



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

Trial Examination Paper, 2022

EXAM B

GUIDELINES FOR STUDENT RESPONSES

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Note: Numbers in brackets indicate the number of marks allocated

Question 1 (7 marks)

a. (3 marks)

Students should see from the data that the overall pattern of change is one of retreat with greater rate of retreat in more recent years. One mark is awarded for this overview.

To be awarded the other two marks students need to provide evidence including dates and the average distance of retreat using the line scale on the figure. Students who provide no dates or distance evidence cannot be awarded a mark.

The Sverdrup Glacier has retreated significantly from 2000-2019 with a more rapid retreat occurring in more recent years. Between 2000 and 2015 retreat was approximately 4.5 km (at the widest point) over 15 years, whilst between 2015 and 2019 (a period of only 4 years) saw a retreat of approximately 3.5 km (at the widest point), with a large retreat of approximately 1.5km between 2016-2017. The direction of retreat from 2000-2015 was greater from the northwest edge of the glacier whilst between 2015-2019 there was greater retreat from the southeast edge of the glacier.

b. (4 marks)

Students need to refer to a specific location they have studied. This may be at a similar scale such as an individual glacier or may be a larger scale such as a glacial region or an ice sheet. Students need to outline their selected location and describe its land cover change (1 mark). Using this information, students need to state the extent to which the change is similar to the Sverdrup Glacier and glacial retreat more generally (1 mark). Students must provide evidence for their viewpoint in the form of specific information and data (2 marks).

Bhutan contains 677 glaciers, retreating at a rate of between 30 and 60 metres per decade. This is a slower rate than the retreat of the Sverdrup Outlet Glacier. Some of Bhutan's glaciers including Thorthormi Glacier are retreating at a faster rate. Thorthortmi Glacier retreated by 700metres between 2000 and 2014. However, this is not as fast as the rate of retreat the Sverdrup Glacier experienced from 2000 and 2015 (4.5 km). Thus, it can be concluded that the rate of retreat of Sverdrup Glacier does reflect glacier behaviour more generally, as glaciers are in retreat, worldwide. However, it does not reflect the rate of retreat found in all glacial regions.

Question 2 (13 marks)

a. (4 marks)

Students need to choose whether they are discussing social, economic, or environmental impacts and whether these impacts refer to deforestation or melting glaciers and ice sheets. Multiple impacts are required but these must be within the same category.

If they are from different categories, then only the first impact will be assessed. One mark is awarded for naming each impact (within one category) and a second mark is awarded for an elaboration (for each of these impacts) in the form of detail and/or a statistic.

The melting of glaciers in northern Bhutan is leading to a range of negative social impacts. As meltwater fills glacial lakes, the risk of Glacial Lake Outburst Floods (GLOFs) is increased. In Bhutan, this risks the safety of villagers who live within glacial valleys. If a GLOF does occur, floodwaters in some valleys could reach as high as 50 metres. This would lead to the loss of many lives as well as the destruction of agriculture and vital infrastructure such as hydropower stations. Melting glaciers is also leading to an alteration in water supplies. Many villagers rely on glacial melt for domestic and agricultural use. Melting glaciers causes the flow regime of many rivers to change, leading to an excess of water in some seasons and disastrous shortages during others.

b. (9 marks)

Students are required to write on a national scale response to the land use change discussed in part a (either melting glaciers and ice sheets or deforestation). Students are only required to discuss one response, writing on additional responses will not yield additional marks. Students will need to outline their chosen national response to provide context and then evaluate this response using multiple criteria. An overall statement of the effectiveness of the response is required which will involve weighing up the extent to which these criteria have been met. Marks should be awarded using the following:

8–9	Responses are very clear and have answered all aspects of the question in detail. They include: • A detailed outline of a national response including specific goals • A clear outline of criteria used to evaluate the success of this response • A detailed discussion of the success of this response in terms of addressing these criteria • An appropriate conclusion showing an overall understanding of the success of the response • An excellent use of geographical terms and concepts
6–7	Responses answer most parts of the question well. A good understanding of the question is demonstrated but some aspects lack sufficient detail. Responses include: • An outline of the national response • A discussion of its effectiveness making reference to criteria • A conclusion summarising the overall success of the response

