



EARTH AND ENVIRONMENTAL SCIENCE

Sample WACE Examination 2016

Marking Key

Marking keys are an explicit statement about what the examiner expects of candidates when they respond to a question. They are essential to fair assessment because their proper construction underpins reliability and validity.

Section One: Multiple-choice

15% (15 Marks)

Question	Answer
1	c
2	d
3	b
4	d
5	b
6	b
7	d
8	a
9	d
10	a
11	c
12	b
13	b
14	a
15	c

Section Two: Short answer

50% (105 Marks)

Question 16

(13 marks)

Metamorphic rocks result from the solid-state alteration of pre-existing rocks by the effects of heat and pressure.

- (a) Describe **two** changes in rock texture that commonly occur during metamorphism.

(2 marks)

Description	Marks
Any two metamorphic textural changes, For example: increasing grain size, alignment of mineral grains (foliation), deformation (flattening and elongation) or existing grains, recrystallisation on existing crystals etc. (1 mark each)	1–2
Total	2

- (b) The type of rock produced and the minerals of which it is composed are related to the type of metamorphism, the composition of the parent rock and the conditions of temperature and pressure involved.

Complete the table below. For each of the parent rocks listed, name a metamorphic rock that may be produced, and suggest a common mineral found in each metamorphic rock. (6 marks)

Parent Rock	Type of metamorphism	Possible metamorphic rock produced from the parent rock	A common mineral found in this type of metamorphic rock
Limestone	Regional	Marble	Calcite
Sandstone	Contact	Quartzite	Quartz
Shale	Regional	Slate,	Depends on rock chosen → quartz, muscovite biotite or chlorite
		Phyllite	→ quartz, muscovite biotite or chlorite
		Schist	→ muscovite or biotite, garnet
		Gneiss	→ quartz, orthoclase feldspar, plagioclase feldspar (Light bands) or pyroxene, amphibole or , biotite (dark bands).Also allow garnet.

Description	Marks
(3 marks maximum) For each correctly matched product rock type (to parent rock and chosen type of metamorphism)→ See table above	1–3
(3 marks maximum) For a mineral to match matches each metamorphic product. → See table above	1–3
Total	6

- (c) Metamorphism is responsible for producing many natural resources that are used in modern society. Name a resource formed by metamorphic processes that you have studied. Describe briefly how it was formed and state **one** use for this resource.

(5 marks)

Description	Marks
Resource: <ul style="list-style-type: none"> Any suitable resource of mainly metamorphic origin: Mineral examples include – talc, graphite, garnet, asbestos, kyanite/andalusite/silliminite Rock examples include – slate, marble, quartzite	1
How this resource was formed <ul style="list-style-type: none"> Short or inaccurate description lacking detail (1 mark) Up to 3 marks for a detailed description (3 marks) Note: description must match specified resource.	1–3
Use of this resource <ul style="list-style-type: none"> to any common use of the specified resource 	1
Total	5

Question 17

(6 marks)

- (a) Using an example, define the term ‘sustainability’ as it applies to a natural resource.

(3 marks)

Description	Marks
Use of resource	1
Avoiding long term degradation/ destruction/loss of the resource	1
Named example	1
Example answer: Sustainability means that a resource is not used at a rate which exceeds what it can be replenished at and avoids destruction or degradation of the ecosystem. For example, only allowing fishing in the Swan River at a rate means the natural population of fish does not decrease. Note: Resources such as coal, oil, natural gases and most minerals cannot be used sustainably, but these may be used in an answer as an example of unsustainable use.	
Total	3

- (b) (i) How many kangaroos could the shooters kill and still maintain the population at a sustainable level? (1 mark)

Description	Marks
1500 – 800 = 700 (Calculation not required)	1
Total	1

- (ii) Two years later, the property was affected by a severe drought and 2000 kangaroos died and only 100 young survived. Describe how this altered the sustainability and culling quota for the population of kangaroos on the property. (2 marks)

Description	Marks
Drought would cause the short-term sustainability of the area to be reduced (1 mark)	1
During this drought (and possibly for a few years after), culling numbers would need to be reduced.	1
Total	2

