

VICTORIA JUNIOR COLLEGE
JC2 PRELIMINARY EXAMINATION P2 2025
H2 GEOGRAPHY PAPER 2 9173/02

MARK SCHEME

Section A

Qn	Answer	Marks
1 (a)	Explain one strength and one weakness of the hypothesis. Award 1 mark per identification of strength of weakness and an additional mark for elaboration of each strength and weakness. Some possible answers Strength The hypothesis is measurable, since residents' perceptions of whether nature-based flood management features (like bioswales) lower flood risk can be directly surveyed. It connects local experiences to the park's design purpose, providing valuable insight into community confidence in flood mitigation. Weakness [Lack awareness] Residents may lack awareness and knowledge of the nature based flood management features in the park, so their views may not accurately indicate the effectiveness of the features. [Lack of objectivity/ recency effect] Perceptions may be influenced by recent rainfall events or flooding experiences, rather than effectiveness of the nature based flood management features. [Indirect link to effectiveness of nature-based flood management features] The hypothesis is about residents' feelings of safety, which may not directly correspond with the actual functioning of nature-based flood management features. [Sampling bias] Responses might not represent the whole community (e.g., only vocal residents respond, or newer residents may not have experienced past flooding). Accept any other plausible response. AO1	[4]
1 (b)	With reference to Resources 1 and 2, explain the usefulness of conducting a site audit. Award 1 mark per usefulness, up to a maximum of 2 mark per use identified. [Keeping a record/ site familiarisation] A site audit allows the students to systematically record the location, type, and condition of flood management features in the park.[1] In this investigation, it helped them identify and map bioswales before the wet-day visit, ensuring they knew exactly where to return	[4]

		for follow-up observations. [1] This increases the efficiency and focus of the wet-day fieldwork and ensures data is collected from the same sites for direct comparison. [Basis of comparison] The audit also provides a baseline record of dry-day conditions,[1] which can be compared against wet-day observations. [1] [Provide context] The audit also gives context for interpreting survey results, [1] as students can relate residents' perceptions to the actual presence and condition of flood management features in the park.[1] AO1	
1	(c)	Describe some risks the students could have encountered in conducting the geographical investigation and suggest how these risks can be minimised.	[6]
		Award 1 mark per risk identified, 1 mark for elaboration of risk, and 1 mark per suggestion. Most risks are to occur on the wet day, particularly due to intermittent rain. Wet ground surfaces may result in slipping: • Risk: During the wet-day visit, paths and grassy areas near bioswales could be slippery, increasing the chance of injury. • Minimization: Wear appropriate footwear with good grip and avoid steep, muddy, or waterlogged slopes. Exposure to intermittent rain and rising water levels in Alkaff Lake: • Risk: The intermittent rain on the wet day may not be light, and water levels in the lake may rise faster than expected. This puts the student at risk. • Minimization: The students should watch out for the public broadcast system in case a warning comes on, and be ready to move to higher ground. 3. Interaction with wildlife or insects • Risk: Working near marshes and wetlands may bring students into contact with mosquitoes, bees, or snakes. • Minimisation: Apply insect repellent, remain vigilant, and avoid disturbing wildlife habitats. AO1	
1	(d)	Explain the limitations of the sampling method used by the students.	[4]

