Section One: Multiple Choice (each question is worth one mark)

1.b
2.b
3.c
4.c
5.b
6.b
7.a
8.c
9.d
10.c
11.a
12.a
13.b
14.d
15.a
16.b
17.d
18.b
19.c
20.b

Section Two: Short response (30 marks)

**Question 21** **(2 marks)**

With reference to **Source 1,** describe the spatial relationship between the topography and Lakes Entrance Airfield (GR 838102).

**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:**
The student must first ensure they find and describe the correct airfield (as there are two on the map). The Lakes Entrance area is very undulating with a complicated terrain, dominated by multiple creeks / watercourses, making it somewhat challenging to distinguish distinctive topographic features. The airfield is located on a gentle, elongated slope (1:50) which is in fact quite flat when compared with the surrounding gullies, creeks and undulating land. The topography provides one of the few lengths of relatively flat ground suitable for an airstrip.

**Example:**
*The Lakes Entrance airfield is located on relatively flat land of approximately 60m ASL. The surrounding topography is quite steep, featuring gullies and creeks that are unsuitable for airstrips. The airstrip follows the gentle slope running almost East-West.*

**Marking Key:**

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

**Question 22**

**(2 marks)**

A farmer walks from spot height 45 (GR 847109) down to GR 849106. Calculate the average gradient of their walk. 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 between the two points given of approximately 1.8cm, which represents 450m metres on the ground. NB: distance may vary between 1.8-1.9cm, 450 – 475m
- The difference in elevation ("rise") is 45 - 10 = 35 metres. (The nearest marked contour lines are at GR 849108 (30m and 20 m) and counting the contours downhill toward the fenceline, the final contour is 10m ASL.
- Students should then use the formula 'rise over run' to calculate the average gradient: Rise : run = 35:450.
  *and then divide both sides of the ratio by 35 to achieve a final gradient of*
  1:12.85 = 1:13 to the nearest whole number.
- Allow variation to accommodate horizontal distance variation, therefore 1:14 would also be an acceptable answer.

**Marking Key:**

| Description | Marks |
|---|---|
| Correctly shows calculations to determine the answer. (Answer may be correct or incorrect depending on whether correct heights and distances were identified – this mark is for correct formula and method of calculation. | 1 |
| Correct answer is provided due to correct determination of "rise" and "run" and calculation of gradient as 1:13 or 1:14. | 1 |
| **TOTAL** | **2** |

**Question 23** **(2 marks)**

Consider a scenario where a bushfire starts in the vicinity of AR 8213 in the Colquhoun / Boyanga Gidi State Forest and moves in a South Easterly direction towards Lakes Entrance. Using evidence from Source 1, identify and provide the location of a natural or cultural feature that may assist in reducing the risk to the built up area of Lakes Entrance.

**Syllabus:**

- Identify, describe and interpret spatial patterns (including land use, settlement and transport), and spatial relationships between natural and cultural features on maps.
- explain the concepts of preparedness and mitigation in relation to hazard risk management

**Key word:**
*Identify:* recognise and name.

**Teacher Notes:**
There are several possible responses to this question and some teacher discretion is required. Note: the answer does NOT have to explain how the feature reduces risk, it simply needs to name the feature and provide the location.

Possible natural features that reduce bushfire risk:

- Mississippi Creek (vicinity of GR 860090)
- Cleared land (e.g. vicinity of GR 870093 and GR 855085)

Possible cultural features that reduce bushfire risk:

- A1 Highway, other roads and forest tracks for emergency service access and possible evacuation routes
- Airfields (Lakes Entrance GR840101) and Great Lakes Airport (GR 880103) for emergency service use.
-

**Marking Key:**

| Description | Marks |
|---|---|
| Identifies a feature that is logically likely to reduce bushfire risk. Gives accurate location using map evidence (e.g. ARs and/or GRs) | 2 |
| Identifies a feature that is logically likely to reduce bushfire risk. Does **not** give accurate location using map evidence. | 1 |
| **TOTAL** | **2** |

Refer to **Source 1:** Lakes Entrance topographic map 2019 and **Source 2** Lakes Entrance satellite image 2005 to answer Questions 24.

**Question 24** **(2 marks)**

With reference to map evidence, identify the location of and describe a change that can be observed to have occurred between 2005 and 2019 in the area contained in Source 2.

