

Marking Scheme for JC2 H2 Geography

Prelims

Section A – Tropical Environments

1 (a) Explain the factors influencing rainfall distribution in the humid tropics [12]

Indicative Content

Candidates should consider both the **spatial** and **temporal** rainfall variations that exists across the humid tropics. Responses should describe the variations across the 3 climatic types (Af, Am & Aw). Factors to explain these variations should include global scale like migration of ITCZ, ENSO, Monsoons and localized scale like relief/topographic effects on onshore wind flow.

A higher level response will offer detailed explanation of the factors focusing on ITCZ, seasonal variation of monsoonal winds and at least localized factor accompanied by well annotated diagrams (e.g. location of ITCZ on the World Outline Map, ENSO, formation of orographic rain. Responses that make reference to places in the climatic zones should be credited with higher marks.

Levels marked using H2 generic level descriptors for 12m SEQ sub-part (a)

(b) The interplay of climate and geology explains the variation in the karst landscapes in the humid tropics.' Discuss this statement with support from relevant diagram(s).

[20]

Indicative Content

Karst landscapes in the humid tropics have characteristic surface and sub surface morphology as a result of the interaction between water and geology. Candidates should demonstrate the movement of both surface water (rivers) and sub-surface river and water and the dissolution processes of the rock type (limestone or dolomites) and rock structure. A variety of surface landforms such as cone, tower and isolated karst and surface landforms such as cave and speleothems could be used to illustrate the movement of water affect the geology or vice versa. Other factors that could influence the karst landforms could be tectonic uplift, vegetation and time.

A higher level response should demonstrate the differential erosion by water on the soluble rock guided by secondary permeability of the rock structure. This is evident through the varied landforms found in the landscapes. Evidence of the varied landscapes can be seen. The counter argument to the statement could examine the present of other factors such as tectonic uplift in changing the dynamic of solution processes to enhance the forms of the landforms over time. Reference to concrete examples of karst landscapes in Guilin, China or Vietnam and Malaysia should be credited. A good response could use the carbonation equation to demonstrate the dissolution of limestones in sub-aerial to shape the landscapes and movement of water in sub-surface especially in cave resulting in varied forms of speleothems.



Eunoia Geography Unit JC2 H2 Geography Prelims Examination

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2(a) Explain the variations in the drainage basin water balance within the tropics $[122]^{18}$

Indicative Content

The drainage basin water balance differs between climates in the tropics as well as over time. In general, it should be noted that the drainage basin water balance in the humid tropics is in surplus, whilst it is in deficit in the arid tropics. Students should establish the differences in drainage basin and provide relevant explanation to the differences, making close reference to the components of the hydrologic cycle (ie: inputs, flows / stores, output). Higher level responses should identify that the drainage basin water balance varies over time as well, especially so for seasonally humid / arid climates (Af, Aw, BSh, BWh).

2(b) 'Channel patterns constantly evolve as a result of different physical conditions'. Discuss this statement with support from relevant diagram(s).

Indicative Content

Physical conditions refer to the climatic and geological conditions of the drainage basin. Different climatic and geological conditions influence river discharge and hence the amount of energy possessed by the river to do work (ie: fluvial erosion, transport, deposition). In general, students should establish that drainage basins with constantly high discharge gives rise to high-energy river systems that facilitate the formation of meanders, whereas basins with high discharge variability promotes erosion and deposition leading to braided channels. Such channel patterns also evolve due to the geological conditions of the channel (eg: erodability and cohesiveness of beds and banks). Ultimately, students should be able to conclude if climatic and geologic conditions are fully responsible for the development of channel patterns. Higher level responses should explore the influence of other activities or conditions that would influence the development of channel patterns. These other factors could include natural events such as mass movements; or human activities such as deforestation, hard engineering efforts to manage floods. Students could also explore the impact of global climate change on the drainage basins and hence effects on channel patterns.