		Award 1 mark for each limitation identified and 1 mark for each elaboration, up to a maximum of 2 marks. (Accept 2 or 3 limitations) [Sampling bias] Convenience sampling only surveys people who are easily accessible — in this case, park users.[1] This means the results may not represent the views of all Bidadari Estate residents, especially those who rarely visit the park.[1] [Lack of representation] Because the sample is drawn from the park, it may over-represent certain groups [1] (e.g., younger or more active residents) and under-represent others (e.g., elderly residents or those living farther away), reducing the representativeness of the findings.[1] [Recency effect on perceptions] The opinions collected may reflect the immediate experiences of park visitors rather than broader perceptions of flood risk in the community,[1] which can limit the validity of conclusions about residents' overall attitudes toward nature-based flood management, especially since the surveys were carried out on a dry day.[1] AO1	
1	(e)	Using Resource 3, suggest 3 improvements to the questionnaire survey.	[6]
		Award 1 mark per identified flaw and 1 mark per suggestion. [Clearer demographic profile for efficiency of analysis] Instead of just “Gender/Age,” ask for specific categories (e.g., Male/Female/Other, and age ranges like 18–25, 26–40, etc.).[1] This allows for easier analysis and comparison of responses across different demographic groups.[1] [Assumptions of prior knowledge in Q2] “Do you think Bidadari Park is designed differently from other parks in Singapore?” assumes all park users know what other Singapore parks are like. [1] This could be turned into an open ended question instead, to allow for respondents to suggest some differences they could have noticed. A possible question could be: Which aspects of Bidadari Park’s design do you find unique or different? [Variable interpretation of options] For Q5/6, the options provided are quite subjective, and each respondent could have different interpretations of the options. As much as possible, students should actually quote the questions that need improvements. AO2	
1	(f)	Using a suitable data representation method, present the results to Question 6 in the questionnaire survey in Resource 4 and justify your choice.	[6]

		Perceived Effectiveness of Flood Mitigation Measures <table><caption>Data for Perceived Effectiveness of Flood Mitigation Measures</caption><thead><tr><th>Effectiveness Rating</th><th>Percentage of Respondents</th></tr></thead><tbody><tr><td>Highly effective</td><td>25</td></tr><tr><td>Effective</td><td>40</td></tr><tr><td>Don't really know</td><td>10</td></tr><tr><td>Ineffective</td><td>15</td></tr><tr><td>Very ineffective</td><td>10</td></tr></tbody></table> Award 1 mark each of title, both axes, legend, up to a total of 2 marks. Award 1 marks for accuracy of graph drawing, and 1 mark for overall shape. Comparison: It allows easy comparison of the number (or percentage) of respondents in each category. Visibility: You can clearly see which perception is most common (e.g., “Effective”) and which is least common (“Very ineffective”). Simplicity: Respondents’ perceptions are easy to interpret visually without implying exact numerical differences between categories. AO2	Effectiveness Rating	Percentage of Respondents	Highly effective	25	Effective	40	Don't really know	10	Ineffective	15	Very ineffective	10	
Effectiveness Rating	Percentage of Respondents														
Highly effective	25														
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1	(g)	Evaluate the validity of this study in assessing how nature-based flood management features have lowered flood risk in Bidadari estate.	[10]												
		Validity (does it answer the hypothesis?) - The study focuses directly on nature-based flood management features (bioswales, marshlands, wetlands, retention pond) in Bidadari Park, which are relevant to the hypothesis. - Studying flood risk perception of residents aligns with the hypothesis about how residents feel about these features. - Observing bioswales on both dry and wet days provides insight into how water is actually managed and how visible the effects of flood mitigation are under different conditions. Weaknesses: Limited scope of features: Focusing only on three bioswales may not capture the effectiveness of the park’s full flood management system (e.g., Alkaff Lake, marshlands, terraced wetlands). This could reduce validity because results may not generalize to the whole park or its effect on the wider Bidadari Estate.													

		• Indirect measurement of flood reduction: Observing bioswales and pooling gives an indication of water management, but it does not directly measure flooding reduction in Bidadari Estate. There's no data on actual water levels, frequency of flooding, or comparison with pre-park conditions. There is also no direct link between bioswale conditions and flood risk. It also assumes the residents know the function of a bioswale, and by extension, the function of nature-based flood management features, to be able to answer the survey questions on flood risk perception objectively. • Short observation period: Observations over just two days may not account for variability in rainfall intensity or frequency, which affects how effective the features are over time. In fact, only data collection only lasted an hour on the wet day due to rain, and hence the short data collection period may not best represent how the bioswales may perform in a rainfall episode with higher intensity, much less the other nature-based flood management features. On reliability • Observations on the wet day were made quickly during intermittent rain, which may lead to inconsistent recording between different students or days. • Small sample of bioswales and park users means results could vary significantly if the study were repeated, reducing reliability. • Weather and water levels are variable, so repeating the study on different wet days could produce different results. On accuracy • Subjective notes on "conditions" of bioswales may vary between students; no standardised measurement scale (e.g., depth of water, flow rate, or water retention) was mentioned. To improve on this, more precise measurements of e.g. infiltration will need to be taken. • Survey responses about perception are subjective and may not reflect actual effectiveness especially for questions Q5,6,7 which have options quite open to interpretation. • Observing only visible surface water might miss underground drainage or retention capacity, reducing accuracy in assessing true flood mitigation effectiveness. • Studying on the bioswales will also reduce accuracy in assessing true effectiveness of ALL nature based flood management features in the park. AO3	
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Section B

