



**Geography Teachers'
Association of Victoria Inc.**
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GEOGRAPHY

Trial Examination Paper, 2023

GUIDELINES FOR STUDENT RESPONSES

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Note: Numbers in brackets indicate the number of marks allocated

Question 1 (9 marks)

a. (4 marks)

Students need to assess the change in the extent (colour) of deforested areas across the two maps as well as the distribution of deforested areas across the country by using directional terms in their examples.

This question requires the following to receive full marks:

- General statement of overall change to land cover distribution (1 mark).
- Statement of overall change to the extent of deforestation over time (1 mark).
- Identify specific areas of change to the distribution and extent of deforestation (1 mark).
- Refer to examples and provide quantification from Figure 1 (1 mark).

Figure 1 shows a more widespread distribution of deforestation has occurred in Malawi between 2009 and 2015. Yet the extent of area affected in any one location has reduced. Throughout the country there is a more even distribution of deforested areas between 20-65 ha by 2015. Large areas in the south show an increase in deforestation of between 100-400 ha per cell over the 6 years between 2009 and 2015. However, deforestation in the central-north has reduced over this time from a large area where more than 1000 hectares were deforested in 2009 to >400 ha by 2015.

b. (2 marks)

As this question is worth 2 marks, it is not expected that students will define or explain the process of remote sensing but instead outline how it could be useful in managing deforestation over time.

This question requires the following to receive full marks:

- Explain how remote sensing can be used as a management strategy to assess forest cover loss (1 mark).
- Refer to examples from Figure 1 (1 mark).

Satellite imagery is one of the main forms produced by remote sensing that can be used over time to track change (as in Figure 1). In some cases data from remote sensing can help model predicted patterns for future management or mitigation if the information is indicating an undesirable outcome such as the loss of forests in the centre of Malawi. Policy decisions can then be made in response to the GIS and reactionary management or mitigation can take place, such as the reafforestation of the central west region in Malawi.

c. (3 marks)

Students should refer to a specific form of geospatial technology such as GIS, GNSS, satellite imagery or other products of remote sensing at a location they have studied. They should not refer to more than one geospatial technology.

This question requires the following to receive full marks:

- Describe the use of one geospatial technology at a selected location (1 mark).
- Evaluate the effectiveness of the geospatial technology in managing land cover change at this location (2 marks).

In the Amazon Rainforest in Brazil, geospatial technologies have been used to track deforestation and inform management policies with varying degrees of success. PRODES (Program to Calculate Deforestation in the Amazon) is a monitoring program which relies on LANDSAT satellite images which are taken at the same time each year. These images are then uploaded onto a GIS map which can be compared with previous years to illustrate deforestation or reforestation. The drawbacks to this system is that it only records data every 12 months, it can't detect areas smaller than 6.25ha and is limited to detecting rainforest areas only. As a result, the management and detection is reactionary at best. Despite these limitations, the program has been associated with management policy that has correlated to a drop of up to 70% in deforestation rates since its inception in 1978.

Question 2 (6 marks)**a. (1 mark)**

Students need to accurately classify the region of glaciers which contribute most to domestic water use as the Tropical Andes.

b. (2 marks)

To distinguish between the domestic use of glacial meltwater in each country, students need to pay careful attention to both the number of people symbolised in Figure 2 and the colour of the legend symbol (red or black). Carefully considering both the number of people and the colour of the symbols will highlight the population's reliance on glacial melt as its main source of water.

This question requires the following to receive full marks:

- Identify Peru as the country where glacial melt provides the main source of domestic water use, with supporting data (1 mark).
- Identify Bolivia as the country where glacial melt is used by the most people for domestic water use, with supporting data (1 mark).

In an optimum melt period it is Peru where the population most heavily rely on glacial melt as their source of domestic water, recording 203 000 people who use melt water for 80-100% of their daily needs. While Bolivia records a larger population that use

glacial melt overall at 515 400, over 500 000 only use it for 45-80% of their daily needs.

c. (3 marks)

This question requires the following to receive full marks:

- Outline a weak interconnection between long glacier length and contribution towards domestic water use (1 mark).
- Explanation of the interconnection with supporting data from Figures 2 and 3 (2 marks).