Question 18**(8 marks)**

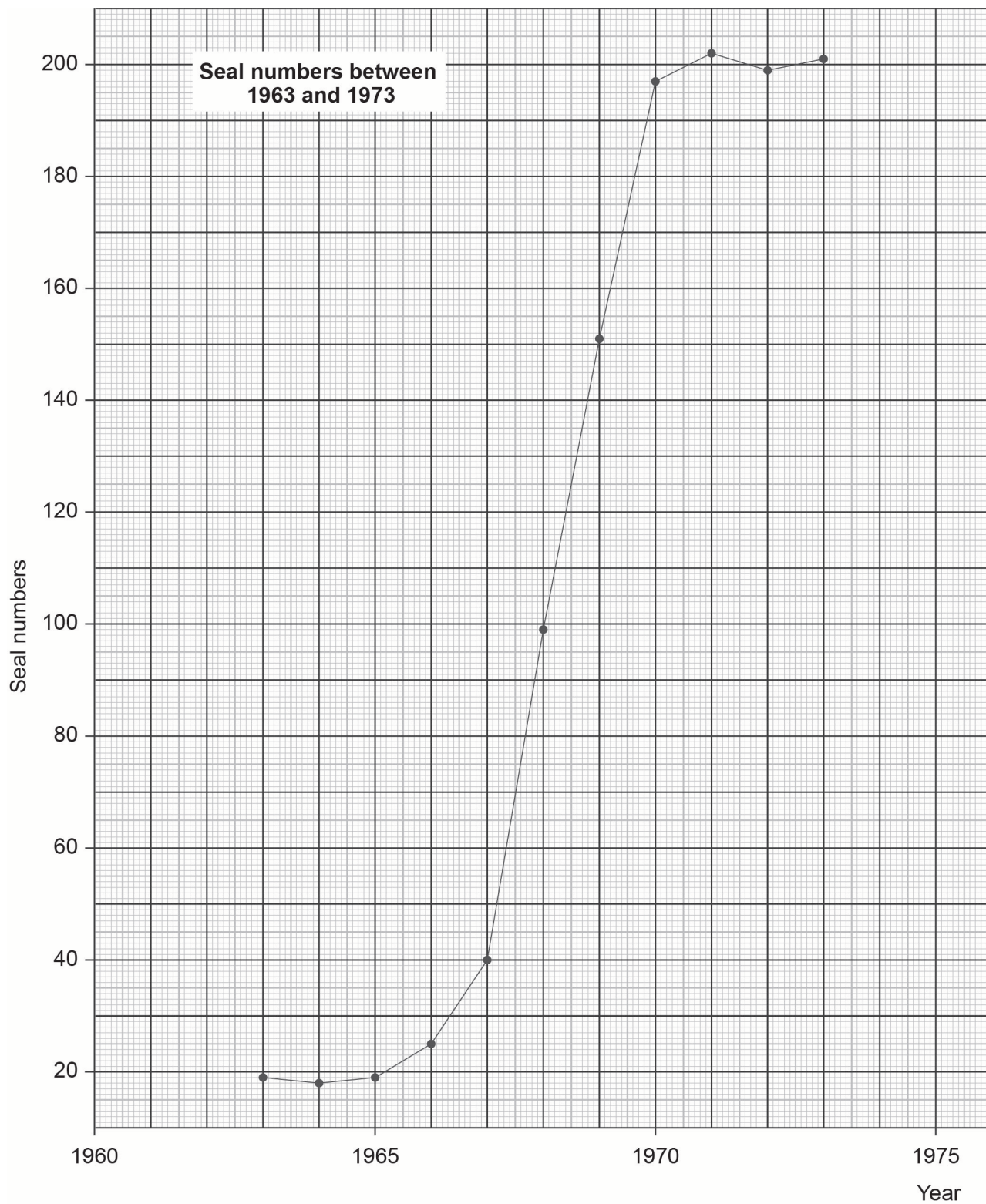
- (a) Draw a graph (using the grid on page 11) showing the numbers of seals on the island over the eleven-year period. (4 marks)

Description	Marks
Title	1
Axes marked, labelled and with units	1
Data plotting accurate with line	1
Axes correct direction	1
Total	4

Note: column or bar graph acceptable

- (b) Explain **two** trends shown in the graph. (4 marks)

Description	Marks
Any two of the following (two marks each) (1 mark for trend, 1 mark for explanation) maximum 2 marks each trend <ul style="list-style-type: none"> • Numbers initially very low due to hunting/sealing • Following introduction of restrictions on sealing seal numbers rapidly increase • Numbers eventually level off as new carrying capacity is reached Or any other acceptable trend.	1–4
Total	4