Synoptic links: Floods (Topic 1.2), Deforestation (Topic 1.2), Climate Change (Topic 3.1)



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Section B – Development, Economy and Environment

3 (a) Explain how the core-periphery and dependency theory help in understanding [12] development in low income countries

Indicative Content (low income countries)

The centre–periphery (or core–periphery) model is a spatial metaphor which describes and attempts to explain the structural relationship between the advanced or metropolitan 'centre' and a less developed 'periphery', either within a particular country

Stage 1 – The first stage refers to an **underdeveloped region characterized** by the prevalence of primary production activities. In this stage, independent local centres with no hierarchy represents the pre-industrial (agricultural), pre-colonial stage and is associated with a series of isolated selfsufficient local economies and a small scale settlement structure. Many low income countries have a huge primary sector focused on agriculture, with little surplus goods being produced.

Stage 2 – Backwash Effect. The centre core 'feeds' on the rest of the nation, and the extensive periphery is drained. This is also known as the **"backwash" effect**, where by population migrations, trade and capital movements all converge on the key growth points of the core region. Low income countries will be drained of talent and resources.

Stage 3 characterizes the eventual development of a single national centre with strong sub-cores and peripheries. The simple centre-peripheral model has progressively transformed to a multi-nuclear one with the development of sub-cores and peripheries.

New sub-cores start to develop due to economic growth and diffusion from the core region (**spread effect**). This may also be due to governmental intervention to stimulate growth and development in the periphery, by the process of decentralization due to increase in production costs (mainly labour and land) in the core area. Low income countries will be benefit from the "spread effect" as production activities move to these areas (e.g. global shift of manufacturing or services) to India.

In a historical sense, dependency theory looks at the **unequal power relations** that have developed as a result of **colonialism**. As a result, surplus value was extracted from the peripheral and transferred to core regions, and from LDCs to DCs.

Dependency theory has relevance and currency in today's context. Although colonialism has collapsed after the 2nd World War, its legacy continued in the form of *neo-colonialism*. International finance and capitalism became the preferred methods of control over LDCs. As a result, many LDCs has a significant of debt. For example, 25% of aid received by African countries each year is used to repay debt rather than build infrastructure. LDCs also suffer from a reliance on importing finished goods and exporting natural resources.



3(b) 'The state is no longer important with the presence of other actors in the global **[20]** economy'. To what extent do you agree with this statement?

Indicative Content

Candidates should discuss this statement in relation to the global economy (one that is interdependent, inter-connected, integrated and ICT enabled). Most scripts were able to discuss this in relation to other actors in the global economy but they differ in terms of the amount of details/alignment to the question.

While the provision of public goods is a relevant role of the state, it is not sufficient for candidates to say how they would improve the welfare of the people without relating to how it would impact the global economy. For example, how these public infrastructure would make the country have the basic facilities and amenities that would attract FDIs and labour flows into the economy. In addition, the state can invest in home-grown corporations (e.g. Chaebols

Better scripts were able to highlight that the significance of the state can differ between that of more developed and less developed countries (e.g. through their involvement in political decisions in international organisations).

Possible Synoptic Links:

3.1 Sustainable Development, e.g. how states play an important in ensuring efforts to attain SD at the national scale or 3.1 Climate Change – how different states collaborate within a supranational framework (e.g. Paris Climate Agreements) to mitigate a global issue.



4 (a) Explain how Thomas Malthus and Ester Boserup view the relationship between population and resources.

Indicative Content

Thomas Malthus and Ester Boserup saw the relationship between population and resources at 2 ends of the spectrum – the former taking on the pessimist 'doomsday' approach whilst the latter taking on an optimistic/cornucopian stance. In approaching this question, students should adequately explain the premises in which both the nature of relationship between population and resources. Specifically, whether the humankind (population) is seen as consumers or producers of resources; as well as the regenerative potential of resources. Higher level responses would also highlight the common ground established by both perspectives.

4(b) Assess the success of strategies used to manage transboundary sources of water supply and associated conflicts.