Figures 2 and 3 indicate that there is a weak interconnection between long glaciers and high domestic water use in South America. Most glaciers in the northern region of the Tropical Andes are between 5–20 km in length yet support 875,400 people with domestic water. In the southern region of the Wet Andes, glaciers range between 15–40 km in length but the melt water only supports 351,000 people, which is less than half of the Tropical Andes population.

Question 3 (9 marks)

a. (4 marks)

In this response, students may refer to past, current or future modelled data to show how anthropogenic climate change is continually impacting the process of glaciation at a specific location.

This question requires the following to receive full marks:

- Demonstrates understanding of anthropogenic climate change (1 mark).
- Clearly articulates an understanding of glaciation processes (1 mark).
- Predictive statement about impact of anthropogenic climate change on glaciers (1 mark).
- Reference to a specific location (1 mark).

Anthropogenic climate change (ACC) is the acceleration of natural climate change processes through changing land cover, burning fossil fuels and the increased pressures brought about by global population which has increased from 1 to 8 billion in just over 200 years. One of the greatest associated problems of ACC is global warming, with average global temperatures being 1 degree warmer than they were 40 years ago. Increasing temperatures interfere with the process of glaciation, seeing a retreat in most world glaciers and ice sheets. This is occurring in New Zealand's Franz Josef Glacier which has retreated 2.25km in the last 100 years.

The accumulation of ice and snow at the head of the glacier can now be less than the ablation of ice and water at the terminus as melt rates are increasing due to increased temperatures. Without a reduction in the rate of global temperature increase as a result of ACC, one would predict that the rate of ablation of glaciers will continue to

accelerate and will eventually outstrip accumulation completely seeing a loss of glaciers on a global scale,

b. (4 marks)

This question requires the following to receive full marks:

- Describe the social and economic impacts of melting ice sheets and glaciers (2 marks).
- Explain the interconnection of impacts at case study location (2 marks).

In Greenland there are several social and economic impacts of melting ice sheets and glaciers (MISAG), especially in the southern regions such as Narsaq and Qaqortok where the melt rate is greatest. These occur at both national and local scales and can be closely interconnected. The main social impacts of MISAG seen in Greenland are unemployment, loss of indigenous way of life, social diseases such as HIV/AIDS and alcoholism/drug use. This is compounded by the younger working age population leaving to find work in Europe or the USA. Historic hunting and fishing grounds have been lost and are continuing to decline due to the ice sheet retreat. Traditional employment based on these areas, such as the fishing industry and indigenous lifestyles are being impacted by this. Drug use and alcoholism have become more common as indigenous people no longer have employment and are finding other options to fill their days. This places stress on the economy of the region with a limited workforce to contribute to the GDP (currently about 3 Billion USD). With increasing interest from international investors in the mineral deposits which have become increasingly easy to access due to the retreating ice sheet, mining of rare earth elements and sand are replacing the traditional fishing and hunting based economy and theoretically provide potential jobs for Greenlanders and a boost to the GDP. However, in reality what has emerged is a 'fly in fly out' transient international workforce made up of mostly young men. This results in further social displacement of Greenland's youth and disillusionment with the social and economic stability of the region.

Question 4 (8 marks)

Students need to compare an appropriate local and national response to the environmental impacts of either melting glaciers and ice sheets or deforestation.

6–8 marks	The response is very clear and answers all aspects of the question in detail. It includes: • a clear contention outlining support or not for statement (1 mark) • a clear description of the location and context of their answer e.g. deforestation in the Amazon or melting ice sheets or glaciers in Greenland (1 mark) • a concise outline of the chosen national and local responses to an environmental impact (2 marks) • a discussion of the success or not of both strategies including elaboration and statistics (3 marks)
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	• a comparison of the success of both responses with a logical justification based on evidence. (1 mark)
3–5 marks	The response answers most parts of the question well. A good understanding of the question is demonstrated but some aspects lack sufficient detail. The response includes: • a brief outline of both responses • a statement of location or land cover change • a discussion of the success of both strategies • a basic comparison of the success of the strategies.
1–2 marks	The response does not adequately address the question or contains lots of incorrect information. Insufficient detail is included, and the student has not demonstrated an understanding of the relative success of a local and national response to an issue associated with land cover change at a location they have studied.