2(a)	With reference to Resource 5, <u>describe the changes</u> in sources of carbon emissions and carbon emissions absorbed by carbon stores, between 1900 to 2017.	[6]
	Award 1 mark for each description of the changes between sources of carbon emissions or carbon emissions absorbed by stores. Award a maximum of 1 additional mark for further development of each description, where applicable. Note: - R5 is a compound line graph, there are multiple variables stacked on top of each other to show the total value across all variables. Students need to be able to read total values and values of individual components. - Answers describing 'CO₂ absorbed' should use positive values even if axis shows negative because the absorption means that the CO₂ is removed, the removal would have accounted for the negative value on in the axis. Possible responses include: - Amongst the sources of carbon emissions, fossil fuels and cement production produced <u>increased significantly</u> while carbon emissions from land-use changes <u>fluctuated but did not increase significantly</u>. [1] - Emissions from fossil fuels and cement production was about 2 Gt CO₂ in 1900 but increase more than 18 times to 37 Gt CO₂ in 2017. Emissions from land-use change was 5 Gt CO₂ in 1900 and gradually increased to 7 Gt CO₂ in 1960 before decreasing back to 5 Gt CO₂ in 1980 and fluctuated around there till 2017. [+1] - Land-use change was the dominant carbon emission source in 1900 but emissions from fossil fuel and cement production became the <u>dominant carbon emission source</u> from 1960. [1] - In 1900, emissions from fossil fuels and cement production was about 2 Gt CO₂ but emissions from land-use change was 2 times more at 5 Gt CO₂. However, in 1960 emissions from fossil fuels and cement production was about 10 Gt CO₂ which was 2 times that from land-use change which emitted 5 Gt CO₂. [+1] - Carbon emissions absorbed by ocean sinks <u>fluctuated less</u> than the carbon emissions absorbed by land sinks and atmosphere. [1] - Carbon emissions absorbed by ocean sinks fluctuated about 2 Gt CO₂ year-on-year but that absorbed by atmosphere and land sinks fluctuated between 2 to 10 Gt CO₂ year-on-year. [+1] - While carbon emissions absorbed by all carbon stores increased, atmosphere had the greatest <u>absolute increase</u> in carbon emissions absorbed. [1] - Carbon emissions absorbed by atmosphere increased significantly from 1 Gt CO₂ in 1900 to 20 Gt CO₂ in 2017. In contrast, carbon emissions absorbed by ocean sinks increased moderately from 2 Gt CO₂ in 1900 to 9 Gt CO₂ in 2017. Carbon emissions absorbed by land sinks increased moderately in a fluctuating manner from 2 Gt CO₂ in 1900 to 12 Gt CO₂ in 2017. [+1]	

	AO2	
2(b)	Explain <u>two</u> reasons for the increased carbon emissions seen in Resource 5.	[4]
	Award 1 mark for each explanation of global carbon emissions. Award 1 additional mark for further development of each point, where applicable. Possible responses include: - Carbon emissions have increased due to the burning of carbon-rich fossil fuels for urbanization and industrial activity. [1] Fossil fuels contain carbon from plants and animals that lived millions of years ago. The burning of fossil fuels releases these geological carbon stores of carbon rapidly as carbon emissions. [1] - Fossil fuels are burnt to produce electricity to provide energy for household and commercial activities like lighting and air-conditioning. [+1] Fossil fuels are needed as fuel for daily commuting public and private vehicles. [+1] - Fossil fuels are also burnt to produce electricity to power the factories for mass production of goods. [+1] Fossil fuels are needed to transport of raw materials and finished goods via container ships and cargo airplanes. [+1] - Carbon emissions have increased due to land-use changes which would require land to be deforested to make space for urbanisation or factories. [1] - Clearing the trees exposes the soil to direct sunlight. Higher soil temperatures will increase the rate of carbon oxidation, which is the process whereby carbon in soil organic matter reacts with oxygen to produce carbon dioxide. [+1] - In the extreme case when deforestation occurs through slash-and-burn techniques, large amounts of stored carbon are also released rapidly as CO₂. [+1] - No marks given for how deforestation reduces carbon sink since the question is on increase carbon emissions - Carbon emissions have increased due to the production of cement. Carbon dioxide is emitted as a by-product of clinker production, an intermediate product in cement production. [1] - Urban areas are densely built-up. Cement is required to make concrete, which is a common construction material for residences, commercial buildings and transportation infrastructure. [+1] - Cement is a source of 8% of the world's CO₂ emissions. [+1]	
	AO1	
2(c)	Explain how the absorption of carbon by ocean carbon sinks and the atmosphere seen in Resource 5 could impact aquatic ecosystems.	[4]
	Award 1 mark for each explanation impact on aquatic ecosystems or terrestrial ecosystems. Award 1 additional mark for further development of each point, where applicable. Possible responses include:	

	- Oceans as natural carbon sinks are R5 shows that they are absorbing more CO₂ due to increased emissions, leading to formation of carbonic acids, resulting in <u>ocean acidification</u>. [1] - Carbonic acids dissolve calcium carbonate, which is what makes up the coral skeletons and shells of shellfish. This makes it harder for corals to build up and maintain their structure and causes less healthy corals [+1]. - Shellfish like oysters and scallops have thinner and weaker shells which make them less able to protect themselves from predators and harsh conditions. [+1] - R5 shows that the atmosphere has absorbed a large proportion of carbon emissions. This will lead to <u>enhanced greenhouse effect</u> when more long-wave radiation is intercepted and absorbed by the higher concentration of greenhouse gases, leading to more heat trapped in the atmosphere and a rising global temperature. [1] This can lead to warmer sea surface temperature's which can lead to <u>coral bleaching</u>. Coral reefs are highly sensitive to even small changes in temperature. Higher ocean temperatures cause thermal stress to corals, which triggers corals to expel out the symbiotic algae that live in them. This causes corals to turn them white. This process is known as coral bleaching. [1] - Without algae that makes food through photosynthesis, the corals lose their major source of food. The corals become more vulnerable to diseases, and are more likely to die. This weakens coral reef ecosystems as there are fewer coral habitats for fishes, reducing biodiversity and <u>disrupting marine food chains</u>. [+1] - For example, coral bleaching in the Great Barrier Reef has led to the collapse of fish populations that depend on healthy coral for shelter and food. [+1]	
	AO1	
2(d)	With reference to Resource 6, explain the two challenges in implementing strategies to respond to climate change.	[4]
	Award 1 mark for each explanation impact on aquatic ecosystems or terrestrial ecosystems. Award 1 additional mark for further development of each point, where applicable. Note: Students should try to use <i>economic challenge</i> and <i>political challenges</i> as these are terms from the syllabus. Possible responses include: - One challenge is the <u>economic challenge</u> of prioritising economic development over environmental development. R6 shows that much of the land is used for industrial activity and transportation of goods which produces large amount of carbon emissions, compared to small land set aside for tree planting. This is evidence that countries prioritise economic development and is unwilling to cut back on economic development. [1] - This is especially so in countries that are rapidly developing, because they need the land for economic development to pull the country out of poverty first before they can consider any forms of environmental protection. [+1]	