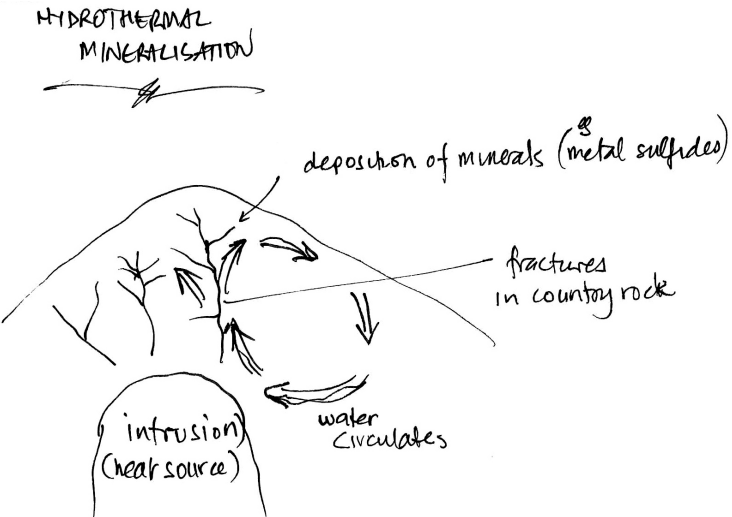


Question 19

(12 marks)

- (a) Choose **one** of the above processes of ore formation and then use a labelled diagram or flow chart, to explain clearly how the minerals are concentrated. Include the source of metals and fluids in the system you illustrate, and the physical conditions or properties that are required for the ore deposit to form. (6 marks)

Name of process chosen: _____

Description	Marks
<p style="text-align: center;"><u>HYDROTHERMAL MINERALISATION</u></p>  <p>Diagram (maximum 2 marks) showing:</p> <ul style="list-style-type: none"> • Heat source (e.g. intrusion) and • convection <p>Three relevant labels: e.g. three of</p> <ul style="list-style-type: none"> • intrusion or heat source • circulation or convection • country rock • fractures • deposition of metals etc. 	<p>1-2</p>
<p>Description: 4 points for 1 mark each, maximum 4 marks:</p> <ul style="list-style-type: none"> • Fluid source maybe be seawater, water trapped during rock formation, water produced during metamorphism etc. • Heat causes fluid circulation • Metals leached from intrusions and/or country rock • Metals deposited due to drop in temperature and/or pressure; fluid mixing; reaction with wall rock etc. to produce ore deposit. 	<p>1-4</p>
Total	6

- (b) Name a major Western Australian metallic ore deposit. Give its approximate location and state the primary resource contained in the deposit. (3 marks)

Description	Marks
Specific deposit name (e.g. Lawlers, Kanowna Bell, Mount Whaleback)	1
Location (either nearest town or region) provided (e.g. Leinster, Kalgoorlie, Pilbara, Kimberley etc.)	1
Resource(e.g. gold, iron ore, lead/zinc etc.)	1
(Note: Non-metallic resources (e.g. diamonds, coal) do not score marks)	
(Note: Only West Australian deposits score marks)	
Total	3

- (c) Name and describe an exploration technique that could be used to search for the mineral resource cited in part (b) above. (3 marks)

Description	Marks
Name viable exploration method (e.g. aerial magnetics, drilling, soil sampling, geological mapping etc.)	1
Description (1 mark per relevant point, maximum 2 marks)	1–2
Example 3-mark answer: Aerial magnetics (1) would be a suitable method. This involves flying over the area with a magnetometer (1) and recording the rocks magnetism to identify any anomalies (1) that may indicate an ore deposit.	
Total	3

Question 20**(11 marks)**

- (a) Describe and explain the likely effect of this change on Australian species distribution and sea levels. (4 marks)

Description	Marks
Species distribution Description: Species distribution will tend to move southwards or distribution become more restricted or possibly lost	1
Species distribution. Explanation: To move back into areas with suitably cooler climates or because suitable habitats disappear due to climatic change (e.g. drying wetlands etc.)	1
Sea levels Description: Sea levels will rise	1
Sea levels Explanation: due to expansion of water as it warms, addition of new glacial / Antarctic water to the oceans as the ice melts. NB No marks for melting of ice packs in the Arctic as these do not have any effect on sea level	1
Total	4

- (b) Climate change models provide projections of future climatic conditions. They take into account the natural variability of the world's climate over time, as well as current measured data.