3–5	Responses address some parts of the question. A basic understanding of the question is demonstrated. Responses lack sufficient detail and depth. They include: • A brief outline of a national response • An attempt at evaluating this response but lacking in specific information such as statistics or the use of criteria
1–2	Response does not adequately address the question or contains lots of incorrect information. Insufficient detail is provided and the student has not demonstrated an adequate understanding of the topic.

In 2008, the Bhutanese Government launched a five-year policy called ‘Reducing Climate Change Induced Risks and Vulnerabilities from Glacial Lake Outburst Floods (GLOF)’. It cost \$7.6 million US in total and involved the installation of early warning systems and the use of modelling to predict glacial floods in advance. Early warning systems were expanded into remote valleys which use automatic water level sensors and sirens to provide warning for residents. Another aspect of the national response involved reducing the risk of GLOFs by lowering the level of glacial lakes. This occurred at Lake Thorthormi where 350 workers excavated soil and rock to lower the water level by 5 metres.

The first criteria that can be used to evaluate this response is whether they have been successful in reducing the current risk of GLOFs. Prior to this response, initial surveys had predicted a GLOF would occur from the Thorthormi glacier in 2010. The lowering of the lake was successful in stopping this GLOF from occurring and the social, economic and environmental impacts that would have followed.

Another evaluation criteria is whether they have reduced the potential future impacts of GLOFs. The installation of early warning systems was also successful with systems now spread to 90% of households in 21 of Bhutan’s most vulnerable communities.

The final evaluation criteria involves whether they have provided social benefits for communities throughout Bhutan. While the system cannot save downstream communities from losing crops and infrastructure, it gives residents the social benefit of 6 hours to escape and find higher ground. Awareness of GLOFs was also raised with 2500 communities educated about the risks of glacial melt.

Overall, this national response has been successful in all three criteria by reducing the current dangers near Lake Thorthormi, successfully establishing a national GLOF warning system, educating the local communities about the dangers of GLOFs and providing jobs for local people.

Question 3 (4 marks)

Students must clearly reference two selected geographic characteristics such as the topography of the land and the lake (body of water). Each of these must contain a clear link to the land use change that has occurred (2 marks for each).

The historic land use of Albert Park as a series of swamps and a river delta, highlight its natural shape as a flat landscape, an ideal shape to be used as a Grand Prix circuit. During the 1890s, water was diverted by the Yarra River to change the characteristics of the swamp and create a permanent lake. This large artificial waterbody was ideal for use for sailing and rowing and to also use as an aesthetic feature for the current Grand Prix circuit.

Question 4 (16 marks)

Although no marks are awarded, students need to identify their fieldwork location.

Our fieldwork site was the suburb of Cloverton located 36 km north of Melbourne's CBD.

a. (6 marks)

Students are required to discuss the role of political or environmental factors at their specific fieldwork site mentioned above. If both types are discussed, then no marks will be given for the second factor discussed.

Multiple political or environmental factors are required for the chosen category with one mark awarded for naming the factor and two marks awarded for discussing its role in the process of land use change. The land use change discussed should be the same one discussed in part a.

In 2010 the Urban Growth Boundary was extended by the State Government to include Lockerbie, a sheep farm of 1121 ha near Kalkallo. This political decision would enable a change in land use from agricultural land use to residential. In the same year the property group Stockland purchased the site from Burgess Rural Pty Ltd for \$300 million making the purchase Australia's largest ever individual land transaction. In 2012 a strategic plan for the area, the Lockerbie Precinct Structure Plan was prepared by the State Government Growth Areas Authority in consultation with the Hume City Council, Government agencies, service authorities and major stakeholders such as Stockland. Following development of the initial infrastructure and the issuing of planning permits for building lots by Hume City Council, land sales commenced late 2015 and building at the new Cloverton estate commenced in 2016.