**Syllabus:**

- compare the different types of information available from remote sensing products with the information depicted on a topographic map
- use remote sensing products as an aid to interpreting natural and cultural features shown on topographic maps
- use combinations of remote sensing products and topographic maps to provide information based on change over time

**Key word:**
*Identify:* recognise and name.

*Describe:* provide characteristics and features.

**Teacher Notes:**
Students may identify other changes that are not included as examples below. While the topographic map and the satellite image are 14 years apart, there are actually very few clearly identifiable changes over that time.

Examples changes include:
- Increase in buildings (most likely houses) on O'Donnell Drive in the vicinity of GR 874099. In the 2005 satellite image (Source 2) there are very few houses visible and in Source 1, there are numerous in that location.
- Increase in buildings (most likely houses) on Tarra Drive in the vicinity of GR 866090. In the 2005 satellite image (Source 2) there are some houses visible and in Source 1, the area is labelled built up, indicating an increase in density of housing (effectively a full sub-division).

**Marking Key:**

| Description | Marks |
|---|---|
| Accurately locates and describes an example of a change between 2005 and 2019. Supports with good use of geographical terminology and map evidence (e.g. GR, street names). | 2 |
| Describes an example of a change between 2005 and 2019 but does **not** support with good use of geographical terminology or map evidence (e.g. GR, street names)<br>OR<br>Gives accurate map evidence / location of the change, but does not accurately describe the change itself. | 1 |
| **TOTAL** | **2** |

Refer to **Source 6**: Decadal average of world deaths from natural disasters to answer Question 25 and Question 26.

**(4 marks)**

**Question 25**

Outline the trends in the temporal distribution of world deaths from drought and storms between 1900 and 2010.

**Syllabus:**

- identify and analyse relationships, spatial patterns and trends, and make predictions and inferences
- interpret and construct tables and graphs (e.g. picture graphs; line, bar and compound graphs; histograms; scattergrams; climatic graphs; pie graphs; flowcharts, population pyramids).

**Key word:**
*Outline:* Sketch in general terms; indicate the main features of

**Teacher Notes:**
Students will need to ensure their response only describes the distribution relating to drought and storms.
Death from drought has seen a general decline over time, whereas death from storms has remained more constant over time with higher averages in 1970s, 1990s and 2000s.
The response must provide a description over time, using specific dates and data from the graph.
The response need not give reasons for the distribution.
NB: The graph shows average annual deaths per decade, not total deaths in each decade.

**Exemplar:**
*Drought accounted for an average of approx. 120,000 deaths per year in the 1900s then rose rapidly to over 450,000 in the 1920s before seeing an overall decline, where there have been very few deaths from drought since the 1990s. The temporal distribution of deaths from storms has not been declining, with each decade since 1910 including some deaths from storms. Storm deaths remained relatively constant at around 10,000 per year in each decade between 1920 – 1960, but rose to nearly 30,000 in the 1970s, then declining to their typical range around 10,000 per year.*

**Marking Key:**

**For BOTH drought and storms (2 marks per hazard)**

| Description | Marks |
|---|---|
| Correctly and clearly outlines changes observed in deaths and identifies exceptions. Uses specific decades and data from the source to support the response. Includes all /most of the time periods given. | 2 |
| Outlines changes observed in deaths but may not identify exceptions. Uses some decades and data from the source to support the response. Includes some of the time periods given. | 1 |
| **TOTAL** | **2** |

**Question 26**

**(3 marks)**

Account for the change in world deaths from natural disasters between 1920 – 2010. You may wish to consider using examples of preparedness and/or mitigation.

**Syllabus:**

- interpret and construct tables and graphs (e.g. picture graphs; line, bar and compound graphs; histograms; scattergrams; climatic graphs; pie graphs; flowcharts, population pyramids)
- outline examples of the following natural hazards:
  tropical storms, floods, landslides, droughts, bushfires, earthquakes and volcanoes
- explain the concepts of preparedness and mitigation in relation to hazard risk management

**Key word:**
*Account for:* state reasons for, report on.

**Teacher Notes:**
The response should consider the overall downward trend in deaths from natural disasters and offer legitimate examples of factors that may help explain this downward trend. There is no need for the response to include specific, real-life data or information.

Some students may focus on specific hazards, such as extreme temperature, that have seen an increase in deaths.