Transboundary sources of water supply present challenging situations for riparian states and hence the conflicts are associated with quantity, quality, timing and reliability. In assessing the success of strategies, students should identify that these strategies require specificity in tackling the associated conflict, and are more effective when employed at both the regional and local/community level. Students should surface a variety of transboundary rivers and associated conflicts in evaluating the strategies. Higher level responses should identify that every river is unique and the success of strategies would hinge upon whether it would allow riparian states to achieve desired outcomes on economic, social, environmental and political dimensions, and at a larger scale, attainment of sustainable development goals.

Synoptic links: Understanding Development (Topic 2.1), Sustainable Development (Topic 3.1), Sustainable Urban Development (Topic 3.2)



Section C – Sustainable Development

5 (a) Explain how *ecological footprint* and *urban metabolism* are important in the [12] understanding of sustainable urban development in cities with high resource use.

The EF is a resource management tool that **measures how much land and** water area a human population requires to produce the resources it consumes and to absorb its waste under prevailing technology and socioeconomic conditions. It is calculated based on the total area of productive land and sea required per person to meet their food, energy, raw material, water and waste disposal needs.

The significance of the ecological footprint is conditioned by 3 key factors:

- The rate of population growth
- The levels of development and consumption
- The nature of available technology

Associated concepts of carrying capacity and ecological overshoot should also be addressed. A higher level of response would make specific reference to EF values of certain countries

Urban Metabolism- **The Rogers models** (Figure 1) compares an unsustainable city with a sustainable city. Using a systems approach, notice the differences in the amount of inputs and outputs, and the important roles of recycling and pollution control in the sustainable city





(b) To what extent is it difficult but necessary to measure sustainable urban [20] development?

Indicative Content

Candidates should address both key words of "difficult" and "necessary".

"Difficult"

- 1) Highlight that there are indicators to measure SUD but these are fraught with limitations.
- 2) Broad and ambiguous meanings of SUD which are subjected to different interpretations. The more "qualitative" aspects of SD is hard to measure. How can values of justice or equity be measured?
- 3) Nature of SUD idea of trade-offs. While one aspect of SUD is being achieved, other aspects may be compromised.

"Necessary"

- 1) SUD comprises various dimensions and can be contextualized to a regional scale (e.g. European Green City Index, China Urban Sustainability Index)
- 2) While it is difficult to measure the "end state", assessment of SUD can be seen as a process, such that city governments can work towards SD at the urban scale.
- **6 (a)** Explain why hydropower and **one** other energy source are considered [12] sustainable alternatives to fossil fuels.

Indicative Content

Other energy sources could include nuclear power, biofuels, solar energy, wind energy and geothermal energy. Candidates should address the term "sustainable" which can be understood to be less pollutive, higher energy security and a lower probability of catastrophic events

A higher level response should cover why fossil fuels are not considered sustainable and how hydropower and the chosen energy sources are considered to be sustainable alternatives.

Levels marked using H2 generic level descriptors for 12m SEQ sub-part (a)

(b) 'International cooperation is crucial for the successful mitigation of and [20] adaptation to climate change'. To what extent do you agree with the statement?

Indicative Content

Responses should include a discussion on the extent that international cooperation is crucial to the successful mitigation of and adaptation to climate change. There should be recognition of other factors other than international cooperation that are relevant to the examples used. Reasons should be provided on why one factor is more crucial than another.

A higher level response would be able to discern the differences in approach for mitigation of and adaptation to climate change and highlight how the role of international cooperation might be more important for one than another.



Marking Scheme for JC2 H2 Geography MYE (P2)

Theme 4: Geographical Investigations

1 The Marina Bay area is an extension of Singapore's Central Business District. During the 1970s and 1980s, the government reclaimed land to develop the area into a world-class destination. Marina Bay is currently envisioned as a vibrant 24/7 and sustainable mixed-use district where people live, work, play.

A group of 25 students from Goodwill Junior College wanted to examine the impact of urban imaging of the Marina Bay area on different groups of people living in the city. The students took 3 days during their June vacation to conduct the study via site observations and the use of a questionnaire survey on 100 respondents, administered at the entrance of the Marina Bay Sands integrated resort. They also have access to secondary data including photos and a land-use map.

Resource 1 shows the photos of the Marina Bay area before and after development. Resource 2 shows the current land-use map of the Marina Bay area. Resource 3 shows an excerpt of the survey questions crafted by the students.

