

**GEOGRAPHICAL ASSOCIATION OF WESTERN AUSTRALIA** [Inc.]

**Year 11 ATAR GEOGRAPHY**

**Unit 1**

**Semester 1, 2021**

**MARKING GUIDE**

**for**

**Teacher Use Only**

**Section One: Multiple-choice 20% (20 marks)**

Each correct answer is worth **one (1)** mark.

|  |  |  |  |
| --- | --- | --- | --- |
| **Qu** | **Ans** | **Description** | |
| 1 | (b) | Comment | The map scale (both as a ratio and a line scale) shows that one centimetre represents 500 metres, making (b) the correct alternative. |
| **Syllabus** | Interpret and express scale in written, linear and ratio (representative fraction) formats, and convert scale from one format to another. |
| 2 | (b) | Comment | The runway measures around 4.8 cm on the map, the equivalent to 2.4 km on the ground. Hence, option (b) is the best alternative. |
| **Syllabus** | Apply the map scale to basic calculations to determine time, speed, distance and area. |
| 3 | (b) | Comment | There are several features on the map where students could determine the contour interval e.g. Single Hill (AR 4152), Mount Elizabeth (AR 5062) and Little Hill (AR 5162) each of which have a numbered 100m contour line and a Spot elevation in close proximity, by studying the number and sequence of contour lines between these two elevations, students should be able to determine that the map’s contour interval is 20 metres. Hence (b) is the correct alternative. |
| **Syllabus** | Interpret relief on a map using contours and height information (spot heights), to describe the steepness and shape of a slope (concave, convex and uniform), and calculate the average gradient |
| 4 | (a) | Comment | Firstly, students should be able to eliminate options (c) and (d) as natural features. The nearest built-up area is more than two kilometres away, rendering (b) incorrect. A correct reading of the map legend shows a bridge along the Arthur Highway and therefore option (a) is the correct alternative. |
| **Syllabus** | Iidentify and interpret natural features and cultural features on a map. |
| 5 | (d) | Comment | Mount Garrett has a spot elevation at its peak of 86 metres asl and Mount Elizabeth has peak elevation of 236 metres asl. The difference between these two elevations is 150 metres – alternative (d). |
| **Syllabus** | Interpret relief on a map using contours and height information (spot heights), to describe the steepness and shape of a slope (concave, convex and uniform), and calculate the average gradient. |
| 6 | (d) | Comment | By using the alternating black-and-white segments on the map border, we can establish the latitude and longitude of Spectacle Island. The island has a latitude (to the nearest minute) of 42°52’ S and a longitude of 147°36’ E, making option (d) the correct alternative. |
| **Syllabus** | Establish position on a map using alphanumeric grid coordinates, eastings and northings, four figure area references, six figure grid references, and latitude and longitude expressed in degrees and minutes. |
| 7 | (c) | Comment | This slope is, in essence, almost perfectly uniform. The contour lines along this transect are nearly evenly positioned at a distance of 3 contours every 200m, along a steady gradient of just under 1**:**3½. Hence, alternative (c) is correct. |
| **Syllabus** | Interpret relief on a map using contours and height information (spot heights), to describe the steepness and shape of a slope (concave, convex and uniform), and calculate the average gradient |
| 8 | (a) | Comment | Both Sorell and Seven Mile Beach are located on mainly flat ground, with no contours passing through Seven Mile Beach and only the 20m contour passing through the northern part of Sorell. None of the other topographic features (ridge, saddle and valley) appear on these built-up areas. Hence, the topographic feature is alternative (a) – Plain. |
| **Syllabus** | Identify different relief features (landforms, including hills, valleys, plains, spurs, ridges, escarpments, saddles, cliffs), types of natural vegetation cover and hydrological features (land subject to inundation, perennial and intermittent water bodies). |
| 9 | (b) | Comment | The distance along the road is approx. 14.4 cm, or 7.2 km on the ground. Using the formula **t = d/s**, we can work out that: **t** = (7.2/70) x 60 = 0.102 x 60 = approximately 6 minutes – alternative (b) is correct. |
| **Syllabus** | Apply the map scale to basic calculations to determine time, speed, distance and area. |
| 10 | (a) | Comment | Woody Island is approximately 400 metres long by 200 metres wide at its widest points (i.e. if it was rectangular, it would be around 8 hectares). The island itself is slightly smaller and more triangular in shape, measuring closer to option (a) 5 hectares. The second closest option, (b), would require the island to be around half a grid square long by half a grid square wide. It is clearly much smaller than that. Hence, alternative (a) is correct. |
| **Syllabus** | Apply the map scale to basic calculations to determine time, speed, distance and area. |

|  |  |  |  |
| --- | --- | --- | --- |
| **Qu** | **Ans** | **Description** | |
| 11 | (d) | Comment | Students should understand that compass bearings run clockwise from north at 0° and that the direction of west correlates with a compass bearing of 270°, making (d) the correct alternative. |
| **Syllabus** | Establish direction on a map using general compass directions (16 points) and bearings. |
| 12 | (a) | Comment | The term “spur” rules out option (b) as a spur is surrounded by on the sides by flatter ground, not water. Option (c) incorrectly refers to a saddle and option (d) describes the situation of Midway Point, rather than its site. This leaves (a) as the correct alternative. |
| **Syllabus** | Describe the site and situation of places. |
| 13 | (b) | Comment | The answer can be established by finding the same two points on the two sources and measuring the distances between them. The source with the larger distances between the two given points (Source 2) will have the larger scale. |
| **Syllabus** | Interpret the difference in scale between a photograph and a topographic map of the same place. |
| 14 | (b) | Comment | The climate graph displays ***average*** minimum and maximum temperatures and ***average*** rainfall. The graph does not tell us what is “always” occurring or what has “never” occurred, ruling out options (a), (c) and (d). Option (b) is the correct alternative, with the summer months **typically** around 10°C warmer than the winter months. |
| **Syllabus** | Interpret and construct tables and graphs, including: picture graphs; line, bar and compound graphs; histograms; scattergrams; climatic graphs; pie graphs; flowcharts and population pyramids |
| 15 | (c) | Comment | The phrase “economic resources” is clearly a reference to the data for GDP per capita shown in the map. With much of Sub-Saharan Africa shown as having a GDP per capita of less than $5,000 per capita, option (c) is the most correct alternative. |
| **Syllabus** | Interpret and apply data from different types of statistical maps (isopleth/isoline maps, choropleth maps, proportional circle maps, overlay and dot distribution maps) |
| 16 | (d) | Comment | Students are required to analyse this compound line graph in order to work out the cumulative number of cases within different regions of the world. Each colour represents the total cases of a given region. It is common here for students to misinterpret this type of graph and assume that the region at the top of the graph has the highest total. On a compound line graph, the differences between the points on adjacent lines give the actual values. Note that China is represented by a red line while Oceania is represented by a purple line indicating a relatively low number of confirmed COVID-19 cases. Options (a) – (c) are incorrect as they all have less than 120 million cases. Hence, option (d), across the world, is the correct alternative (i.e. approximately 125 million confirmed COVID-19 cases). |
| **Syllabus** | The spatial and temporal distribution, magnitude, duration, frequency, probability and scale of spatial impact of natural and ecological hazards at a global scale |
| 17 | (c) | Comment | The graph shows that, over time, deaths from natural disasters have decreased. This makes (c) the correct answer. |
| **Syllabus** | The spatial and temporal distribution, magnitude, duration, frequency, probability and scale of spatial impact of natural and ecological hazards at a global scale |
| 18 | (d) | Comment | The Hazard Management Model is a generic model by which governments and other stakeholders seek to manage the risk of hazards, as stated in (d). It does not imply that hazards should not impact communities in any way, ruling out (a); nor does it seek to directly inform individuals and households, thus ruling out (b). While the model identifies some policies, procedures and practices, it certainly does not show *all* that could possibly be used in addressing the risk posed by hazards, ruling out (c). |
| **Syllabus** | Interpret and construct tables and graphs, including: picture graphs; line, bar and compound graphs; histograms; scattergrams; climatic graphs; pie graphs; flowcharts and population pyramids |
| 19 | (a) | Comment | Option (a) is taken from the glossary of the SCSA syllabus. Both (b) and (c) do not address the main criteria of ecological hazards, whereas alternative (d) defines a natural hazard. |
| **Syllabus** | Ecological hazards, including environmental diseases/pandemics (toxin-based respiratory ailments, infectious diseases, animal-transmitted diseases and water-borne diseases) and plant and animal invasions |
| 20 | (c) | Comment | The “likelihood” of the hazard is the key term in the question. This refers to the hazard’s *probability* – alternative (c) The other terms, also taken from the syllabus, are other measures of hazards and their impact. |
| **Syllabus** | The spatial and temporal distribution, magnitude, duration, frequency, probability and scale of spatial impact of natural and ecological hazards at a global scale. |

**NOTE:**

**Some element of teacher discretion will be required for the allocation of marks for some questions, with specific reference to the quality of the answer.**

**Section Two: Short response 40% (40 marks)**

Refer to **Source 1:** Sorell topographic map 2017 to answer Questions 21 to 26.