A student may wish to offer multiple reasons for a specific hazard type (e.g. earthquakes, development in building technology) or general reasoning that accounts for several different hazard types (e.g. enhancements in telecommunication technology to assist prior warning to hazards).

Student responses must include appropriate geographical terminology and demonstrate an understanding of the concepts of hazard geography, preparedness, adaptation and/or mitigation.
Some examples may include:

- improved farming techniques and global aid to reduce the impact of drought
- enhancements in flood mitigation, dam construction to reduce the impact of floods
- climate change impacting on increased frequency of heatwaves and storms
- enhancements in medical and emergency response technology
- enhancements in remote sensing technology to provide early warning

| Marking Key: | Description | Marks |
|---|---|---|
| | Provides a correct, detailed and logical explanation of reasons for change in world deaths over time. May explain **one** (1) reason in more detail or two or more reasons in less detail. Uses appropriate and accurate geographical terminology and uses data and hazard types from the source to support the response. | 3 |
| | Provides a logical explanation of reasons for change in world deaths over time, but lacks detail. May explain **one** (1) reason in some detail, or simply list several reasons with limited explanation. Uses some geographical terminology but uses limited data and hazard types from the source to support the response. | 2 |
| | Provides a poor explanation of reasons for change in world deaths over time. May only list one or two reasons with very limited detail. Limited use of geographical terminology and little to no data and hazard types are used. | 1 |
| | **TOTAL** | **3** |

**Question 27**

**(3 marks)**

Define the term spatial technologies and outline one way in which they are used in the study of natural or ecological hazards.

**Syllabus:**
Describe the role of spatial technologies in the study of natural and ecological hazards.

**Key word:**
Define: State meaning and identify essential qualities

Outline: Sketch in general terms; indicate the main features of

**Teachers Notes:**
Some teacher discretion is required for this response and the example given for how spatial technology is used may vary. Response must include a clear definition of the term spatial technologies: ***: Any type of technology that refers to place, space or location; this includes technologies that collect and organise data from specific points on the earth's surface*** *. The use of spatial technologies forms the basis of many geographers' work practice. Global positioning systems (GPS), Google Earth, geographic information systems (GIS) and the use of satellite images are the most commonly used spatial technologies to visualise, manipulate, analyse, display and record spatial data.*

**Marking Key:**

| Description | Marks |
|---|---|
| Correctly defines the term spatial technologies. Identifies and clearly outlines the use of one spatial technology, making reference to a specific natural or ecological hazard. | 3 |
| Partial or limited definition of the term spatial technologies and identifies and outlines the use of one spatial technology in the study of natural or ecological hazards. | 2 |
| Incorrect or does not provide a definition or a generally poor outline of spatial technologies use. | 1 |
| **TOTAL** | **3** |

**(4 marks)**

**Question 28**

With reference to both a natural and ecological hazard event and/or place that you have studied, outline the concept of probability.

**Syllabus:**
For one natural/ecological hazard event and/or place:

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

**Key word**
*Outline:* Sketch in general terms; indicate the main features of

**Teacher Notes:**
Students must make direct reference to a specific natural hazard event and/or place and a specific ecological hazard event and/or place that they have studied. E.g. Students cannot simply refer to the probability of bushfires in general terms, they must relate the term to a specific event.

Good responses will also give a specific definition of the term probability and it is reasonable to expect this definition to only be given once in the response:
*A prediction that a hazard event will occur based on scientific observations or relevant factors to the hazard.*

Responses need to explain the particular probability of their specific hazard event and may include further information that outlines how probability data may have been collected or historical data that helped predict the probability of their chosen event. Responses can further explain that higher probability usually results in higher risk.

**Marking Key:**
**For BOTH natural hazard example and ecological hazard example (2 marks each)**

| Description | Marks |
|---|---|
| Correctly outlines the term probability and relates it clearly and logically to a specific natural or ecological hazard event and/or place. The response includes linking the specific hazard event with the concept of probability and may include reference to specific data that helps in predicting probability. Use of relevant and appropriate geographical terminology. | 2 |
| Attempts to outline the term probability and relates it to a specific natural or ecological hazard event and/or place. The response includes linking the specific hazard event with the concept of probability but does not include reference to specific data that helps in predicting probability. Limited use of geographical terminology. | 1 |
| **TOTAL** | **2** |