In 2017 the Victorian State Government developed 'Plan Melbourne' a planning strategy for Melbourne's until 2050. This political policy was a response to the predicted rapid population growth of Melbourne. Growth is focused on four growth corridors, including the Hume corridor to the north, which includes Cloverton estate.

The North Growth Corridor will eventually accommodate a population of over 260,000 people and provide over 100,000 dwellings. Each stage of the Cloverton estate development must be approved by Hume City Council with the land title process taking about six months. Thus, it can be seen that the role of political factors, at state and local government levels, has determined the process of land use change at Cloverton.

b. (2 marks)

Students may select any impact on people or the environment and it may be positive or negative. If they write on more than one impact, only the first one should be marked. One mark is given for stating the nature of the impact with the second mark given for additional detail such as statistics or evidence observed.

One negative impact on the environment at Cloverton estate concerns Merri Creek which forms the eastern boundary of the estate. The creek and surrounding grassland is the habitat for the locally endangered Growling Grass Frog. Disturbed soil from earthworks at construction sites can enter and muddy the creek and threaten this habitat. Efforts to control the movement of soil by using shade cloth over street drains were observed to be ineffective.

c. (4 marks)

This question requires students to outline two examples of interconnections. If more than two are outlined, then no additional marks are awarded. For each of the two examples, students must clearly name the interconnection (1 mark) and discuss the example, making a clear reference to the surrounding region (1 mark).

Cloverton is interconnected with the surrounding region by several transport links. The Hume Highway forms the western boundary of the estate and the NorthEast Railway Line forms the eastern boundary of the estate with Donnybrook Station a short distance along Donnybrook Road in the south of the estate. Both of these transport links connect the estate with the surrounding region. Also, a future railway station is planned for Cloverton as well as an outer metropolitan ring road interchange, providing further interconnection with the surrounding region.

As the development of housing at Cloverton has preceded the development of amenities in the area, residents need to travel either west to shopping facilities at the nearby Merrifields estate or south to Craigieburn to purchase goods. This has ensured that the estate is interconnected with the surrounding region.

d. (4 marks)

Students may choose to discuss a singular type of geospatial technology such as satellite imagery or a combination such as the use of Geographic Information System (GIS) which contains satellite imagery among other data types. Students must name their chosen geospatial technology (1 mark) and demonstrate an understanding of what it is and how it works (1 mark). They must explain how this geospatial technology can

be used to assess and manage land use change (1 mark) and must link this explicitly and logically to their selected fieldwork location (1 mark).

One geospatial technology used to assess land use change at Cloverton was remote sensing of aerial images collected by drones. Remote sensing is the gathering of information about an area of the Earth's surface without making physical contact with it. In this case, drones have flown over the estate at various stages to take photos of the site. This aerial footage was provided by the developer of the estate, Stockland. They regularly uploaded drone footage onto the Cloverton estate website starting from 2015 and past Stockland drone footage could be found on YouTube. The drone footage shows the major features developed at each stage of the estate development such as the information and sales centre, display village and the location of future planned facilities and land releases. The drone footage was accompanied by the Stockland Masterplan for the estate to assist to locate the features shown. This drone footage was used by Hume City Council to monitor whether builders were correctly collecting rubbish on housing sites and, if not, then builders were fined by the council. Thus, the geospatial technology of drone footage was used to manage the land use change of development of Cloverton.

Question 5 (9 marks)

a. (5 marks)

Students are expected to describe the distribution of the global population in detail including making reference to several contrasting regions. Students may wish to follow the Pattern, Quantification, Exception format although this is not necessarily required. Students should demonstrate their ability to use the legend effectively, interpret the map accurately and use appropriate geographical terms and concepts.