 (a) Suggest a research question for the investigation and explain three reasons why it is of a suitable scale. [4]

Research question:

- How has the urban imaging of the Marina Bay area impacted the people living around the area?
- What are the social and economic impacts of the imaging of Marina Bay area on the people living in the area?
- To what extent has the urban imaging of the Marina Bay area affected different groups of people living in the city?

Suitable scale:

- The investigation is contained within the Marina Bay area which is within walking distance from one point to another (area is about 1.5km by 1.5km)
- 25 students can be grouped into 5 groups of 5, suggesting that there is enough manpower to conduct 100 surveys
- There is sufficient time for the students to complete the investigation, also given that it is conducted during the June holidays
- The investigation is focused on the people living in the area, which is manageable for the students
- (b) Explain how Resources 1 and 2 are useful as secondary data to a group of students carrying out this investigation on the impact of urban imaging of Marina [5] Bay.
 - Resource 1 provide good contrast between the Marina Bay area before and after imaging over a span of 20 years, which will allow students to visually see the change in urban image of the area over time. From here, they will be



able to make initial conclusions on the level of urban liveability brought about by the changes.

- Resource 2 indicates the landuse of the area, which allows the students to identify the type of landuse that has been added to the area as part of the imaging efforts.
- Resource 2 as a map provide students with a sense of the size of the area and allows them to measure the distance between amenities, which could deepen their understanding of the aspects contributing to the liveabiliy of the area.
- Resource 2 is also useful as a base map for student to delineate the areas in which they would conduct their surveys
- (c) With reference to Resource 3, describe an appropriate method to represent the data that would be obtained. Outline one advantage of the chosen data representation method.

[3]

Appropriate data representation & advantage(s):

- Bar chart
 - Display relative numbers or proportions of multiple categories
 - Summaries a large data set in visual form
 - o Clarify trends better than tables
 - Estimate key values at a glance (good visual representation)
- Pie Chart
 - o Display relative proportions of multiple classes of data
 - Size of the circle can be made proportionate to the total quantity it represents
 - o Summarise a large data set in visual form
- (d) Your group concluded that some of the data collected may not be completely reliable and/or accurate.

Explain how the process of data collection could be improved.

[5]

Reasons why the data collected may not be completely reliable / accurate & proposed improvements

- Issue with question too broad and subjective (eg: different groups of people covers a large range and respondents are required to respond to a whole range rather than a specific type; 'needs' may refer to a variety of needs)
 - To provide specific groups of people (eg: elderly, handicapped, migrants, children, etc) and needs (eg: entertainment, safety, etc) for respondents to respond to
- Issue with study group in survey respondents may not be able to accurately
 differentiate between 'residents' and 'expatriates', or have not interacted with
 them to respond to the survey question, leading to an inaccurate assessment
 on whether Marina Bay will serve their needs



- To further refine the question based on the profile of the respondent and for them to respond if their own needs have been met
- Issue with data collection method it was not about the sampling method used, and whether it is consistently used for all groups, leading to unreliable data
 - To standardise a stratified sampling method based on age group, profile (local vs expats), gender
- Issue with data collection method administered at the entrance of the Marina Bay Sands integrated resort which would only provide a narrow profile of respondents, leading to a skewed data, unrepresentative of the actual population
 - To conduct survey at multiple points within the Marina Bay area which will capture a more representative target group.
- (e) The Urban Redevelopment Authority (URA) has asked the group to gather information to assess the success of urban imaging of Marina Bay. Outline how the group would go about collecting the information.

To assess the success of urban imaging of Marina Bay, students should:

- Craft an appropriate research question for the investigation
- Identify the appropriate target group and data collection methods
- Consider issues like ethics when conducting the investigation

Level	Marks	Descriptors
3	7-8	Insightful response in employing the various sources of data (both primary and secondary). Considerations in the GI are clearly identified and appropriately addressed. Response shows good knowledge and understanding of urban imaging and GI methods.
2	4-6	Able to use a few data collection methods but may leave out on either the primary or secondary data collection. Response may be unbalanced or lacking in details.
1	1-3	Response shows some knowledge and understanding of data collection methods. Strategies used may be generic to fieldwork but of limited relevance to the context.