**Question 29**

Using an example, define hydrological hazards. **(2 marks)**

**Syllabus:**

- define the concepts of hazard geography, natural hazards, atmospheric hazards, hydrological hazards, geomorphic hazards and ecological hazards

**Key word**
*Define*: State meaning and identify essential qualities

**Example:**
*Hydrological hazards involve the movement and distribution of water and include hazards such as flooding, king tides or storm surges.*

**Marking Key:**

| Description | Marks |
|---|---|
| Correctly defines a hydrological hazard and provides a correct example. | 2 |
| Correctly defines a hydrological hazard but does not provide an accurate example OR provides an incorrect definition of a hydrological hazard with an accurate example. | 1 |
| **TOTAL** | **2** |

Refer to **Source 7**: Vulnerability versus mitigation actions – hazard risk matrix to answer Question 32.

**Question 30** **(6 marks)**

(a) Referring to **Source 7**, outline how vulnerability and mitigation actions combine to determine risk.

(2 marks)

(b) Explain how human factors contribute to less developed countries being more vulnerable to a natural hazard than more developed countries.

(4 marks)

**Syllabus:**

- explain the concepts of preparedness and *mitigation* in relation to hazard risk management
- compare the physical and human factors that explain why less developed countries are more *vulnerable* to the hazard than more developed countries.

**Key words:**

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

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

**Teacher Notes:**

(a) Vulnerability refers to the susceptibility to harm or change while mitigation involves the implementation of the strategies to eliminate or minimise the severity of a hazard. Source 7 shows how both vulnerability and mitigation can interact to result in varying degrees of risk. Better mitigation strategies with less vulnerability, results in lower risk. Conversely, poor mitigation strategies and more vulnerability result in higher risk. Responses should demonstrate an understanding of the concepts of vulnerability, mitigation and risk. While specific definitions may not be given, the terms must be explained to demonstrate understanding.

(b) Examples of human factors that contribute to less developed countries being more vulnerable include:

- less developed country with poorly constructed homes (highly vulnerable), combined with governments lacking funding and development of early warning systems for tsunamis
- less developed country more likely to have relatively limited transport and communications infrastructure
- less developed country likely to have relatively limited levels of organisation and availability of emergency infrastructure to effectively manage relief efforts

Examples of how human factors may reduce vulnerability in more developed countries include:

- public education programs / advertisements to increase household planning for bushfire season combined with mandatory building standards by Government in bushfire zones
- increased funding and subsidies to emergency services with robust training and education systems
- high levels of technical skills to design and construct preventative measures or to predict impacts.

**Marking Key:**

(a)

| Description | Marks |
|---|---|
| Provides a correct explanation of the matrix using appropriate geographical terminology. Refers to the source to aid in explaining how these two factors combine to influence risk. | 2 |
| Provides a limited explanation of the matrix using some geographical terminology. Refers to the source to aid in explaining how these two factors combine to influence risk. | 1 |
| **TOTAL** | **2** |

(b)

| Description | Marks |
|---|---|
| Provides a correct and detailed explanation of how vulnerability is impacted by human factors. Multiple factors are explained using clear examples of either natural or ecological hazards, illustrating the difference between less developed and more developed countries. Accurate and sophisticated use of appropriate geographical terminology throughout. | 4 |
| Provides a correct explanation of how vulnerability is impacted by human factors. Multiple factors are explained using examples of either natural or ecological hazards, illustrating the difference between less developed and more developed countries. Use of appropriate geographical terminology throughout. | 3 |
| Provides an explanation of how vulnerability is impacted by human factors. Only single factor or vague multiple factors are explained, possibly using examples of either natural or ecological hazards, illustrating the difference between less developed and more developed countries. Some use of geographical terminology throughout. | 2 |
| Provides an attempt at explaining how vulnerability is impacted by human factors. Only one factor is explained using poor or no example of either natural or ecological hazards, illustrating the difference between less developed and more developed countries. No use of appropriate geographical terminology. | 1 |
| **TOTAL** | **4** |

**Extended Response (40 marks)**

Part A: Unit 1 Depth Study 1 (Answer either Question 33 or 34)

**Question 33** **(20 marks)**

(a) Explain **two** (2) ways in which the activities of people intensified the impacts of a natural hazard event and/or place you have studied. (8 marks)

**Syllabus:**

- explain the means by which the activities of people intensified the impacts of the hazard

**Key words:**

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

**Teacher Notes:**

Students can refer to any natural hazard event and/or place 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.