The distribution of world population is uneven. Regions such as northern India and eastern and central China contain clusters with a density of more than 500 people per square kilometre. Smaller clusters of this very high density also exist in central Europe. In contrast, large areas of North America, northern and southern Africa, northern China and Mongolia, northern Russia and Australia have population densities of less than two people per square kilometre. Polar areas such as Greenland and Antarctica have extensive areas that are uninhabited.

b. (4 marks)

Students need to name two appropriate factors accounting for the variation in world population distribution (2 marks). Any type of factor can be chosen (e.g. political, environmental, historical etc.). The final two marks are allocated for elaborating when outlining the factors and clearly linking them to a specific example to demonstrate how they account for variation in the world population distribution.

Climate is an environmental factor that can determine population distribution. Much of Australia's landscape is arid, suitable only for grazing and dryland farming and it therefore has a very low population density. Population densities are much higher in areas of flat arable farming land with moderate temperatures such as China, India and the eastern half of USA.

Another factor influencing the variation in world population distribution is economic activity. The concentration of population in urban areas is an outcome of diverse economic activities and livelihood options offered by cities. Cities provide a large job market which attracts people resulting in settlement growth. Therefore, population density in the towns and cities tends to be higher than in rural areas. This is noticeable on the eastern coast of Brazil where two megacities, Rio de Janeiro and Sao Paulo have attracted huge populations due to economic opportunities as well as Tokyo in Japan with the largest city in the world with 37 million people.

Question 6 (6 marks)

Marks are allocated as follows:

- Two marks: students are required to outline the key features of Malthusian Theory.
- Two marks: reference to Figure 4a, linking relevance to Malthusian Theory with quantification.
- Two marks: reference to Figure 4b, linking relevance to Malthusian Theory with quantification.

Example:

Malthusian theory suggests that population growth will occur at a rate where production of resources such as food will not be able to keep pace with population increase. Food production would grow arithmetically (2, 4, 6, 8...) compared with population increasing geometrically (2, 4, 8, 16...). Malthusian theory explains the link between population growth and the provision of resources. As a population grows beyond the available resources required (point c in Figure 4a), growth is limited as a result of either an increased death rate (a result of factors such as famine) or a reduction in birth rate as couples cannot afford large families.

Figure 4b shows that India has increased its crop production, keeping up with population growth by improved productivity specifically in wheat and rice. Population has increased from 375 million in 1951 to 1250 million in 2011. Rice production increased from approximately 20 Mt to 90 Mt and wheat from approximately 10 Mt to 90 Mt in the same period.

Through the enhanced food production in India, the country has managed to keep pace with their population growth moving beyond the critical (point c in Figure 4a) where traditional food production would not be sufficient for its population. Malthusian theory

shows how populations are limited by resources such as food, but India has shown how it has delayed this limiting effect by enhancing its food production capacity.

Question 7 (4 marks)

- One mark is allocated for identifying each appropriate stage in the Demographic Transition Model.
- One mark is allocated for each justification. Students are required to show their understanding of the principles of birth rate, death rate and how these relate to various living conditions.

a. (2 marks)

1785: Stage 1 – A relatively stable population with a gradual increase due to the high birth rate (31 per thousand) compensating for the high death rate (30 per thousand). In 1785 birth and death rates were similar resulting in a short period of little net increase in total population.

b. (2 marks)

2001: Stage 4 – A stable population due to birth rates (10 per thousand) being similar to the death rates (10 per thousand). Both of these are much lower than in Stage 1 as Sweden is moving through demographic transition. Improved living conditions and a lower mortality rate have resulted in lower fertility.

Question 8 (21 marks)

Although no marks awarded, students need to indicate clearly whether they are writing on a country with a growing or ageing population. Note: the same country should be used for all parts of this question.

For example:

Germany is a country with an ageing population.

a. (5 marks)

Students should be outlining an issue or challenge. This question does not require students to provide details as to why the issue is occurring. One mark can be awarded for students identifying a relevant issue or challenge. Elaborating on this issue further, such as discussion of consequences, gains another 2 marks. The additional 2 marks are given for relevant supporting statistics.

Germany is a hyper-aged society with 21% of its population aged over 65 years and it is expected to continue to increase whilst the percentage of young people in the population is decreasing. A major issue for the country is the increase in the old-age dependency ratio. The tax base which provides income for Germany's government is therefore declining as those in the working age groups are reduced. By 2030, it is

estimated that only two people will be working to support each retiree. This has implications for the health and welfare systems in the country. Less income will make it harder for Germany to continue to provide its high level of health care (over 10% of GDP) and to fund the pension system (which currently supports 85% of retirees).

b. (3 marks)

Students should follow the PQE approach here. The same issue should be referred to as above.

The distribution of aged persons in Germany is uneven. There is a distinct contrast between the east and west of the country. The highest percentage of aged persons are found in the former East Germany in regions such as Brandenburg where there was more than a 5% decrease in population between 2006 and 2011. In contrast, the west of Germany enjoys a more youthful population structure with major cities such as Munich and Frankfurt attracting young people to them. Similarly, Berlin in the east does not face the issues of an ageing population to the same extent as the rest that part of the country.

c. (8 marks)

This question has two components and it is suggested that 4 marks be allocated for outlining the response and 4 marks for the evaluation. The response should be linked to the issue outlined in part b. The response should be clearly described and information could include: who implemented the response, when, scale, aims and what strategies were used. The evaluation should include a clear statement as to the effectiveness of the response with relevant supporting evidence in order to justify this opinion.

One response at a national scale to the issue of an increasing old age dependency ratio was the introduction of “family friendly measures” by Chancellor Merkel. This measure was introduced in 2006 in order to raise the birth rate. The introduction of “family friendly measures” included provision of extended parental leave of up to three years on the birth of a child as well as the payment of allowances to try to encourage more couples to have children. The Kindergeld allowance provides a payment of \$255 per month per child whilst the Eltnergeld allowance is an income subsidy paid to parents primarily in the first year of a child’s life. The aim of these measures is to reduce the financial burden of child rearing on parents and enable both partners to share the responsibility of child rearing. It was therefore hoped that in the long-term greater numbers of children would, in time, increase the workforce and in turn help reduce the old age dependency ratio.

The “family friendly measures” response has had limited effectiveness. It has been very costly. The German Government has paid a considerable amount of money – over \$6 billion – in parental leave payments. On the positive side, there has been a slight increase in the fertility rate since the introduction of this response. In 2006 the fertility rate was 1.33 children per woman. This rose to 1.5 in 2015 – the equivalent of

56 babies per 1000 women which is higher than in 2014. The last time authorities recorded a similar rate was in 1982. However, most of this is thought to be attributed to the impact of migration rather than the “family friendly” measures. One million asylum seekers typically of child -bearing age, have been accepted into Germany. Finally, it should be noted that despite the slight increase in fertility rates to 1.5, this is still well below the replacement rate of 2.1 which is required to ensure a stable population. Therefore, the response of the German Government to the problem of an increasing old age dependency ratio has not been effective.

d. (5 marks)

A specific geospatial technology should be mentioned and its role explained (2 marks). Students can use an actual example or suggest how one could be used as long as it is linked to population challenges in the country they chose (2 marks). Students should clearly evaluate the effectiveness of this technology in responding to the population issue (1 mark).

The German Federal Office for Building and Regional Planning uses geospatial technology to produce maps of demographic, economic and environmental data which can be used by demographers. Geospatial technology in the form of Geographic Information Systems (GIS) collect, store and analyse spatial data using layers of information. This can be of use to demographers in terms of planning for an ageing population to ensure that necessary facilities such as aged care and hospitals are located where needed. It can also identify areas of declining population with unoccupied buildings such as in the former East Germany where more than 300,000 empty residences have been removed to save on maintenance costs. While this technology has assisted with services for the ageing population, it has not assisted in reducing the dependency ratio.