Levels marked



Section B

Theme 1: Tropical Environments

Climates and Hydrological Systems in the Tropics

- 2 Resource 4 shows the global distribution of average annual solar radiation received on the Earth's surface. Resource 5a and 5b show the annual climates of Manaus, Brazil (latitude 3^oS) and Kano, Nigeria (latitude 12^oN). Resource 6 shows the changes in bedload particle diameter and distance from the source of a river in Manaus. Resource 7 shows the drainage pattern of two drainage basins.
- (a) With reference to Resource 4, explain the variations in the global distribution of average annual solar radiation received on Earth's surface. [6]

[Description of Variation] – Maximum 2 marks

Higher amount of average annual solar radiation within the tropics (between 23.5°N and 23.5°S), ranging from 150-275 watts per square metre.

Highest insolation found received in the tropic of Cancer and Capricorn, e.g. 275 watts per square metre in the Middle East, or 225 watts per square metre at Australia.

Lower amount of average annual solar radiation outside of the tropics (decrease polewards), ranging from 275 to 75 watts per square metre

[Explanation]

Higher amount of average annual solar radiation due to axial tilt of the Earth - higher angle of incidence in the tropics and the smaller distance travelled through the atmosphere.

Angle of Incidence- high angle of incidence means that the amount of insolation would be spread over a smaller area and be less diffused.

Smaller distance travelled across the atmosphere – less insolation will be lost by scattering and reflection by the atmosphere.

Cloud Cover – Lack of cloud cover (due to the permanence of the Sub tropical high pressure belt) means that there are less clouds to reflect and scatter the amount insolation received.

(b) Contrast the climates of Manaus, Brazil and Kano, Nigeria using Resource 5a [5] and 5b.

[Differences] in terms of temperature and rainfall

Temperature –

Manaus- **constant average** of about 26°C with **small annual range** of about 2 degrees celcius. In contrast, **two peaks of temperature (**34 degrees) experienced in April and October (30.5 degrees). Annual temperature range of about 8 degrees celcius.



Rainfall-

[Seasonality of Rainfall]

Receives rainfall throughout the year, ranging from 45mm to 260mm. This is opposed to the distinct wet dry seasons in Kano (dry season – Nov- April, and wet season (March – September).

[Peak and Least Rainfall] Least rainfall in Aug (45mm) in Manaus, Brazil compared to peak rainfall of 260mm in Kano, Nigeria.

[Total Amount of Rainfall] – Manaus receives about 1780mm, as compared to 850mm in Kano.

- (c) Using Resource 6, describe the changes in bedload particle diameter with increasing distance from the source of the river.
- [4]
- Maximum particle diameter decreases from 120mm (2km) to 110mm (4km) to 90mm (6km).
- Slight/marginal increase in minimum particle size, 24mm (2km) to 28mm to 32mm (6km).
- No change in median particle diameter at about 60mm.
- Middle 50% of particles largest range (42mm) decreases to about 36mm, which decreases to (30mm). Note increase in size in the middle (50%), from 4km to 6km.
- (d) Explain two fluvial erosional processes that have led to the changes in bedload particle diameter in Resource 6. [4]

Corrasion – refers to the scratching and scraping of the river bed and banks by the load carried by the river (largely by bed load).

Attrition - refers to the breakup of the load itself into small, angular fragments as a result of collision and mutual scraping of the load.

(e) With the aid of a diagram(s), explain how and why the characteristics of hydrographs would differ between the two drainage basins shown in Resource [6] 7.

Candidates should point out that the drainage density for Basin B is higher than that of Basin A, given the same basin size.

[HOW] Hydrograph of Basin B would demonstrate a flashier hydrograph, with a steeper rising limb, higher peak flow, steeper falling limb, and lower base flow.

[WHY]

Lack of Vegetation in Basin B – What impact does it have on overland flow and amount of infiltration?