List **two** methods that modellers might use to gather data on previous global climatic conditions. (2 marks)

Description	Marks
1 mark for any of the following points (maximum 2 marks) <ul style="list-style-type: none">• Pollen and fossil plant/animal remains indicative of environment• Sedimentary layers – show sea level rise and fall• Gases in ice cores• Tree ring analysis (Dendrochronology)	1–2
Total	2

- (c) Outline **one** reason why future climate changes may **not** be what climate models predict. (2 marks)

Description	Marks
1 mark for any of the following points (maximum 2 marks) <ul style="list-style-type: none">• Models usually involve a single model run, simulating one set of conditions• These may not be the actual conditions• There are many conditions which can act as variables, leading to an infinite number of possible outcomes	1–2
Total	2

- (d) Analysis of climatic evidence from the distant past has shown that natural processes have been involved in all climate changes observed in the last 250 million years. Name one natural process that has caused a significant global change in climate and explain its effect on climate. (3 Marks)

Description	Marks
Numerous natural processes could be named e.g. changes in oceanic circulation, orbitally-induced solar radiation fluctuations, intense periods of volcanism, the plate tectonic supercycle etc. (Any one, 1 mark)	1
Process named and how it affects climate (maximum 2 marks) <ul style="list-style-type: none">• Detailed explanation which includes appropriate terminology, examples or details (2 marks)• Simplistic explanation lacking correct terminology, examples or detail (1 mark) Note: Examples of detail might include correct use or explanation of orbital terms such as eccentricity, obliquity or explanation of how gases or dust contribute to climatic variation etc.	1–2
Total	3

Question 21

(14 marks)

Earthquake epicentres can be located on the Earth's surface by analysing seismograph profiles and making calculations based on the physical properties of S and P waves.

- (a) (i) Determine the S–P interval for the profile above. (2 marks)

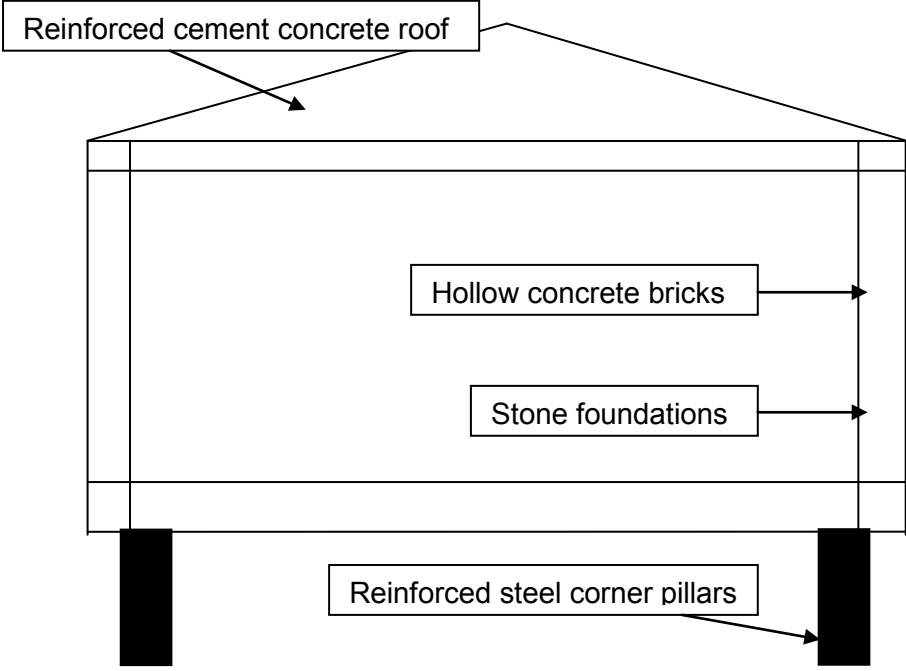
Description	Marks
Correct value (35-37)	1
Correct units (seconds or s)	1
Total	2

- (ii) Determine the distance between the location where the seismograph profile was recorded and the earthquake's epicentre. Use the graph above which shows the relationship between the S–P interval and the distance of the seismograph from the epicentre. (2 marks)

Description	Marks
Correct value (340 - 360)	1
Correct units (kilometres or km)	1
Total	2

Some geographical areas are at serious risk of earthquake events. