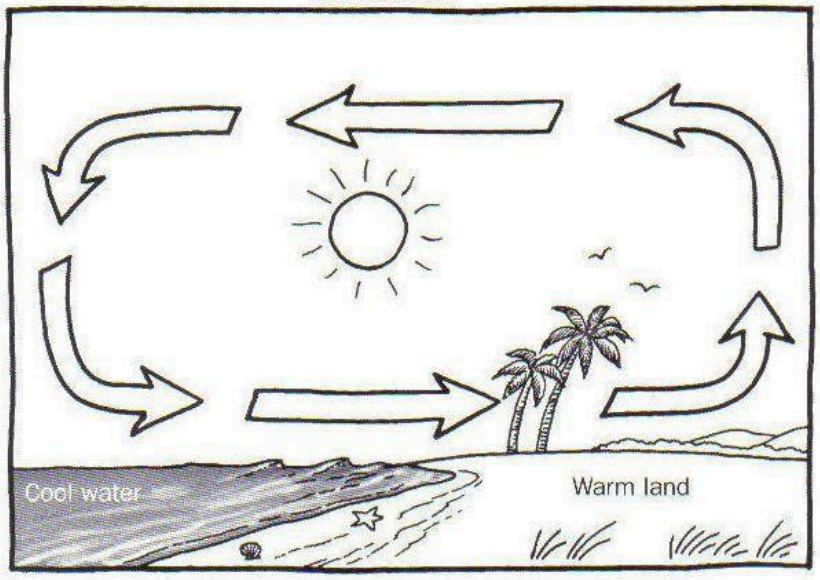


Fig. 1.9

		Account for the formation of the local wind shown in Fig. 1.9.	[4]
		Award 1 mark for explanation of each step in the formation of a sea breeze. During the day, shortwave radiation from the sun is absorbed by the land and sea at different rates. [1] The land and the air above it gain heat quickly. The warmer air is less dense and rises, forming an area of lower pressure over land. [1] The sea and the air above it gains heat slowly. The cooler air is denser and sinks, forming an area of higher pressure over the sea. [1] Air moves from an area of higher pressure over the sea to an area of lower pressure over the land, forming a sea breeze. [1] **AO1**	
	(d)	'Type of surface cover is the main factor that causes higher temperatures in cities.' How far do you agree with this statement? Support your answers with evidence.	[9]
		Candidates at each level will show the following characteristics: LEVEL 1 (1-3 MARKS) 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. LEVEL 2 (4-6 MARKS) 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.

LEVEL 3 (7-9 MARKS)
Develops arguments that support 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.

Possible response:

I disagree with the statement. Although the type of surface cover in cities do cause them to experience higher temperatures compared to rural areas, it is not the main factor that causes some cities to have higher temperatures. A city's latitude and distance from sea also have a strong influence on the temperatures it experiences.

Type of surface cover
Cities comprise of mainly urban areas which tend to have higher temperatures than rural areas as they comprise larger areas of dark surfaces such as tarmac roads and concrete, which absorb more solar radiation and radiate more heat than forest and water bodies. This results in higher temperatures compared to rural areas. Glass covered sky scrapers found in cities also reflect sunlight to the ground surface. This increases absorption of solar radiation and heat radiation by ground surfaces which also leads to higher temperatures. For example, night time temperatures at Singapore's Central Business District were found to be 2^{o}C warmer than the area near MacRitchie reservoir, which has very dense vegetation. Thus, this shows that even in a small country such as Singapore, type of surface cover affects temperature; this will be amplified in larger cities whereby manmade surface and buildings cover much larger areas.

However, the type of surface is not the main factor that may cause cities to have higher temperatures. A city's latitude, altitude and distance from sea will have greater impact on its temperatures on a larger scale.

Latitude
Places at different latitudes receive different amounts of solar radiation that will result in differences in temperature. Cities at higher latitudes will experience lower temperatures. At higher latitudes, the angle at which the sun's rays strike the earth's surface (solar angle) is smaller, therefore solar radiation is less direct and spread out over a larger area. The sun's energy is less concentrated, leading to lower temperatures. Places closer to the equator will experience higher temperatures as the solar angle will be large. Solar radiation is more direct and concentrated over a smaller area, causing the higher temperatures all year round. For example, Beijing, China is 40^{o}N of the equator and has average annual temperatures averaging 12 ^{o}C, while Singapore, 1^{o}N of the equator has average annual temperatures averaging 29 ^{o}C. Hence, latitude is a factor that has a greater influence on the temperature of places be it a city or rural area.

		Distance from the sea Due to maritime and continental effect, places could have varying temperatures regardless of the type of surface over. In cities located along a coast, their annual mean temperatures are moderated by the sea and thus they have a smaller annual temperature range. This is because sea heats up and cools down more slowly than land. During winter, the sea is warmer than land, warming the air along coastal areas, and thus have higher temperatures than inland areas. During summer, the sea is cooler than land, cooling the air along coastal areas, thus have lower temperatures than inland areas. Inland areas do not experience this moderating influence of the sea and thus experience warmer summers and cooler winters, leading to larger annual temperature range. For example, Anchorage, a coastal city in Alaska, USA has a lower annual temperature range of 23°C as compared to Fairbanks, an inland city in Alaska, USA that has a higher annual temperature range of 40°C. Thus, this shows that although both Anchorage and Fairbanks are cities with similar type of surface cover, they experience different temperatures throughout the year. Conclusion Therefore, I disagree with the statement that type of surface cover is the main factor that causes temperature differences between cities. Whatever the type of surface cover, factors such as latitude and distance from sea may influence temperature on a larger scale. On a global scale, locations that share similar latitudes would experience similar temperatures, regardless of the type of surface cover. A location's distance from sea will also cause temperature to vary all year round regardless of its type of surface cover. Thus, latitude and distance from the sea have a greater influence as they determine temperatures of places long before the land is developed into cities by humans. **AO3**	

END OF PAPER

Table of Specifications				
	Topic	**AO1**	**AO2**	**AO3**
1(a)	3.1 Designing Fieldwork (limitation)	1		

1(b)(i)	3.2 Collecting Primary Data (sampling)	1		
1(b)(ii)	3.2 Collecting Primary Data (sampling)	2		
1(c)	3.4 Presenting Findings (draw graph)		3	
1(d)(i)	3.3 Processing and analysing data		1	
1(d)(ii)	3.3 Processing and analysing data (compare satisfaction levels)		2	
1(e)	3.3 Processing and analysing data (reliability)			2
	Sub-total	**4**	**6**	**2**
2(a)	1.1 Relationship between people and nature in their neighbourhood	3		
2(b)	1.1 Relationship between people and nature in their neighbourhood			4
2(c)	1.3 Relationship between locations in a neighbourhood		4	
2(d)	2.2 Ecosystem services in urban neighbourhood	3		
2(e)(i)	2.3 Common hazards in urban neighbourhood		2	
2(e)(ii)	2.3 Common hazards in urban neighbourhood		4	
	Sub-total	**3**	**11**	**4**
3(a)	1.1 Climatic type		3	
3(b)	1.3 Formation of convectional rain	4		
3(c)	1.4 Land and sea breeze	4		
3(d)	[OEQ] 1.2 Factors affecting temperature			9
	Sub-total	**8**	**3**	**9**
Total		**15**	**20**	**15**