Higher Drainage Density in Basin B – Channel flow > throughflow processes. Also less distance travelled by various pathways to reach the river channel.



- 3 Resource 8 shows the nature of Foreign Direct Investments in Vietnam from 2012 to 2017. Resource 9 shows the number of labour workers employed by Nike worldwide. Resource 10 shows the annual and hourly minimum wage of selected countries. Resource 11 shows an excerpt of an article on new laws in Vietnam seeking to attract foreign investments.
- (a) With reference to Resource 8, describe the changes in Foreign Direct Investments and number of new projects in Vietnam from 2012 to 2017.
 - In general, FDIs have increased from 2010 to 2017, with a steady increase in terms of realised capital (quote values)
 - In terms of new registered and added capital, there has been some fluctuations (increase between 2012 and 2013, decrease from 2013 to 2015 and a steady increase from 2015 to 2017)
 - The number of new projects have increased from 2012 to 2016, with about double the number of new projects. There is a slight dip in the number of projects from 1408 in 2016 to 1378 in 2017.
- (b) Using Resource 8 and your own knowledge, suggest reasons for the relative significance of *Processing-manufacturing* in the structure of Vietnam's economy.
 - The processing-manufacturing sector has received the highest FDI in the period, with 10.83b (49.4% of total FDI)
 - Possible reasons could include:
 - Vietnam being an industrialising country which has attracted a high number of projects related to the processing and manufacturing of products
 - Relatively ideal location within southeast Asia for shipping of processed goods to other parts of the world
 - Role of government in promoting the sector
 - Availability of cheaper labour that has attracted TNCs to relocate their processing plants to Vietnam.
- (c) Using Resources 9, 10 and your own knowledge, explain why Nike employs labour workers from around the world.
 - Footloose nature of Nike as a TNC allows them to locate / outsource their production plants to tap on the skills and affordable labour (countries with comparative advantage) -
 - This is seen in R9 where nearly 1 million workers are employed from 744 factories worldwide.
 - In R10: the minimum wage for India, Indonesia and Vietnam are lower, which corresponds to the high number of workers employed in these countries.
 - China, which has the highest minimum wage, are valued for the skills for higher value added processes
 - Production plants are located near consumer markets
 - To offset shipping costs of finished products in order to increase revenue and maximise profits
 - This is shown by factories present in emerging markets in Asia (esp South Asia) and South America (R9)



(d) Using Resources 8, 10, 11 and your own knowledge, evaluate the extent to which Vietnam can be considered competitive in the global economy.

There is no right or wrong answers to this question as the students are to provide a response to whether Vietnam can be considered competitive in the global economy, and provide support from the respective resources.

Vietnam is considered competitive:

- *R8:* Positive growth new and added capital year on year with increasing realised capital despite a slight dip in number of new projects
- *R8: a strong performance in processing-manufacturing sector indicating that they are able to attract TNCs*
- R9: Largest number of workers employed by Nike and 2nd largest number of factories indicating strong attraction
- R11: Relevant and targeted laws aimed at attracted FDI in bid to increase competitiveness

Vietnam is not considered competitive:

- R8: Dip in number of new projects since 2017 may indicate lost of competitiveness to other countries
- R8: Most FDI in processing-manufacturing sector which is less value adding than other sectors such as R&D
- R9: Not conclusive if Nike is the significant TNC it hosts; or a signal of high dependency on one TNC for its economic development
- R11: despite new laws enacted in 2015, number of new projects have declined from 2016 (may indicate that the law has little effect in increasing competitiveness)
- R11: facing challenges in maintaining sustainable development

Level Marks Descriptors

7-9

3

- Response demonstrates a clear knowledge and understanding of the context in the question.
 - Uses relevant, detailed and accurate factual information and conceptual understanding.
 - Reflects strong critical thinking skills and may include perceptive insights for the strongest responses.
 - Source(s) is well used to support the response.
 - Provides a logical and well-developed evaluation well founded on evidence and/or different viewpoints.
- 2 4-6 A satisfactory response which is generally sound and contains relevant points, but may not always focus on the context in the question.