**Question 21 (2 marks)**

A new residential development is proposed for the entire area of AR 4762. Describe **two (2)** site characteristics of the proposed area.

**Syllabus:**

Describe the site and situation of places.

**Key word:**

*Describe*: provide characteristics and features.

**Teacher Notes:**

Site can be described by referring to the physical characteristics of a place. Site characteristics should be described accurately in full sentences, using correct geographical terminology. Features referred to should be for the site of the settlement only; not unrelated features in the distance.

Site features may include:

* Topography – height, gradient, slope - e.g. Is a hill with a peak of 86 metres.
* Landforms – e.g. floodplain, valley - e.g. Contains a saddle in the south-eastern corner.
* Gradient – Mount Garrett has a high average gradient of approximately 1:10 on the west, steeper to the east.
* Drainage – rivers, lakes, swamps - e.g. There is a stream running into the south-western corner.

**Marking Key:**

|  |  |
| --- | --- |
| **Description** | **Marks** |
| |  | | --- | | Correctly describes **two** (2) site characteristics (e.g. elevation, natural drainage, natural vegetation, slope, soil). | | 2 |
| Correctly describes **one** (1) site characteristic (e.g. elevation, natural drainage, natural vegetation, slope, soil). | 1 |
| **TOTAL** | **2** |

Refer to **Source 1:** Sorell topographic map 2017

**Question 22 (2 marks)**

Describe **two (2)** characteristics of the situation of the built-up area of Seven Mile Beach (AR 4154).

**Syllabus:**

Describe the site and situation of places**~~.~~**

**Key word:**

*Describe*: provide characteristics and features.

**Teacher Notes:**

Situation can be described by referring to the location of a place in relation to its surroundings or its proximity to other places or features. Situation characteristics should be described accurately in full sentences, using appropriate geographical language.

Good answers for this question could include:

* Distance and direction from other settlements or major features

- e.g. Approximately 10 km south west (or SSW) of the built-up area of Sorell.

- e.g. Approximately 9 km west of Dodges Ferry.

- e.g. Approximately 2 km south (of the main buildings) of the Hobart Airport.

- e.g. Approximately 1.5 kilometres north of Single Hill.

* Latitude and longitude of the location.

- To the nearest minute, Seven Mile Beach is located at a latitude and longitude of:

42° 52’ S 147° 30’ E. [Note: allow 42° 51’ S as Seven Mile Beach is between these two latitudes].

**Marking Key:**

|  |  |
| --- | --- |
| **Description** | **Marks** |
| Correctly describes any **two (2)** situation characteristics (e.g. latitude and longitude, distance and direction from other places or features, location in relation to major transport routes). | 2 |
| Correctly describes only **one (1)** situation characteristic (e.g. latitude and longitude, distance and direction from other places or features, location in relation to major transport routes). | 1 |
| **TOTAL** | **2** |

Refer to **Source 1:** Sorell topographic map 2017

**Question 23 (2 marks)**

A hang glider flies from the peak of Mount Elizabeth (AR 5062) to the end of the vehicular track at Flinty Point (GR 489617). Calculate the average gradient at which the glider must descend. Provide your answer as a ratio to the nearest whole number.

**Syllabus:**

Interpret relief on a map using contours and height information (spot heights), to describe the steepness and shape of a slope (concave, convex and uniform), and calculate the average gradient.

**Key word:**

*Calculate*: ascertain/determine from given facts, figures or information.

**Teacher Notes:**

* In working out the horizontal distance (“run”), students should determine the map distance of 3.2 cm closest approximation), which represents 1,600 metres on the ground.
* The difference in elevation (“rise”) is equal to 236 – 5 (approx.) = 231 metres.
* Students should then use the formula ‘rise over run’ to calculate the average gradient:

Rise **:** run = 231 **:** 1,600 .

*and then divide both sides of the ratio by 231 to achieve a final gradient of*

1: 6.9 approx. = 1: 7 to the nearest whole number.

**Marking Key:**

|  |  |
| --- | --- |
| **Description** | **Marks** |
| States an accurate formula for determining gradient and applies calculations for the “run” and “rise” and correctly states the average gradient as 1:7. | 2 |
| States an accurate formula for determining gradient and applies calculations for the “run” and “rise”; however, did not provide the correct gradient. | 1 |
| **TOTAL** | **2** |

Refer to **Source 1:** Sorell topographic map 2017

**Question 24 (2 marks)**

With reference to **Source 1,** describe the spatial relationship between the topography and the Arthur Highway.

**Syllabus:**

Identify, describe and interpret spatial patterns (including land use, settlement and transport), and spatial relationships between natural and cultural features on maps.

**Key word:**

*Describe*: provide characteristics and features.

**Teacher Notes:**

In this map, it can be seen that the Arthur Highway has followed areas of lower elevation and flatter topography. The steeper hills and mountains have been avoided by transport routes. Students should describe this relationship and refer to named topographic features to support their answer.

**Example:**

*The Arthur Highway has mostly been positioned on land which is flat to gently undulating in its topography, varying in gradient from 1:10 to 1: 50. Steep hills, for example, Mount Elizabeth and Table Hill in the north-east part of the map, have been avoided.*

**Marking Key:**

|  |  |
| --- | --- |
| **Description** | **Marks** |
| Describes in detail the spatial relationship between topography and the Arthur Highway, using valid geographical terminology and map evidence to support the description. | 2 |
| Describes aspect(s) of a spatial relationship between topography and the Arthur Highway with limited detail and supporting evidence. | 1 |
| **TOTAL** | **2** |

Refer to **Source 1:** Sorell topographic map 2017

**Question 25 (5 marks)**

1. On the axes below draw a labelled cross section from GR 460630 to GR 520630.

(3 marks)

1. Label the following features which occur along the cross section:

* Forest/scrub and
* Arthur Highway

(2 marks)

**Syllabus:**

Interpret, construct and annotate cross sections to show natural and cultural features on the landscape.