	- Another challenge is the <u>political challenge</u> of lacking political will to tackle climate change. R6 shows that the government's new climate plan is in fact a very small strategy of planting a single tree, which is minuscule compared to the ongoing carbon emission. A single tree is unable to absorb the large amount of carbon emissions that is currently being emitted. [1] - This is evidence that governments are aware of the need to tackle climate change but they are not willing to put in drastic efforts to do so for fear that it may hinder economic growth, or that the strategy may take too long to see any effect. [+1] - These political challenges cause the government's effort to lag behind the problem, as seen from how the tree will take a long time to mature before it can absorb carbon emissions. By that time, the strategy would have a delayed effect and would be insufficient to effectively combat climate change. [+1] AO2	
2(e)	With reference to Resource 7, explain the potential of achieving sustainable urban development in New Delhi.	[6]
	Award 1 mark for explanation of a potential or a challenge of achieving SUD. Award a maximum of 1 additional mark for further development of each explanation, where applicable. Possible responses include: - There is a potential of achieving SUD in terms of <u>environmental integrity</u> when <u>waste is viewed as a potential resource</u>. As seen in R7, the Tidy Trails Program helps to reduce plastic waste by recycling them and reusing them to make functional items like benches and chairs for public spaces. This would reduce pressure on productive land to assimilate these plastic wastes, thus lowering the ecological footprint. [1] - When existing resources are reused into other functional items, it promotes circular urban metabolism as the city needs low input of resources and has low output of waste generated. [+1] - This is especially so when most plastics are non-biodegradable and would stay in the landfill for more than a few decades. [+1] - With less pressure on limited land for landfills, the city government would face less pressure to search for new land to expand the landfill OR Existing landfills can last for longer periods of time. [+1] - Furthermore, ecological footprint of New Delhi is also reduced because less area of productive land and aquatic ecosystems are needed to produce the public infrastructure as these are made from existing plastics. [+1] - There is potential in achieving SUD in terms of <u>social well-being</u> R7 shows that the collected plastic is recycled into benches and chairs that are installed in public spaces. This would increase accessible rest points for people in the urban area, which is important for young children and the elderly, thereby improving the quality of life in the city. [1] - There is potential in achieving SUD in terms of <u>social well-being</u> because of the strong partnership between private businesses, government, and	

	consumers. R7 shows that the Tidy Trials project is developed by a TNC in collaboration with a social organisation, and involves local governments, market associations, shopkeepers, and consumers. This means that there is a strong ground-up movement in sustaining this waste reduction effort. [1] ○ This fosters a sense of ownership and shared responsibility amongst different stakeholders to work towards a common long-term goal of sustaining the well-being of the environment and the community. [+1] ○ This helps to build more equitable and inclusive societies where even lower-income and marginalised groups participate in sustainable waste management. [+1] • There is potential in achieving SUD in terms of <u>economic vitality</u> R7 shows that the Tidy Trials project is developed by a TNC in collaboration with a social organisation, also involves market associations and shopkeepers. This means that foreign businesses and local businesses pool together resources to make this project economically viable so much so that it can be expanded to other cities. [1] ○ The government will also need to spend less money in waste management and building public infrastructure because of the efforts by other TNCs, local businesses and locals. [+1] ○ By improving the image of PepsiCo India through this project, the TNC can continue to operate in the city and bring in more foreign direct investment and create job opportunities for locals. [+1] AO2	
2(f)	Explain why women may face issues relating to their social well-being in cities.	[6]
	Award 1 mark for each explanation of issues relating to women's social well-being in cities. Award a maximum of 1 additional mark for further development of each explanation, where applicable. Possible responses include: • Due to societal expectations that women are the main caregivers in the family, women are expected to bear a larger responsibility to care for children and the elderly compared to males. [1] ○ This would reduce the time that women have to pursue their own interests outside of work, making feel less able to find a sense of fulfilment in life [+1] ○ With less time to meet friends, their social circles may shrink and women will have fewer support outside of the family. [+1] ○ As caregiving is a stressful role due to the financial and emotional demands on the individual, the lack of support from people outside from the family can increase the anxiety of shouldering this responsibility alone and cause women to feel isolated. [+1] • In cities of lower levels of development, the lack of money to send females at school-going age to school causes them to have lower educational attainment [1].	