**Activities of people** may include the following where relevant:

- Nature and location of human settlements – materials used in the 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 a microclimate.
- Activities associated with and the nature of mineral extraction practices such as clearing of land, water management practices and alteration to a 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, stormwater 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.
- Government policy, funding, organisation and management of risk and hazard operations.

arking Key:

| Description | Marks |
|---|---|
| Identification of a specific natural hazard event and/or place is given. Very detailed and thorough explanation of <u>two</u> human activities is given. The response clearly articulates the cause and effect relationship between the activity and how this intensified the impacts of the specific hazard event and/or place 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. | 7-8 |
| Identification of a specific natural hazard event and/or place is given. A detailed explanation of explanation of <u>two</u> human activities is given. The response articulates the cause and effect relationship between the activity and how this intensified the impacts of the specific hazard event. A range of appropriate supporting evidence and specific 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 |
| Identification of a specific natural hazard event and/or place is given. An appropriate explanation of <u>two</u> human activities is given. The response attempts to articulate the cause and effect relationship between the activity and how this intensified the impacts of the specific hazard event and/or place, but is somewhat unclear. 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. | 3-4 |
| Identification of a specific natural hazard event is and/or place may be given. A limited explanation of a particular human activity(s) is given. The response does not adequately articulate the cause and effect relationship between the activity and how this intensified the impacts of the specific hazard event and/or place. Limited evidence is used to support statements and generalisations. There is limited use of geographical terminology and concepts in a largely unstructured response. | 1-2 |
| No relevant attempt. | 0 |
| **TOTAL** | **8** |

*Note: If a response only explains one human activity, a maximum of 4 marks is to be awarded.

(20 marks)

**Question 33**

(b) Discuss the environmental, economic and social impacts of a natural hazard event and/or place you have studied. (12 marks)

**Syllabus:**

- discuss the environmental, economic and social impacts of the hazard

**Key word:**
*Discuss*: Identify issues and provide points for and/or against

**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.
Some examples of possible impacts include:
Environmental: coastal erosion, liquefaction, aftershocks, associated hazards e.g., landslides, avalanches, tsunamis etc.
Economic: impact on GDP, loss to industry, loss to agriculture, damage to infrastructure etc.
Social: death toll, injuries, displaced people etc.

**Marking Key:**

| Description | Marks |
|---|---|
| A detailed and comprehensive discussion is provided with accurate information provided on the impacts of a chosen natural hazard event and/or place. The response thoroughly addresses environmental, economic and social impacts. A wide range of appropriate supporting evidence and examples are used to develop and strengthen the discussion. 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 detailed discussion is provided and accurate information is provided on the impacts of a chosen natural hazard event and/or place. The response addresses environmental, economic and social impacts. A range of appropriate supporting evidence and examples are used to develop and strengthen the discussion. Relevant geographical terminology and concepts helps to develop a cohesive and detailed answer, with well-developed sentences and paragraphs in an extended answer format. | 9-10 |
| A limited discussion is provided and some information is provided on the impacts of a chosen natural hazard event and/or place. The response includes environmental, economic and social impacts. Evidence is used to support statements and strengthen the discussion. There is use of geographical terminology and concepts in a structured response. | 6-8 |
| A limited discussion is given and generalised information is provided on the impacts of a chosen natural hazard event and/or place. The response may only address one or two of either environmental, economic and social impacts. 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 explanation is and little information is provided on the impacts of a chosen natural hazard event and/or place. The response does not adequately address environmental, economic and social impacts. 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** | **12** |

**Question 34** **(20 marks)**

(a) Describe the spatial and temporal distribution of a natural hazard you have studied.

(8 marks)

**Syllabus:**

- describe the spatial and temporal distribution 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 both spatial (the arrangement of geographical phenomena or activities across the Earth's surface) and temporal (the distribution of geographical phenomena over time) distribution in relation to their chosen natural hazard.