**Key word:**

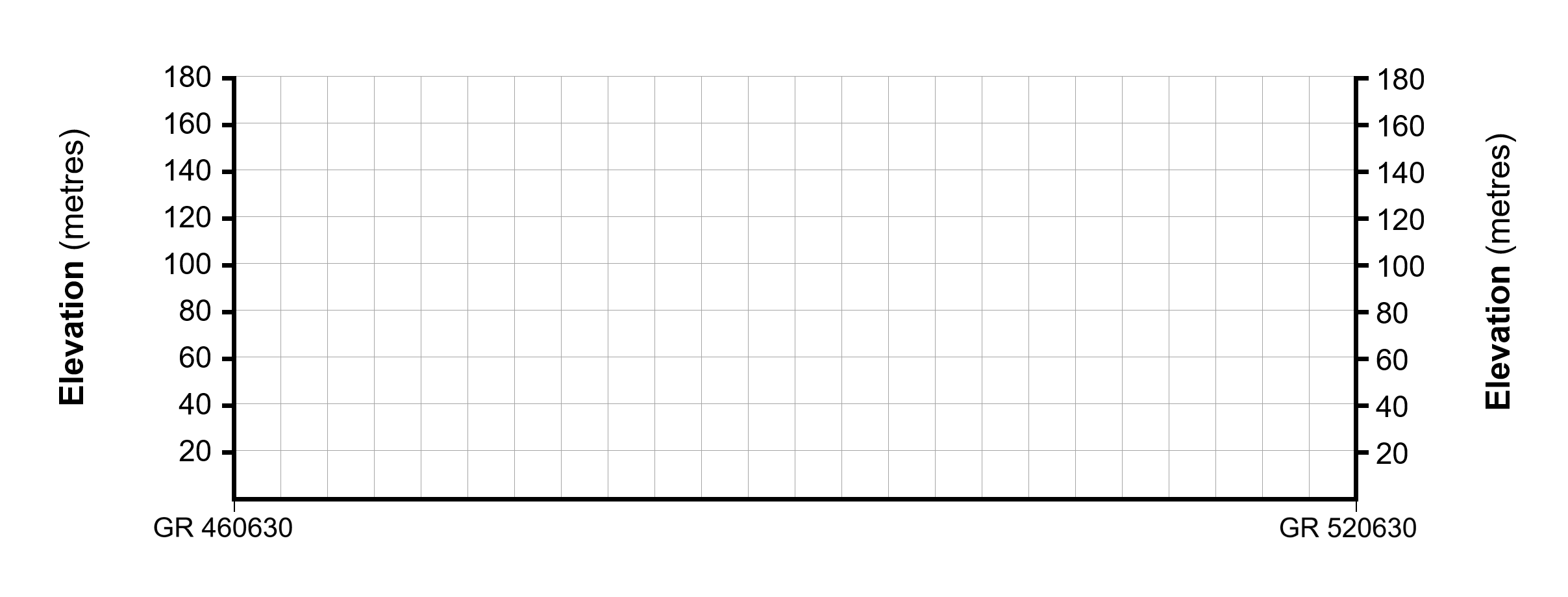
*Draw* (diagrams, etc.): an instruction, as in draw a circle.

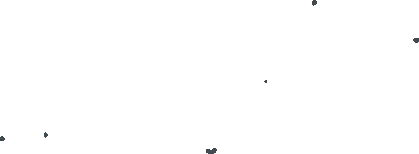
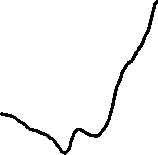
*Label* (and annotate): identify by placing a name or word used to describe the object or thing.

**Teacher Notes:**

* Teacher discretion is required on this question.
* In part (a) teachers may break the three marks down into more precise measurements, such as the approximate heights on the vertical axes.
* For the labelling of the two features in part (b), some leniency (perhaps 2-3 mm either side of the labels on the exemplar on the cross section below) would typically be allowed.
* An exemplar is provided below:

*A cross section from GR 460630 to GR 520630*





**Marking Key:**

Part (a)

|  |  |
| --- | --- |
| **Description** | **Marks** |
| Draws a line that represents a neat, accurate cross section. | 3 |
| Draws a line that represents a cross section that is, at least in part, neat and accurate; contains two or more significant deviations from the exemplar cross section. | 2 |
| Draws a line that is limited in its neatness and/or accuracy; contains several significant errors against the exemplar cross section. | 1 |
| No reasonable attempt made. | 0 |
| **TOTAL** | **3** |

Part (b)

|  |  |
| --- | --- |
| **Description** | **Marks** |
| Correctly locates and labels both Arthur Highway and forest/scrub. | 2 |
| Correctly locates and labels only one of Arthur Highway and forest/scrub. | 1 |
| **TOTAL** | **2** |

Refer to **Source 1:** Sorell topographic map 2017

**Question 26 (6 marks)**

Consider a scenario whereby a 10-metre wave, generated from a natural hazard, such as a storm surge or tsunami, approaches the map area from the south.

1. With reference to **Source 1**, identify **one** natural feature **or one** cultural feature that may be vulnerable to such a hazard and use map evidence to propose reasons for its vulnerability.

(3 marks)

(b) Explain one possible impact of such a natural hazard on the area shown.

(2 marks)

**Syllabus:**

* Identify, describe and interpret spatial patterns (including land use, settlement and transport), and spatial relationships between natural and cultural features on maps.
* The physical and human factors that explain why some places and people are more vulnerable to the hazard than others

**Key word:**

*Identify:* recognise and name.

*Propose*: put forward (for example, a point of view, idea, argument, suggestion) for consideration or action.

**Teacher Notes:**

Some possible features that could be identified as being vulnerable to such a hazard:

* Any one of the built-up areas of Seven Mile Beach, Dodges Ferry, Carlton, Lewisham and others; particularly coastal areas thereof.
* Beaches such as Seven Mile Beach and Carlton Beach.
* Coastal dune systems associated with beaches.
* The shellfish farms in Pitt Water.
* Hobart Airport.
* Islands such as the Spectacle Islands.
* Other relevant features.

In all cases, the most vulnerable features occur due to one or more of the following reasons:

* At an elevation of 0-20 metres. The spit running west-east through the centre of the map, has spot elevation of 6 and 12 metres, showing the low-lying nature of the topography in that area, for example.
* On or near the coast – most exposed to wave action.
* South-facing – unprotected from incoming wave.
* At sea level, e.g. shellfish farms.

**Marking Key:**

|  |  |
| --- | --- |
| **Description** | **Marks** |
| Identifies a feature that is vulnerable to the hazard and proposes two or more valid reasons for its vulnerability. Supports with good use of geographical terminology and map evidence (e.g. elevation). | 3 |
| Identifies a feature that is vulnerable to the hazard and proposes two or more reasons for its vulnerability; however, there is incomplete reasoning and/or supporting evidence. | 2 |
| Identifies a feature that is either not clearly vulnerable; or one which is supported by insubstantial reasoning / evidence. | 1 |
| **TOTAL** | **3** |

Refer to **Source 1** Sorell topographic map 2017

**Question 26**

(b) Explain **one** possible impact of such a natural hazard on the area shown. (3 marks)

**Syllabus:**

The concepts of risk and hazard management as applied to natural and ecological hazards.

**Key word:**

*Explain*: relate cause and effect; make the relationships between things evident; provide why and/or how.

**Teacher Notes:**

Students may categorise their chosen impact in a generic sense using terms such as economic, social or environmental impact. If this categorisation is supported by sound inferences based on their geographical knowledge and is supported by some specific detail, the students should gain full marks.

Some examples of more specific points are listed below:

Economic impacts:

* Effect on economic resources, such as Hobart Airport, which is sited on flat, low-lying topography, the appears to be less than 6m in elevation and would therefore experience major flooding as a result of the hazard. This would lead to major economic losses, in terms of the response and recovery phases as well as the loss of trade and transport in the short term.
* Impacts upon the shellfish farms in Pitt Water as a result of debris and damage to infrastructure.

Social impacts:

* People in areas such Dodges Ferry and Seven Mile Beach to their health and safety. Loss of life, and damage to homes and property would likely occur.
* People’s mobility would be affected by reduced access to transport routes.

Environmental impacts:

* Impacts upon coastal beaches and coastal dune systems, such as those of Seven Mile Beach, would occur. This would result in the erosion and flooding of natural landforms, the potential loss of wildlife and increased salinity of soils, rivers and lakes.

**Marking Key:**

|  |  |
| --- | --- |
| **Description** | **Marks** |
| Provides a detailed explanation, with correct use of geographical terminology, of a possible impact of the hazard. Relates cause and effect in the explanation. Uses relevant map evidence and/or supporting examples. | 3 |
| Provides an appropriate explanation of a possible impact of the hazard, which may imply cause and effect. Uses limited map evidence and/or supporting examples. | 2 |
| Provides a very basic explanation of a possible impact of the hazard which lacks the required detail, terminology, evidence and/or examples in the explanation. | 1 |
| **TOTAL** | **3** |

Refer to **Source 1:** Sorell topographic map 2020 and **Source 2:** Sorell satellite image 2005 to answer Question 27.