	○ They tend to sacrifice their chances of going school to care for younger siblings or help out with household chores like fetching of water. [+1] ○ This lowers their chances of finding a job and breaking free from the cycle of poverty in adulthood. [+1] ● In cities in countries of lower levels of economic development, women tend to lag behind males in education attainment and employment (or gender gap in education and gender gap in labour force participation). This lack of education attainment and work experience impedes the rise of women to leadership positions in work places and politics. The lack of representation of women in decision-making positions hinders the gender inclusive urban policies and programme [1], and perpetuates the city as an unequal space for women in receiving education and job opportunities. [+1] ● Women in cities also face the fear of violence in public spaces such as being a victim of sexual misconduct on crowded public transport or on poorly lit streets at night. [1] ○ The fear of public spaces will restrict their ability to enjoy and use urban spaces [+1] ○ Women may also avoid going out of the house after dark, and this impacts their ability to participate in social activities. [+1] ● Women in cities may not be able to access quality healthcare due to the lack of healthcare infrastructure. This would cause delay in healthcare treatment and poorer health for women. [1] ○ This is especially acute in cities of lower income countries where there is less government spending on public healthcare. [+1] ○ In many Indian cities, women are expected to stay silent about their health issues and this reduces their chances of seeking medical help. [+1] ○ The lack of female doctors may also deter women from seeking healthcare advice on reproductive health. [+1] ○ See more: https://timesofindia.indiatimes.com/city/mumbai/healthcare-crumbling-in-maharashtra-say-ngos-grading-state-and/articleshow/114998655.cms and https://www.dw.com/en/access-to-health-care-a-distant-dream-for-most-indian-women/a-50108512	
	AO1	

Section C

Generic Level Descriptors for H2 Essays		
Level	Marks	Descriptors
5	18–20	Evaluation is consistently analytical and coherent. Response is well-supported by relevant material, including the effective use of examples. Response features accurate geographical knowledge and reflects good understanding of the subject content relevant to the question.
4	14–17	Evaluation is analytical and coherent. Response is mostly well-supported by relevant material, including the appropriate use of examples. Response features accurate geographical knowledge and reflects adequate understanding of the subject content relevant to the question.
3	10–13	Evaluation is broadly analytical and generally coherent. Response is moderately well-supported by relevant material, including some appropriate use of examples. Response features accurate geographical knowledge and reflects adequate understanding of the subject content relevant to the question.
2	6–9	Response is largely descriptive with limited analysis and evaluation. Response is partly coherent and may lack clarity in parts. Response is poorly supported by relevant materials, including the limited use of examples. Response features inaccurate geographical knowledge and poor understanding of the subject content relevant to the question.
1	1–5	Response is descriptive with no analysis or evaluation. Response is fragmented and lacks clarity. Response consists of unsupported assertions. Response features largely inaccurate geographical knowledge and a lack of understanding of the subject content relevant to the question.
0	0	No creditworthy response

3	“Housing problems in cities in countries at lower levels of development can never be solved.” Evaluate this statement. Possible Approach: Candidates could approach the question by making a judgement on whether slum management strategies (e.g. public housing, site and services scheme, upgrading of poor neighborhoods) could solve housing problems in cities in countries at lower levels of development. They can do so through a consideration of two or more case studies of cities in LDCs. They could identify the contextual factors (e.g. level of development, level of community involvement, political will) that allowed these strategies to be more successful in one city over another. Levels marked using Generic Level Descriptors for 20m H2 essays. AO3	20
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4	“Contemporary climate change impacts everyone in the same way.” Evaluate this statement. Possible Approach: Candidates could approach this question by making a judgement on whether impacts of contemporary climate change affect everyone in the same way by considering criteria such as a temporal scale of the impacts, geographic location, demographics, adaptive capacity and the ability of the country to recover from the negative impacts, ability of the country to maximise the positive benefits. Students can consider can be both negative and positive impacts, such as changing crop yield and impact on food security, water scarcity, flooding (coastal, inland, fluvial - caused by sea level rise, increased rainfall, storm surge from tropical cyclones), spread of vector-borne diseases. Levels marked using Generic Level Descriptors for 20m H2 essays. AO3	20
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