In Brazil, especially focussing on the Amazon region, grassroots or local responses have been equally effective at reafforestation/revegetation and environmental conservation of forests when compared to national initiatives. They each work best in synergy with the other.

One local initiative, the Tapajos-Arapiuns Extractive Reserve (TAER) initiative demonstrates that it is possible to revegetate areas of forest with the preservation of Indigenous communities as well as protecting large areas of forest. The reserve is approximately 648,000 ha in size and is found on the west side of the lower Tapajós river near where it flows into the Amazon. It is an IUCN category 4 protected area. Farmers in the area revegetate areas of forest with economically viable crop trees and also engage in subsistence farming. This action preserves existing forest cover and revegetates areas which have been disturbed or degraded. Since 1998 the program has experienced good success in preserving forests with a deforestation rate of 0.5% as compared to remote sensing data of surrounding non-preserved areas over the same period showing rates of up to 90%. Protecting forests also manages a range of environmental impacts from deforestation, such as loss of viable soil, excessive run-off and flooding, erosion and biodiversity loss.

Comparatively the Amazon Protected Areas Program (ARPA) in Brazil is the world's largest conservation management program. It was established in 2002 and is run by the federal government of Brazil and other NGOs who invest in the program. Its aims are to conserve and protect large areas of the Amazon as well as revegetating and managing those areas which had fallen into disrepair and had been ecologically damaged through erosion, loss of humus layers and the destabilisation of indigenous flora and fauna. Preventing the deforestation over the last 20 years in the region has prevented 1.4 billion tonnes of carbon dioxide from being released into the atmosphere

and thus has helped slow the effect of global warming. Overall, ARPA is responsible for a 75% decline in Brazil's deforestation rates since its introduction.

When combined ARPA and TAER work together. Neither is more effective than the other as they each have similar goals and both have similar success at preventing deforestation, protecting biodiversity and encouraging revegetation. Whilst ARPA has the backing of strong financial support to enact a larger scale response over a longer time period; TAER has the people on the ground, in place working to enact location specific responses which are targeted to beneficial environmental outcomes.

Question 5 (9 marks)

a. (No marks allocated)

Although no marks are awarded, students must identify the name of a site and location.

Martha Cove, Mornington Peninsula.

b. (3 marks)

This question requires the following to receive full marks:

- A statement explaining the land use change that has occurred (1 mark).
- A reason for the change e.g. the need for high density residential accommodation to meet social demands (1 mark).
- Contextual site-specific information and data (1 mark).

At Martha Cove on the Mornington Peninsula, a housing development of more than 700 residences, restaurant, general store and artificial marina have been constructed between 2004 and now, with the work ongoing. This land use change has been from agricultural and coastal scrubland surrounding the Tassels Creek to residential mixed use SUZ4. This makes it possible for integrated recreational and residential development at the site. One main driver for the change was social. The area as a seaside holiday location on the urban fringe of Melbourne, was perceived by some as unattractive for future inhabitants and businesses. Local government and developers saw a need for the establishment of more holiday rental and high-end holiday residential housing in the region to draw people back to Safety Beach. The inclusion of the marina with allotment for 280 plus boats made the location a more desirable place as people are now effectively buying into a particular lifestyle.

c. (6 marks)

This question requires the following to receive full marks:

- A statement naming and categorising each geographic characteristic (1 mark).
- A description of how each characteristic influenced the land use change (2 marks each).
- Contextual site-specific information and data (1 mark).