**Question 27 (3 marks)**

With reference to map evidence, identify and describe **one** example of a change in land use that can be observed to have occurred in the area north of Arthur Highway between 2005 (**Source 2**) and 2017 (**Source 1**).

**Syllabus:**

Interpret and describe changing patterns and relationships that have taken place over time.

**Key word:**

*Identify:* recognise and name.

*Describe*: provide characteristics and features.

**Teacher Notes:** Students are to describe one example of a change in the land use that can be observed to have occurred between 2005 and 2017. This will involve locating a relevant area and then describing what human activity was previously in place there and what activity was more recently in place.

Some examples of land use change may include, but are not limited to:

* Development of new (residential) built-up area to the south of Gatehouse Drive in the northern part of Sorell. The land on and around GR 460637 shows new roads have been built, surrounded by new areas of housing. Previously this land was most likely used for farming.
* The development of a new rectangular sports oval GR 452633; previously these were green paddocks (agricultural land use).

**Exemplar:**

*In 2005 Source 2 shows there was a relatively small built-up area in the area north of the Arthur Highway, with much of the area appearing to be rural/semi-rural or vacant/unused land. By 2017, Source 1 shows that there have been new roads built and a newly formed built-up area (residential development) in the north-eastern part of AR 4563, where new curvilinear roads and cul-de-sacs have been built.*

**Marking Key:**

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| --- | --- |
| **Description** | **Marks** |
| Accurately and clearly locates an example of a change in a land use that between 2005 and 2017. Clearly describes (or makes a reasonable geographical interpretation regarding the nature of) the original land use of the area in 2005 from Source 2. Describes clearly the more recent land use of the area in 2017 from Source 1. | 3 |
| Locates and describes the original land use of the area in 2005 from Source 2 and describes clearly the more recent land use of the area in 2017 from Source 1; however, the response may lack some clarity or accuracy. | 2 |
| Refers to one or more land uses in the area without clearly and accurately locating and describing a change in land use over time. | 1 |
| **TOTAL** | **3** |

**Question 28 (2 marks)**

With reference to a supporting example, describe the concept of risk in relation to an ecological or a natural hazard event.

**Syllabus:**

The concepts of risk and hazard management as applied to natural and ecological hazards.

**Key word:**

*Describe*: provide characteristics and features.

**Teacher Notes:**

* Risk broadly refers to the potential and/or probability of a hazard event occurring and causing impacts (could be either social, economic and/or environmental impacts).
* A supporting example may reflect:
  + The heightened risk of earthquakes in areas close to tectonic plate boundaries.
  + The risk of tropical cyclones or bushfires occurring during the Australian summer.
  + The risk of flooding and erosion from hydrological hazards in coastal areas.
  + The increased risk of certain diseases occurring in tropical regions.
  + Risks associated with the spread of ecological hazards through the movement of people, goods and services.

**Marking Key:**

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| --- | --- |
| **Description** | **Marks** |
| Describes, in geographical terms, the key characteristics of the concept of risk in relation to a hazard event and provides a relevant supporting example. | 2 |
| Provides a limited description of the concept or risk; may include an example that does not support the concept. | 1 |
| **TOTAL** | **2** |

Refer to **Source 6:** Global deaths from all natural disasters, 1900 to 2019 to answer Question 29.

**Question 29 (4 Marks)**

1. Describe the temporal distribution of deaths resulting from natural hazards from 1900 to 2019.

(2 marks)

**Syllabus:**

The spatial and temporal distribution, magnitude, duration, frequency, probability and scale of spatial impact of natural and ecological hazards at a global scale.

**Key word:**

*Describe*: provide characteristics and features.

**Teacher Notes:**

Students need to describe, using the relevant data, the decreasing trend in global deaths from natural hazards over time. The following points, or similar, could be addressed:

* The trend is an overall decline, with a significant year-to-year variation, over the time period shown.
* In the period up to 1965, over 8 years where there were over 1,000,000 deaths from natural disasters.
* Since 1965, there has not been a year which has seen 500,000 deaths or more.
* There have been no occasions since 2010 where we have seen more than 50,000 deaths per year, reflecting a highly variable but generally downward trend.

Responses need not address reasons for this decline over time. This is addressed in the next question - 30(b).

**Marking Key:**

|  |  |
| --- | --- |
| **Description** | **Marks** |
| Accurately describes an overall declining trend in the number of deaths as result of natural hazards over time. May acknowledge year-to-year variation in data. Uses data from graph to support description. | 2 |
| Describes a declining trend with limited clarity and/or use of supporting evidence. | 1 |
| **TOTAL** | **2** |

Refer to **Source 6:** Global deaths from all natural disasters 1900 to 2019to answer Question 29.

**Question 29**

(b) Outline **two** possible reasons for the temporal distribution over the time period shown.

(2 marks)

**Syllabus:**

The spatial and temporal distribution, magnitude, duration, frequency, probability and scale of spatial impact of natural and ecological hazards at a global scale.

**Key word**

*Outline*: sketch in general terms; indicate the main features of.

**Teacher Notes:**

Some valid reasons that students could suggest:

* A better understanding of the causes of hazards has led to governments and other stakeholders taking more advanced steps towards mitigating the risks associated and improving preparedness for hazards.
* Improved technology and resources for addressing the risk associated with hazard. This includes early warning systems, improved design and construction of earthquake-resistant buildings.
* Improved response and recovery practices. This includes the capacity to provide emergency care to those affected by a hazard.
* Increased global interconnections for foreign aid; including that provided by multilateral aid organisations (e.g. UN, World Bank, IMF), bilateral aid (e.g. from Australian government) and non-government organisations (NGOs; e.g. World Vision Australia).

There are many other possible aspects of hazard management that student could address in order to attain full marks, as long as the criteria below are met by the student’s response.

Students could not argue, however, that hazards have decreased in frequency, magnitude, duration or spatial extent over time – there is no data to support these claims.

**Marking Key:**

|  |  |
| --- | --- |
| **Description** | **Marks** |
| Outlines **two** possible reasons, using valid logic and/or supporting evidence, for the reduced global death toll from natural hazards over time. | 2 |
| Outlines **one** possible reason, using valid logic and/or supporting evidence, for the reduced global death toll from natural hazards over time. | 1 |
| **TOTAL** | **2** |

**Question 30**

Distinguish between atmospheric hazards and geomorphic hazards.

(2 marks)

**Syllabus:**

Classification of natural hazards (atmospheric, hydrological and geomorphic).

**Key word**

*Distinguish*: recognise or note/indicate as being distinct or different from; note differences between.

**Teacher Notes:**

The directive term “distinguish” requires students to state what is different between the two phenomena. It does not technically require them to state what is similar between them – that they are both *hazards* (which have the potential to impact adversely on the wellbeing of people).

It should be noted that the question does not require students to separately define the two. Instead, it is often considered important that students use a conjunction such as “however”, “whereas” or “in contrast” to clearly show they are making clear distinctions between the two.

**Example:**

*Atmospheric hazards originate from weather and climate (i.e. in the layer of gases above the surface of the Earth) and include hazards such as cyclones and droughts; however, geomorphic hazards originate only from forces associated with tectonic plate movement beneath the surface of the Earth (e.g. causing earthquakes).*

**Marking Key:**

|  |  |
| --- | --- |
| **Description** | **Marks** |
| Cleary distinguishes between the two forms of hazards by defining one or more significant differences between the two hazards. May be supported by examples. | 2 |
| Defines one or both hazards without clearly identifying a significant difference between the two. | 1 |
| **TOTAL** | **2** |

**Question 31 (4 marks)**

With reference to a natural or ecological hazard that you have studied, explain the concept of magnitude.

**Syllabus:**

The spatial and temporal distribution, *magnitude*, duration, frequency, probability and scale of spatial impact of natural and ecological hazards at a global scale.

**Key word:**

*Explain*: relate cause and effect, make the relationships between things evident; provide why and/or how.

**Teacher Notes:**

Magnitude refers to the size, severity, force or power of a natural hazard event.