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- Uses factual information and conceptual understanding that is generally appropriate to the given context but lacks detail and may contain some inaccuracies.
- Displays general critical thinking skills.
- Source(s) is used to support parts of the response.
- Provides an evaluation, which may be limited in depth and sufficient elaboration in some parts.
- 1-3
 Response shows a poor understanding of the context in the question.
 - Uses basic factual information and conceptual understanding which has some, but limited relevance to the question.
 - Source(s) is not used or not accurately used to support the response.
 - Provides little or no evaluation
- 0 No creditworthy response.
- 0



Theme 3 – Sustainable Development

Issues of Traffic Congestion and Liveability in New Zealand

- 4 Resource 12 shows the changes in spatial distribution of elderly population in New Zealand from 2011-2031. Resource 13 shows the main means of travel to work in Auckland and Wellington. Resource 14 shows the current (2015) and proposed (2030) rail network in Auckland. Auckland is a major city in New Zealand's North Island and Wellington is the capital of New Zealand.
- (a) Describe the spatial distribution of elderly population in New Zealand in 2031, seen in Resource 12. [3]
 - Generally higher in the southern parts of New Zealand ranging from 22.6-27.5%.
 - Highest in the north-western states (West Coast, Tasman and Nelson) of the southern part and the northernmost part of New Zealand with more than 27.5% of the population being elderly.
 - Lowest in the state of Auckland with 15.1-17.5%.
- (b) Explain three limitations of Resource 12 in representing changes in spatial distribution of elderly population in New Zealand from 2011 to 2031. [5]
 - Only shows changes to proportion of elderly over time but not the absolute increase Difficult to implement policies targeted at the elderly because of uncertainty of whether the number has actually risen. It could be a change in total population size rather than the number of elderly.
 - Variations within each state is not shown There might be variations within each state but it is difficult to represent in a choropleth map.
 - Abrupt change at boundaries Not reflective of the possibly gradual change between boundaries.
- (c) Using Resource 13, compare between the main means of travel to work by employed population in Auckland and Wellington. [4]

Similarities

- The highest percentage for both Auckland and Wellington is via private care, truck or van with 59% and 37% respectively.
- The lowest percentage is also similar for both cities with public bus having only 2% in Wellington and 3% in Auckland.

Differences

- The percentage of working population who travel to work via train in Wellington is significantly more than Auckland at 21%.
- Even though the highest percentage for both cities is in private vehicles, it is significantly higher in Auckland by 22%.
- (d) In February 2018, the NZ Herald wrote that Aucklanders, on average, spend 80 unproductive hours on the road in a year due to traffic congestion. With reference to Resource 13, account for the causes of traffic congestion faced in Auckland.
 - [4]
 - Resource 13 shows that the percentage of population who drove to work whether via private car, truck or van or the company car, truck or van totalled 77%.
 - This would equate to significant traffic on the road, especially during peak hours.
 - Only 4% of the working population were passengers in car, truck van or company bus which showed the lack of car-sharing/pooling in Auckland. Public transport also only came up to 6% of Auckland's working population.
 - All these lead to build-up of traffic on roads and hence traffic congestion.



(e) Using Resources 13, 14 and your own knowledge, evaluate the strategies that the Auckland city government can implement to ease traffic congestion in the city.

[9]

Indicative Content

Candidates should combine their knowledge of the causes of traffic congestion from their own knowledge as well as that shown in the Resources and suggest suitable strategies to ease traffic congestion in Auckland. For example, Resource 14 shows the current and proposed rail network in Auckland. Candidates should not that Resource 13 shows that majority of Auckland's working population travel to work via private transport or company car, van or truck and only 3% commute via train. Improvements to the **accessibility** and **connectivity** of the rail network will hopefully encourage more commuters to use the public trains to travel to work instead.

A higher level response will recognise that a multi-pronged approach is necessary and it is insufficient to merely improve public transport networks. The mindset of the people with reference to using private transport has to be changed as well.

Levels marked using H2 generic level descriptors for open-ended 9m DRQ on Themes 1,2 and 3