At Martha Cove on the Mornington Peninsula the process of land use change has been influenced by Mount Martha to the north, a natural geographic feature, and the existing suburb of Safety Beach to the south, a human geographic feature. Mount Martha limited the growth of Martha Cove due to the incompatible topography. As a man-made waterway it would be impossible to expand towards and over Mount Martha which reaches more than 160m above sea level as compared to the marina sitting below 10m asl. The suburb of Safety Beach to the south limited the expansion of the marina in that direction as it would not be cost effective to demolish an existing suburb to build the waterway and associated infrastructure. The site footprint of 94ha with a width of between 150m – 200m at the narrowest point was amply sized for purpose and any expansion to the south was unnecessary even were it possible.

Question 6 (6 marks)

Students are required to clearly identify two factors that contribute to population change in a country with a growing population. No marks awarded if students used a case study of a country with an ageing population.

This question requires the following to receive full marks:

- Description of two factors that contribute to population change (1 mark each).
- Explanation of the interconnection between the factors (1 mark).
- Supporting data or specific details for each factor (1 mark each).
- Outline how the interconnection causes population change (1 mark).

Two interconnected factors that contribute to population change in Niger are lack of education and early marriage. Niger is one of the fastest growing countries, with a total fertility rate (TFR) of 7.8 babies per woman. Niger's literacy rate is 30%, and less than 20% of Nigerien's complete secondary education. Niger has the highest rate of child brides, with 70% of girls under the age of 18 married, and 28% before they are 15. There is a strong relationship between them – the higher their education level, the less likely the girls are to be married. Eighty-one percent of women aged 20–24 with no education and 63% with only primary education were married or in union at age 18, compared to only 17% of women with secondary education or higher. In order to reduce their TFR, Niger needs to improve educational outcomes for girls, and also raise their marriage age.

Question 7 (8 marks)

a. (4 marks)

In this question students must examine two maps of Angola and compare population density and healthcare facilities.

This question would require the following to receive full marks:

- Identification of a moderate to strong spatial association between these two indicators (1 mark). A weak spatial association is not an acceptable response.

- Outline two examples of locations which support the spatial association described (2 marks).
- Provide supporting data from Figures 4a and 4b (1 mark).
- Students can include exceptions or the inverse (places with low population density have few clinics) but do not have to do so in order to receive full marks.

There is a moderate spatial association between population density and healthcare facilities. For example, in provinces such as Huambo with about 50% of its land urbanised, there are around 50 healthcare centres. Another example is Moxico, which only has one hospital and has less than 5% urbanised land. An exception is Luanda, which is highly urbanised but only has 2 hospitals and no healthcare clinics.

b. (4 marks)

This question asks students to build on their understanding of countries with a growing population, and link in not just population density, but total fertility rate as well.

This question would require the following to receive full marks:

- Suggest an appropriate location for each of the new healthcare centres (1 mark each).
- Support each suggested location with data such as TFR (1 mark each).

One location for a new maternal health clinic is Bie province. This has the highest total fertility rate (TFR) in Angola, with the average woman having more than 8 children. It does not have a maternal health clinic currently. Another location could be Huila province. This has a TFR of between 7.1 and 8 children per woman, and only currently has one maternal health clinic.

Question 8 (17 marks)

a. (No marks allocated)

Students need to name a country with an ageing population, and then answer both Questions 7a and 7b with regard to this country. No marks awarded in Question 8 if students identify a country with a growing population.

b. (3 marks)

This question would require the following to receive full marks:

- Clearly identify a population trend (1 mark)
- Explain this trend in relation to other countries in the region (1 mark)
- Provide quantification (1 mark)

Germany has a hyperaged population, with over 25% of its population over the age of 65 and only 13% of the population between 0–15 years. Germany sits within a large cluster of countries in Europe with an ageing population, including Poland and Italy.

There are other, smaller clusters of countries with an ageing population within east Asia and North America.

c. (6 marks)

Students need to clearly identify a population issue and associated challenge in a country with an ageing population. They should elaborate and provide supporting evidence in the form of statistics to support their statements. They also need to analyse the significance of the issue and challenge.