Students should explain the relevance of the concept to a natural or ecological hazard that they studied.

Some examples of the way in which the magnitude of different hazards may be measured:

|  |  |
| --- | --- |
| Natural Hazards | Ecological Hazards |
| * Moment Magnitude Scale (earthquakes * Tropical Cyclone Category System (cyclones) * Volcanic Explosivity Index (volcanoes) * Beaufort Scale (tropical storms) * The McArthur Forest Fire Danger Index (bushfires) * Rainfall and flood markers (floods) * Others where applicable | * International Nuclear & Radiological Event Scale   (nuclear hazards)   * Nuclear Accident Magnitude Scale (nuclear hazards) * Morbidity and mortality rates (Ebola or Malaria) * Others where applicable |

**Marking Key:**

|  |  |
| --- | --- |
| **Description** | **Marks** |
| Accurately defines magnitude and provides a detailed explanation of the concept. Refers to the way in which the magnitude of a given hazard may vary, typically with further reference to the relevant scale by which it is measured (e.g. Beaufort Scale) and/or other units of measurement. | 4 |
| Accurately defines magnitude and provides an explanation of the concept. May refer to the way in which the magnitude of a given hazard varies and may include reference to the relevant scale and/or units of measurement. | 3 |
| Defines magnitude and provides some explanation of the concept. May make some reference to the variations in magnitude and/or the relevant scale and/or units of measurement. | 2 |
| A limited understanding of the concept of magnitude is shown. | 1 |
| No relevant understanding of magnitude is shown. | 0 |
| **TOTAL** | **4** |

**Question 32 (6 marks)**

Explain the role of spatial technologies in the study of natural and ecological hazards.

**Syllabus:**

The role of spatial technologies in the study of natural and ecological hazards.

**Key word:**

*Explain*:relate cause and effect; make the relationships between things evident; provide why and/or how.

**Teacher Notes:**

Spatial technologies are central to the study of natural hazards in a variety of ways:

* Geographic Information Systems (GIS) such as *Google* *Earth* may be used to track and predict the spatial extent of a given hazard.
* Satellite imagery, aerial photography, drone images, radar tracking, infra-red sensing, Lidar and other remote sensing technologies may also provide support both in preparing for and responding to hazards.
* Other data, such as transport routes, topography, weather and climate, soils and vegetation can be overlaid on GIS to ascertain the areas most affected by a hazard.
  + This can then be used to predict secondary impacts such as landslides in the aftermath of earthquakes and cyclones.

Spatial technologies are also vital to the study of ecological hazards:

* The capacity for GIS to be used to track and predict the spatial distribution of a given ecological hazard is vital.
* As a result of the availability of spatial technologies, geographers are now increasingly able to establish links between the spread of ecological hazards and factors such as population density, levels of economic development, access to medical care, transport links and the implementation of risk management practices.
* The responses to ecological hazards such as, for example, pandemics (eg. COVID-19) and plant-based diseases (such as *Phytophthora cinnamomi*) have benefited greatly from these spatial technologies.

**Marking Key:**

|  |  |  |
| --- | --- | --- |
| **Description (for each of natural and ecological hazards)** | | **Marks** |
| Correctly explains multiple aspects of the use of spatial technology in studying hazards. Uses correct geographical terminology and refers to specific examples to support the explanation. | | 3 |
| Correctly explains one or more aspects of the use of spatial technology in studying hazards. Uses some geographical terminology and refers to an examples to support explanation. | | 2 |
| Refers to an aspect of spatial technology and provides some information on its link to hazards. | | 1 |
| **TOTAL** | **3** x 2 **= 6** | |

**Section Three: Extended response 40% (40 marks)**

**PART A: Unit 1 Depth Study 1 Answer either Question 33 or Question 34 20% (20 Marks)**

**Question 33 (20 marks)**

1. Describe **two (2)** ways in which the activities of people can intensify the impacts of a natural hazard you have studied.

(8 marks)

**Syllabus:**

The means by which the activities of people can intensify the impacts of the hazard.

**Key word:**

*Describe*: provide characteristics and features.

**Teacher Notes:**

Students can refer to any natural hazard that they have studied to answer this question. Teacher discretion is required to determine the relevance of a student’s answer in response to the question.

Students will need to clearly identify their chosen natural hazard. A good answer will demonstrate understanding of the phrase ‘intensify the impacts of’ in relation to their chosen natural hazard.

**Human activities** may include the following where relevant:

* Nature and location of human settlements - Materials used in construction of associated buildings and structures.
* Density of human settlement. Increasing population density and urbanisation.
* Location in relation to aspects of the physical environment and climate characteristics that may intensify the impact of the hazard.
* Activities associated with and the nature of agricultural practices such as clearing of land, irrigation infrastructure and practices, alteration to microclimate.
* Activities associated with and the nature of mineral extraction practices such as clearing of land, water management practices and alteration to microclimate.
* Large scale human activities which may influence climate change and the intensity of atmospheric hazards.
* Management practices associated with forest reserves and bushland areas.
* Deforestation and land clearing.
* The quality of infrastructure and utility supplies – water supply infrastructure (collection, storage, distribution), water treatment, sewage infrastructure/plants, storm water drainage, transport infrastructure, power supply infrastructure.
* The quality of emergency response and medical infrastructure, knowledge and supplies.
* General population’s education and knowledge of potential causes and impacts associated with the natural hazard.
* Others not mentioned may be relevant to specific natural hazards.

**Marking Key:**

|  |  |
| --- | --- |
| **Description** | **Marks** |
| A detailed and comprehensive description is given and accurate information is provided about the ways in which the activities of people can intensify the impacts of a natural hazard. Both the human activities and the intensity and nature of the impacts are described. A wide range of appropriate supporting evidence and examples are used to develop and strengthen the description. The accurate use of relevant geographical terminology and concepts helps to develop a cohesive, concise and articulate answer, with well-developed sentences and paragraphs in an extended answer format. | 7-8 |
| A concise description is given and accurate information is provided about the ways in which the activities of people can intensify the impacts of a natural hazard. Some description of the human activities and the intensity and nature of the impacts is presented. A range of appropriate supporting evidence and examples are used to develop and strengthen the description. Relevant geographical terminology and concepts helps to develop a cohesive and detailed answer, with well-developed sentences and paragraphs in an extended answer format. | 5-6 |
| A limited description is given and generalised information is provided about the ways in which the activities of people can intensify the impacts of a natural hazard. Little description of the human activities and the intensity and nature of the impacts is presented. Limited evidence is used to support statements and generalisations. There is limited use of geographical terminology and concepts in a largely unstructured response. | 3-4 |
| A very basic description is given about the ways in which the activities of people can intensify the impacts of a natural hazard (or just hazards in general). Insufficient evidence is presented in the description. There is limited or no use of geographical terminology and concepts, and poor literacy skills may contribute to a response that is difficult to understand. | 1-2 |
| No relevant attempt. | 0 |
| **TOTAL** | **8** |

NOTE: If only one (1) activity is described a maximum of four marks is to be awarded.

**Question 33 (20 marks)**

1. Identify **two (2)** stakeholder groups affected by a natural hazard you have studied and explain their values and viewpoints on recovery and adaptation measures undertaken.

(12 marks)

**Syllabus:**

The stakeholders affected by the hazard and their values and viewpoints on recovery and adaptation to future hazards in terms of modifying:

* human vulnerability (susceptibility to future loss)
* loss burden (cost of loss mitigation and adaptation)

**Key words:**

*Identify*: recognise and name.

*Explain*: relate cause and effect.

*Stakeholders*: a group or organisation that has interest or concern in an event, process or activity.

*Values*: a judgement of what is important to an individual or group in a given situation. Important beliefs or ideals shared by a group about what are positive, negative or neutral outcomes.

*Viewpoints*: a way of looking at or thinking about something.

*Recovery*: the longer-term measures taken to rebuild a community after a hazard event or disaster has occurred.

*Adaptation*: alteration or adjustment in response to a changed environment.