**Marking Key:**

| Description | Marks |
|---|---|
| A detailed and comprehensive description is given and accurate information is provided about the distribution of the hazard. Both the spatial and temporal distribution are described in detail. 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 detailed description is given and accurate information is provided about the distribution of the hazard. Both the spatial and temporal distribution are 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. | 5-6 |
| A limited description is given and generalised information is provided about the distribution of the hazard. Both the spatial and temporal distribution are described but one type of distribution may be lacking details. 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 distribution of the 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. | 1-2 |
| No relevant attempt. | 0 |
| **TOTAL** | **8** |

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

**Question 34** (20 marks)

(b) Evaluate **two** (2) hazard risk management strategies that were implemented to reduce the impacts of a natural hazard event and/or place you have studied.

(12 marks)

**Syllabus:**

- evaluate **two** hazard risk management strategies implemented to reduce the impacts of the hazard, including mitigation and preparedness.

**Key words:**
*Evaluate:* To ascertain the value or amount of; appraise carefully.

**Teacher Notes:**
Students can refer to any natural hazard event and/or place 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.

In order to adequately address the directional term of evaluation, students must demonstrate a judgement on the effectiveness, or otherwise, of the chosen risk management strategy. Simply describing the strategy does not adequately address the question fully.

**Marking Key**

| Description | Marks |
|---|---|
| A detailed and comprehensive description of **two** (2) hazard risk management strategies are given for a specific natural hazard event and/or place. A thorough and detailed evaluation of the hazard risk management strategies is given, including a clear and concise statement demonstrating a judgement / effectiveness of the strategy. A comparison may be made between the two strategies. 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 description of **two** (2) hazard risk management strategies are given for a specific natural hazard event and/or place. A detailed evaluation of the hazard risk management strategies is given, including a clear statement demonstrating a judgement / effectiveness of the strategy. A comparison may be made between the two strategies. 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 |
| A limited description of **two** (2) hazard risk management strategies are given for a specific natural hazard event and/or place. An evaluation of the hazard risk management strategies is given, including an attempt to state a judgement / effectiveness of the strategy. 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 basic description of **two** (2) hazard risk management strategies or only one hazard risk management strategy is given for a specific natural hazard event and/or place. A limited evaluation of the hazard risk management strategies is given, with no or poorly constructed statement demonstrating a judgement / effectiveness of the strategy. 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 one hazard risk management strategy is given for **one** specific natural hazard event and/or place. Insufficient evaluation of the hazard risk management strategies is given, with no statement demonstrating a judgement / effectiveness of the strategy. 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** |

*Note: If a response only addresses one hazard risk management strategy, a maximum of 6 marks is to be awarded.

Part B: Unit 1 Depth Study 2 (Answer either Question 35 or 36)

**Question 35** **(20 marks)**

(a) Explain how physical and/or human processes impact the spatial and/or temporal distribution of an ecological hazard you have studied. (8 marks)

**Syllabus:**

- explain how physical and/or human processes determine the spatial and temporal distribution of the hazard

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

**Teacher Notes:**
Students can refer to any ecological hazard type 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 question allows flexibility for students to respond by only explaining either physical or human processes, or both. Likewise, the question allows for students to discuss either spatial or temporal distribution, or both.

Responses that only address one type of process or one type of distribution will need greater detail.

**Physical 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.

**Marking Key:**

| Description | Marks |
|---|---|
| A detailed and comprehensive explanation is given and accurate information is provided for physical and/or human processes that determine the spatial and/or temporal distribution of a selected ecological hazard. The spatial and/or 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. | 7-8 |
| An appropriate explanation is given and information is provided for physical and/or human processes that determine the spatial and/or temporal distribution of a selected ecological hazard. The spatial and/or temporal distributions of the ecological hazard are 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. | 5-6 |
| A limited explanation is given and generalised information is provided for physical and/or human processes that determine the spatial and/or 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. | 3-4 |
| A very basic explanation is given and information is provided for physical and/or human processes that determine the spatial and/or temporal distribution of a selected ecological hazard. An attempt is made at describing the spatial and/or temporal distributions of the 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 cause/s of an ecological hazard event and/or place you have studied and evaluate the effectiveness of **one** (1) hazard risk management strategy implemented to reduce the impacts of the hazard event and/or place. (12 marks)

**Syllabus:**

- explain the cause/s of the hazard
- evaluate two hazard risk management strategies implemented to reduce the impacts of the hazard, including mitigation and preparedness.

**Key words:**
*Describe:* provide characteristics and features.

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

**Teacher Notes:**
Students can refer to any ecological hazard event and/or place that they have studied to answer this question. The response could be divided into two discrete parts but students may link the cause/s of the hazard event and/or place directly with the hazard risk management strategy if they wish.