This question would require the following for full marks:

- Clearly identifying a population issue (1 mark) and an associated challenge (1 mark). Mark not awarded for challenge if they don't clearly connect.
- Outlining supporting data or elaboration of the issue (1 mark) and challenge (1 mark).
- Analysing the significance of the issue/challenge (2 marks) – the significance should be quantified by clearly identifying the scale or size of the issue.

One population issue in Germany is the high cost of healthcare. Currently Germany spends 13% of its GDP funding healthcare (the world average is 9.8%), and Germany is ranked second in the world for healthcare spending as percentage of GDP. This is partly due to the high hyperaged population – over 25% of Germany's residents are over 65 years of age. And 66% of these old-age people suffer from a chronic health condition. An associated challenge is that money for healthcare will have to be diverted from other things, such as childcare and education. As the youth population is decreasing, less money is being spent on this generation and the percentage of working age people is declining. With it predicted that one third of the German population will be retired by 2050, funding healthcare is a very significant population issue and causes the government economic challenges.

d. (8 marks)

This question requires students to clearly identify and outline a strategy or response and link it to the issue and challenge identified in part c. They then need to clearly identify their criteria and use this to evaluate the effectiveness of the strategy.

7–8 marks	Responses are very clear and have answered all aspects of the question in detail. They include: • Clearly outlining the strategy • Linking the strategy to the population issue and challenge • Supporting evidence and quantification • Clearly identified appropriate criteria • Evaluating the strategy/response against the above criteria
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5–6 marks	Responses answer most parts of the question but lack sufficient details in some areas. They include: • Strategy outlined • Link of strategy and issue/challenge may not be clear • A range of quantification and supporting evidence included • Evaluation of the strategy
3–4 marks	Responses address some parts of the question. A basic understanding of the question is demonstrated although responses lack sufficient detail and depth. They include: • Strategy not well defined or outlined • No criteria • Some quantification and supporting evidence might be included. • Evaluation may be attempted
1–2 marks	Response does not adequately address the question or contains lots of incorrect information. • Strategy not identified • Very limited quantification or supporting evidence • Evaluation basic or omitted

Question 9 (9 marks)

a. (2 marks)

This question would require the following to receive full marks:

- Clearly identify an element such as shape or age (1 mark) which positions it within stage 4 of the DTM.
- Provide quantification from figure 5 to support their response (1 mark).

One piece of evidence demonstrating it is in stage 4 is that the birth rate stabilised and then declined. This is shown by the even percentages at the 20–35 age groups (of 4 or 4.1%), and the gradual decline from 3.8% for 15–19 year olds, to 3.5% for 0–4 year olds.

b. (4 marks)

Students need to demonstrate an understanding of the demographic transition model.

This question would require the following to receive full marks:

- Explain the relevance of the DTM to global population trends (2 marks).
- Identify at least one limitation to this model (1 mark).
- Elaborate or provide a supporting example (1 mark).

The demographic transition model (or DTM) is a model used to help predict the stages a country goes through as it grows and changes over time. Most ‘western’ industrialised countries have followed this model – starting with high birth and death rates during the industrial revolution, before improvements in healthcare and sanitation meant a decrease in death rates, followed a while later by a decline in birth

rates once child mortality rates fell. Most of these countries are now in Stages 4 or 5. This shows us it is still relevant today. One limitation, however, is that the DTM does not take migration into consideration. This is clear in countries such as Germany, where the death rate exceeds the birth rate, but the total population is still slowly growing, owing to migration.

Question 10 (3 marks)

This question requires students to consider the link between migration and population structure. Many countries experience migration, however not all affect the population structure of a country. Students must select one country which clearly demonstrates that relationship.

This question would require the following to receive full marks:

- Explain how migration could impact a population structure (2 marks).
- Provide supporting evidence relating to a specific country (1 mark).

Migration can have a large impact on a country's population structure. The immigration of migrant workers can greatly alter the proportion of the population within a certain age cohort and possibly lead to an imbalance of men and women at a particular age. In the UAE approximately 50% of the population are men aged between 20 and 50 due to the large influx of migrant workers who travel to the UAE to work.