**Teacher Notes:**

Students can refer to any natural hazard that they have studied to answer this question. Teacher discretion is required to determine the relevance of a student’s answer in response to the question.

**Stakeholders:** Students will need to identify and name **two (2)** different stakeholder groups, along with a brief description of who they are, what they do and the nature of their stake in the scenario. An extremely strong case would have to be presented by the candidate to accept an individual as a stakeholder. Terms such as ‘the residents’ and ‘the citizens’ are also generally accepted as too general, as opinions can vary throughout such broad groups.

Whilst it would be preferable (and a better structured answer) to present two differing sets of values and viewpoints, the syllabus dot point and question does not explicitly require this.

Examples of stakeholders could include:

* environmental groups and agencies
* local governments and councils
* regional, state and federal governments and departments
* United Nations Development Programme (UNDP)
* The UN’s Central Emergency Response Fund (CERF)
* other agencies of the United Nations
* non-governmental organisations (NGOs) such as Doctors Without Borders (Médecins Sans Frontières)
* the workers of NGOs, both locally and internationally
* multilateral aid organisations such as the World Bank
* business and industry groups, e.g. local farmers, mine owners, and other groups representing owners of business and industry
* others as relevant to the specific natural hazard studies.

**Values and Viewpoints:** In explaining values and viewpoints, candidates should state the stakeholder groups’ role in, or connection to the affected area. Are they local to the area? Are they involved or connected on a permanent or temporary basis?

**Marking Key:**

|  |  |
| --- | --- |
| **Description** | **Marks** |
| Identification of a specific natural hazard and of **two (2)** different stakeholder groups is made. Thorough descriptions of the nature of their role and stake are provided. A detailed and comprehensive explanation of the values and viewpoints of each stakeholder group in relation to a number of recovery measures and adaptations undertaken for the natural hazard is presented. A wide range of appropriate supporting evidence and specific examples are used to develop and strengthen the explanation. The accurate use of relevant geographical terminology and concepts helps to develop a cohesive, concise and articulate answer, with well-developed sentences and paragraphs in an extended answer format. | 11-12 |
| Identification of a specific natural hazard and of **two (2)** different stakeholder groups is made. Accurate descriptions of the nature of their role and stake are provided. A detailed explanation of the values and viewpoints of each stakeholder group in relation to a number of recovery measures and adaptations undertaken for the natural hazard is presented. A range of supporting evidence and specific examples are used to develop and expand the explanation. Relevant geographical terminology and concepts help to develop a cohesive and detailed answer, with well-developed sentences and paragraphs in an extended answer format. | 9-10 |
| Identification of a specific natural hazard and of **two (2)** different stakeholder groups is made. General descriptions of their role and stake are provided. An appropriate explanation of the values and viewpoints of the stakeholders in relation to recovery from and adaption undertaken for the natural hazard is presented. Some supporting evidence is used to develop the explanation. Geographical terminology and concepts are applied to construct a response, which shows some detail, but may have difficulty articulating ideas. | 6-8 |
| Identifies a specific natural hazard, however, possibly identifies only **one (1)** instead of **two (2)** different stakeholder groups. Limited or non-existent descriptions of their role and stake are given. Limited explanation, probably only a description, of their values and viewpoints in relation to recovery and adaption undertaken for the natural hazard is presented. Limited evidence is used to support statements and generalisations. There is limited use of geographical terminology and concepts in a largely unstructured response. | 3-5 |
| Possibly identifies a natural hazard, however, identifies only **one (1)**, if any, stakeholder groups. Descriptions of their role and stake not given. Possibly a short description of their values and viewpoints. Insufficient evidence is used to support statements and generalisations. There is limited use of geographical terminology and concepts, and poor literacy skills may contribute to a response that is difficult to understand. | 1-2 |
| No relevant attempt. | 0 |
| **TOTAL** | **12** |

**Question 34 (20 marks)**

1. Explain two (2) causes of a natural hazard you have studied.

(8 marks)

**Syllabus:**

The nature and causes of the hazard

**Key word:**

*Explain*: provide characteristics and features.

**Teacher Notes:**

Students can refer to any natural hazard that they have studied to answer this question. Teacher discretion is required to determine the relevance of a student’s answer in response to the question.

**Causes of** can refer to:

**Natural causes**

* the source of the hazard
* how the hazard is generated

**Man-made causes**

* any human factors that may contribute to the occurrence of the hazard

In many cases, **Source 4:** Gross domestic product per capita 2017 may be useful for students in providing supporting evidence in terms of the country’s capacity to prevent, mitigate and prepare for potential hazards. To this end, students may also look to **Source 7:** Hazard management cycle to support their answer.

**Marking Key:**

|  |  |
| --- | --- |
| **Description** | **Marks** |
| A detailed and comprehensive explanation is given and accurate information is provided on the causes of a natural hazard. A wide range of appropriate supporting evidence and examples are used to develop and strengthen the explanation. The accurate use of relevant geographical terminology and concepts helps to develop a cohesive, concise and articulate answer, with well-developed sentences and paragraphs in an extended answer format. | 7-8 |
| An appropriate explanation is given and general, relatively accurate information is provided on the causes of a natural hazard. A range of appropriate supporting evidence and examples are used to develop and strengthen the explanation. Relevant geographical terminology and concepts helps to develop a cohesive and detailed answer, with well-developed sentences and paragraphs in an extended answer format. | 5-6 |
| A limited explanation is given and some generalised information is provided on the causes of a natural hazard. Limited evidence is used to support statements and generalisations. There is limited use of geographical terminology and concepts in a largely unstructured response. | 3-4 |
| A very basic explanation is given and little information is provided on the typical locations **or** causes of a natural hazard. Insufficient evidence is presented in the explanation. There is limited or no use of geographical terminology and concepts, and poor literacy skills may contribute to a response that is difficult to understand. | 1-2 |
| No relevant attempt. | 0 |
| **TOTAL** | **8** |

**Question 34 (20 marks)**

(b) For **one** developed country and **one** less developed country or region, compare and contrast a natural hazard in terms of its social and economic impacts.

(12 marks)

**Syllabus:**

The environmental, economic and social impacts of the hazard in a developed country such as Australia compared with those in at least one less developed country or region.

**Key words:**

*Compare:* show how things are similar and different.

*Contrast:* show how things are different or opposite.

Developed country is a country that is considered to be strong in terms of its economy, infrastructure and industrial resources. The population of a developed country typically has a high standard of living as measured by GDP per capita, high personal income levels, high levels of employment and a number of positive social indicators, particularly those related to education and health.

Less (economically) developed country: limited in its economy, infrastructure and industrial resources. The population of a less developed country has a relatively low standard of living as measured by low income levels, high unemployment, abundant poverty and a number of negative social indicators, particularly those related to education and health.

**Teacher Notes:**

Students can refer to any natural hazard that they have studied to answer this question. Teacher discretion is required to determine the relevance of a student’s answer in response to the question.

**Economic impacts** of a natural hazard may refer to the following, where relevant:

* destruction of food crops and pastures for livestock.
* medical treatments and facilities
* cost of immediate relief efforts and ongoing medical responses.
* interruption to jobs, income and spending, domestically and internationally, leading to destabilisation of economy and government.
* decline in tourism.
* loss of confidence and international investment.

The impact, size and recovery from these potential economic impacts will vary between developed countries and less developed countries.

**Social Impacts** of a natural hazard may refer to the following, where relevant:

* High percentage of deaths, injury and/or infection from natural disasters occurs in LEDC’s, particularly Sub Saharan Africa.
* Loss of employment, income and businesses.
* Impacts on health and mortality.
* Health care infrastructure already limited, cannot cope with hazard event.
* Lack of access to education can prevent children from receiving adequate training and care.

The impact, size and recovery from these potential social impacts may vary between more economically developed countries and less economically developed countries.

In terms of supporting their responses with data from the Broadsheet, students should look to Source 7: Hazard management cycle to support their answer.

**Refer over page for marking key.**

**Marking Key:**

|  |  |
| --- | --- |
| **Description** | **Marks** |
| A clear and concise identification of a developed country and a less developed country or region is made. In relation to a clearly identified type of a natural hazard, a detailed and comprehensive comparison and contrast of economic and social impacts between the areas identified. (A thorough response will necessarily describe various potential economic and social impacts for the particular locations and type of natural hazard being discussed.) A wide range of appropriate supporting evidence and examples are used to develop and strengthen the comparison and demonstrate varying levels of economic and social impacts. The accurate use of relevant geographical terminology and concepts helps to develop a cohesive, concise and articulate answer, with well-developed sentences and paragraphs in an extended answer format. | 11-12 |
| A concise identification of a developed country and a less developed country or region is made. In relation to a clearly identified type of natural hazard, a detailed comparison and contrast of the economic and social impacts between the areas identified. (A thorough response will necessarily describe various potential economic and social impacts for the particular locations and type of natural hazard being discussed.) A range of appropriate supporting evidence and examples are used to develop and strengthen the comparison and demonstrate varying levels of economic and social impact. Relevant geographical terminology and concepts help to develop a cohesive and detailed answer, with well-developed sentences and paragraphs in an extended answer format. | 9-10 |
| Identification of a developed country and a less developed country or region is made. In relation to a clearly identified type of natural hazard, a comparison and contrast of the economic and social impacts between the areas identified. (A good response will describe a number of potential economic and social impacts for the particular locations and type of natural hazard being discussed.) A range of appropriate supporting evidence and examples are used to develop and strengthen the comparison and demonstrate varying levels of environmental economic and social impacts. Relevant geographical terminology and concepts help to develop a cohesive answer, with sentences and paragraphs in an extended answer format. | 6-8 |
| Might identify a developed country and a less developed country or region or may vaguely refer to the concepts. In relation to a natural hazard, a limited comparison and contrast of economic or social impacts between the areas identified. (Response will describe one or two potential economic and/or social impacts for the particular locations and natural hazard being discussed **or** will describe the impacts in some detail but fail to appraise the reasons for the variations at all.) Limited evidence is used to support statements and generalisations with little reference to varying levels of impacts. There is limited use of geographical terminology and concepts in a largely unstructured response. | 3-5 |
| Might identify a developed country and a less developed country or region, or may vaguely refer to the concepts, if at all. In relation to a natural hazard, a very limited, or no, account is given of the reasons for the differences in the level of some impacts. (Response may describe one or two potential impacts for the natural hazard being discussed **or** will very briefly describe the impacts but fail to appraise the reasons for the variations at all.) Insufficient evidence is used to support statements and generalisations with no reference to varying levels of impact. There is limited or no use of geographical terminology and concepts and poor literacy skills may contribute to a response that is difficult to understand. | 1-2 |
| No relevant attempt. | 0 |
| **TOTAL** | **12** |

NOTE: If only one or two of the three types of listed impacts are addressed a maximum of 4 or 8 marks can be awarded.

**PART B: Unit 1 Depth Study 2 Answer either Question 35 or Question 36 20%(20 Marks)**

**Question 35 (20 marks)**

1. Describe the nature of the risks to be managed for an ecological hazard you have studied.

(8 marks)

**Syllabus:**

the nature of the risks to be managed, such as:

* loss of property/life
* effects on infrastructure, jobs and the economy
* the impact on physical and mental health

**Key words:**

*Describe:* provide characteristics and features.

**Teacher Notes:**

Students can refer to any ecological hazard that they have studied to answer this question. Teacher discretion is required to determine the relevance of a student’s answer in response to the question.

The term *risk* is taken here to be referring to the nature of potential impacts, rather than their actual management.

Risks, or impacts, to be managed, in relation to the dot points highlighted in the question, may include:

* costs of treatment to individuals, businesses, governments and NGO’s
* costs of containment of the spread of a disease, chemical agent, nuclear threat.
* costs of controlling secondary impacts such as contamination of water supplies and/or food sources
* impact on agricultural production and income
* loss of employment, jobs, and income and wider associated impacts on the economy. physical health impacts such as: short term physical injury/illness, reoccurring injury/illness, permanent disability and death
* mental health impacts from personal illness

There may be other specific impacts associated with specific ecological hazards.

**Marking Key:**

|  |  |
| --- | --- |
| **Description** | **Marks** |
| Clearly identifies an ecological hazard and describes the concept of risk as related to this hazard. A detailed and comprehensive description is given and accurate information is provided on risks associated with the given ecological hazard. A wide range of appropriate supporting evidence and examples are used to develop and strengthen the description. The accurate use of relevant geographical terminology and concepts helps to develop a cohesive, concise and articulate answer, with well-developed sentences and paragraphs in an extended answer format. | 7-8 |
| Identifies an ecological hazard and describes the concept of risk as related to this hazard. An appropriate description is given and more general, but accurate information is provided on the types of risks associated with the given ecological hazard. A range of appropriate supporting evidence and examples are used to develop and strengthen the explanation. Relevant geographical terminology and concepts helps to develop a cohesive and detailed answer, with well-developed sentences and paragraphs in an extended answer format. | 5-6 |
| Identifies an ecological hazard. Describes the concept of risk in part. A limited description is given and some generalised information is provided on the types of risks associated with the given ecological hazard. Limited evidence is used to support statements and generalisations. There is limited use of geographical terminology and concepts in a largely unstructured response. | 3-4 |
| May describe an ecological hazard in very generalised terms. A very basic description is given and little information is provided on the types of risks associated with a given ecological hazard. There is limited or no use of geographical terminology and concepts, and poor literacy skills may contribute to a response that is difficult to understand. | 1-2 |
| No relevant attempt. | 0 |
| **TOTAL** | **8** |

**Question 35 (20 marks)**

(b) Describe the spatial and temporal distribution of an ecological hazard and explain the patterns identified by referring to:

* biophysical processes

and

* human processes

(12 marks)

**Syllabus:**

The spatial and temporal distribution of the hazard and how an understanding of biophysical and human processes can be used to explain the patterns that are identified.

**Key word:**

*Describe*: provide characteristics and features.

*Explain:* relate cause and effect; make the relationships between things evident; provide why and/or how.

**Glossary:**

*Spatial distribution:* the arrangement of geographical phenomena or activities across the earth’s surface; the location of features of a place; how features are arranged across the surface of the earth.

*Temporal distribution:* the distribution of geographical phenomena over time; when phenomena occur and/or how frequently, if known.

**Teacher Notes:**

Students can refer to any ecological hazard that they have studied to answer this question. Teacher discretion is required to determine the relevance of a student’s answer in response to the question.

**Biophysical processes** may include the following where relevant: atmospheric processes and patterns; components of the water cycle and surface water conditions; drainage patterns and characteristics; the nature of and variations in ecosystem components such as soil and vegetation types; these may influence habitat and food availability for some components of ecological hazards. Others not mentioned may be relevant to specific ecological hazards.

**Human processes** may include the following where relevant: the nature and location of human settlements and structures; activities associated with and the nature of agriculture; activities associated with and the nature of mineral extraction practices; water catchment management and structures associated with water storage, distribution and power generation; management practices associated with forest reserves and bushland areas; programs and processes that may either hinder or encourage the frequency of occurrence; general level of knowledge and understanding of the hazard; access to preventative medical supplies; others not mentioned may be relevant to specific ecological hazards.

Spatial distribution of the ecological hazard should include where the hazard occurs and the patterns associated with this distribution.

Temporal distribution of the ecological hazard should include how often the hazard occurs/has occurred (frequency) and the probability of the hazard occurring, if known.

In many cases, Source 4: Gross domestic product per capita 2017 may be useful for students in providing supporting evidence, as would Source 5: Total confirmed COVID-19 cases for students who have studied that as their chosen ecological hazard.