**Marking Key:**

| Description | Marks |
|---|---|
| A detailed and comprehensive description of the cause/s of a specific ecological hazard event and/or place is given. A comprehensive and detailed evaluation of a hazard risk management strategy is given, including a clear and concise statement demonstrating a judgement / effectiveness of the strategy. 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 description of the cause/s of a specific ecological hazard event and/or place is given. A detailed evaluation of a hazard risk management strategy is given, including a clear statement demonstrating a judgement / effectiveness of the strategy. 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 adequate description of the cause/s of a specific ecological hazard event and/or place is given. An adequate evaluation of a hazard risk management strategy is given, including a statement demonstrating a judgement / effectiveness of the strategy. 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 description of the cause/s of a specific ecological hazard event and/or place is given. A limited evaluation of a hazard risk management strategy is given, including an attempt at a statement demonstrating a judgement / effectiveness of the strategy. 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 or no description of the cause/s of a specific ecological hazard event and/or place is given. A very limited or no evaluation of a hazard risk management strategy is given, with no statement demonstrating a judgement / effectiveness of the strategy. 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 36 **(20 marks)**

(a) Describe the magnitude, duration, and scale of spatial impact of an ecological hazard event and/or place you have studied.

(8 marks)

**Syllabus:**

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

**Key words:**
*Describe:* provide characteristics and features.

**Teacher Notes:**
Students can refer to any ecological hazard event and/or place 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.

*Magnitude:* the strength of a hazard, or how large and important a natural hazard event is.
*Duration:* the length of time a hazard event occurs.
*Scale of spatial impact:* the extent or size of the area or region impacted by the hazard.

**Marking Key:**

| Description | Marks |
|---|---|
| A detailed and comprehensive description is given and accurate information is provided on the magnitude, duration and scale of spatial impact of an ecological hazard event and/or place. 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 magnitude, duration and scale of spatial impact of an ecological hazard event and/or place. 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 **two** of the three factors (i.e. magnitude, duration, or scale of the spatial impact) of an ecological hazard event and/or place. 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 event and/or place. 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** |

**Question 36** (20 marks)

(b) For an ecological hazard you have studied, explain how physical and human factors account for higher vulnerability in less developed countries when compared to more developed countries. (12 marks)

**Syllabus:**

- compare the physical and human factors that explain why less developed countries are more vulnerable to the hazard than more developed countries.

**Key word:**

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

*Compare:* show how things are similar and different

**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. Student responses must include at least one (1) human and one (1) physical factor in their response.

**Marking Key:**

| Description | Marks |
|---|---|
| A clear and concise comparison between the vulnerability in a developed country and a less developed country or region is made for a clearly identified type of ecological hazard. Detailed and comprehensive explanations are given to account for higher vulnerability, using detailed examples of at least one physical and one human factor. A wide range of appropriate supporting evidence and examples are used to develop and strengthen the comparison. 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 comparison between the vulnerability in a developed country and a less developed country or region is made for an identified type of ecological hazard. Detailed explanations are given to account for higher vulnerability, using examples of at least one physical and one human factor. A range of appropriate supporting evidence and examples are used to develop and strengthen the comparison. 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 |
| A comparison between the vulnerability in a developed country and a less developed country or region is made for an identified type of ecological hazard. An explanation is given to account for higher vulnerability, using some examples of at least one physical and one human factor. Some supporting evidence and examples are used to develop and strengthen the comparison. Some use of relevant geographical terminology and concepts help to develop a cohesive answer, with sentences and paragraphs in an extended answer format. | 6-8 |
| A limited comparison between the vulnerability in a developed country and a less developed country or region is made for an identified type of ecological hazard. A brief explanation is given to account for higher vulnerability, using limited examples of at least one physical and one human factor. Limited supporting evidence and examples are used to develop and strengthen the comparison. There is limited use of relevant geographical terminology and concepts answer format in a largely unstructured response. | 3-5 |
| A very limited or no comparison between the vulnerability in a developed country and a less developed country or region is made for an identified type of ecological hazard. A very limited or no explanation is given to account for higher vulnerability, using very limited or no examples of physical or human factors. Very limited or no supporting evidence and examples are used to develop and strengthen the comparison. 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 type of factor (either physical or human) is discussed, a maximum of 6 marks is to be awarded.