**Marking Key:**

|  |  |
| --- | --- |
|  |  |
| A detailed and comprehensive explanation is given and accurate information is provided of two factors that relate to the spatial and temporal distribution of a selected ecological hazard. The spatial and temporal distributions of the ecological hazard are thoroughly and accurately described. A wide range of appropriate supporting evidence and examples are used to develop and strengthen the explanation. The accurate use of relevant geographical terminology and concepts helps to develop a cohesive, concise and articulate answer, with well-developed sentences and paragraphs in an extended answer format. | 10-12 |
| An appropriate description is given and general, relatively accurate information is provided of two factors that relate to the spatial and temporal distribution of a selected ecological hazard. The spatial and temporal distributions of the ecological hazard are clearly and accurately described. A range of appropriate supporting evidence and examples are used to develop and strengthen the description. Relevant geographical terminology and concepts helps to develop a cohesive and detailed answer, with well-developed sentences and paragraphs in an extended answer format. | 7-9 |
| A limited description is given and some generalised information is provided of two factors that relate to the spatial and temporal distribution of a selected ecological hazard. The spatial and/or temporal distributions of the ecological hazard are described to a limited extent. Limited evidence is used to support statements and generalisations. There is limited use of geographical terminology and concepts in a largely unstructured response. | 4-6 |
| A very basic description is given and little information is provided of one or two factors that may relate to the spatial and temporal distribution of an ecological hazard. An attempt may be made to describe the spatial or temporal distributions of the ecological hazard. Insufficient evidence is presented in the description. There is limited or no use of geographical terminology and concepts and poor literacy skills may contribute to a response that is difficult to understand. | 1-3 |
| No relevant attempt. | 0 |
| **TOTAL** | **12** |

**Question 36 (20 marks)**

1. Describe the nature of an ecological hazard you have studied by referring to its:

* duration and frequency

and

* the scale of its spatial impact.

(8 marks)

**Syllabus:**

The magnitude, duration, frequency, probability and scale of spatial impact of the hazard

**Key words:**

*Describe:* provide characteristics and features.

*Duration:* the length of time a hazard event occurs.

*Frequency:* the rate at which or number of times a hazard occurs over a particular period of time.

*Scale of spatial impact:* the extent or size of the area or region impacted by the hazard.

**Teacher Notes:**

Students can refer to any ecological hazard that they have studied to answer this question. Teacher discretion is required to determine the relevance of a student’s answer in response to the question.

**Marking Key:**

|  |  |
| --- | --- |
| **Description** | **Marks** |
| A detailed and comprehensive description is given and accurate information is provided on the duration, frequency and scale of spatial impact of an ecological hazard. A wide range of appropriate supporting evidence and examples are used to develop and strengthen the description. The accurate use of relevant geographical terminology and concepts helps to develop a cohesive, concise and articulate answer, with well-developed sentences and paragraphs in an extended answer format. | 7-8 |
| An appropriate description is given and general, relatively accurate information is provided on the duration, frequency and scale of spatial impact of an ecological hazard. A range of appropriate supporting evidence and examples are used to develop and strengthen the description. Relevant geographical terminology and concepts helps to develop a cohesive and detailed answer, with well-developed sentences and paragraphs in an extended answer format. | 5-6 |
| A limited description is given and some generalised information is provided for at least the duration and frequency or the scale of spatial impact of an ecological hazard. Limited evidence is used to support statements and generalisations. There is limited use of geographical terminology and concepts in a largely unstructured response. | 3-4 |
| A very basic description is given and little information is provided for the factors listed in relation to an ecological hazard. Alternatively, very brief descriptions (1 sentence each could be given for all the factors). Insufficient evidence is presented in the description. There is limited or no use of geographical terminology and concepts, and poor literacy skills may contribute to a response that is difficult to understand. | 1-2 |
| No relevant attempt. | 0 |
| **TOTAL** | **8** |

NOTE: If only one (1) of the dot points is addressed a maximum of four marks is to be awarded.

**Question 36 (20 marks)**

(b) Evaluate the sustainability of risk management to reduce the impacts of an ecological hazard through:

* prevention and mitigation

and

* preparedness.

(12 marks)

**Syllabus:**

the sustainability of risk management policies, procedures and practices designed to reduce the impacts of the hazard, in the short and long term, through prevention, mitigation and preparedness

**Key words:**

*Evaluate:* to ascertain the value or amount of; appraise carefully.

*Sustainability:* meeting the needs of current and future generations through simultaneous environmental, social and economic adaptation and improvement.

**Teacher Notes:**

Students can refer to any ecological hazard that they have studied to answer this question. Teacher discretion is required to determine the relevance of a student’s answer in response to the question.

Whilst not referred to or required in the question, (as is the practice of SCSA in recent years in the extended answer questions), candidates may use information and terminology found in Source 4 to strengthen their answer, as per instructions on page 2 of the exam booklet.

Candidates should define or briefly describe the nature of sustainability. Risk management policies (plans) and practices (actions taken), for an ecological hazard they have studied, should be described in order to evaluate their level of sustainability. These plans and policies may be produced by various levels of government, risk management authorities (such as FESA), NGO’s or international agencies such as the United Nations of World Health Organisation. Sustainability is measured against the three pillars of sustainability - environmental, social and economic sustainability. The sustainability of policies and practices should be evaluated against these three pillars and their ability to meet the needs of current and future generations.

Aspects to be considered may include:

**Environmental** – do the procedures and practices, impact other aspects of the environment such as species, habitats, water supplies, coastlines and air quality?

**Economic** – are the measures affordable for the country, region, community or individuals affected? Are the costs involved sustainable in the short term and long term? Can governments, NGO’s and individuals afford the ongoing procedures and practices?

**Social** – are the procedures and practices available and affordable to all individuals and communities in need of their application, both now and into the future?

In terms of supporting their responses with data from the Broadsheet, students should look to **Source 7:** Hazard management cycle to support their answer.

**Refer over page for marking key.**

**Marking Key:**

|  |  |
| --- | --- |
| **Description** | **Marks** |
| A detailed and comprehensive evaluation of relevant risk management is given for the chosen ecological hazard. Complete and accurate information is provided about prevention, mitigation and preparedness. The evaluation refers to the three pillars of sustainability and the ability of the policies and practices to meet the needs of current and future generations in the area(s) affected by the hazard. A wide range of appropriate supporting evidence is used to develop and strengthen the evaluation. The accurate use of relevant geographical terminology and concepts helps to develop a cohesive, concise and articulate answer, with well-developed sentences and paragraphs in an extended answer. | 11-12 |
| A detailed evaluation of relevant risk management is given for the chosen ecological hazard. Accurate information is provided about prevention, mitigation and preparedness. The evaluation refers to the three pillars of sustainability and the ability of the policies and practices to meet the needs of current and future generations in the area(s) affected by the hazard. A range of appropriate supporting evidence is used to develop and strengthen the evaluation. The accurate use of relevant geographical terminology and concepts helps to develop a cohesive and detailed answer, with well-developed sentences and paragraphs in an extended answer. | 9-10 |
| An appropriate evaluation of a relevant risk management policy and practices is given for the chosen ecological hazard. Some accurate information is provided about prevention, mitigation and preparedness. The evaluation refers to the three pillars of sustainability and the ability of the policies and practices to meet the needs of current and future generations in the area(s) affected by the hazard. Some supporting evidence is used to develop the evaluation. Geographical terminology and concepts are applied to construct a response, which shows some detail, but may have difficulty articulating ideas. | 6-8 |
| A limited evaluation, more likely a description, of a relevant risk management policy or practice is given for the chosen ecological hazard. Some generalised information is provided about the nature of the policy or practice. The three pillars of sustainability and the ability of the policy or practice to meet the needs of current and future generations in the area(s) affected by the hazard are only partially referred to. Limited evidence is used to support statements and generalisations. There is limited use of geographical terminology and concepts in a largely unstructured response. | 3-5 |
| A basic description, of a relevant risk management policy or practice is given for the chosen ecological hazard. Insufficient information is provided about the nature of the policy or practice. The three pillars of sustainability and the ability of the policy or practice to meet the needs of current and future generations in the area(s) affected by the hazard are not referred to. Insufficient evidence is used to support statements and generalisations. There is limited use of geographical terminology and concepts, and poor literacy skills may contribute to a response that is difficult to understand. | 1-2 |
| No relevant attempt. | 0 |
| **TOTAL** | **12** |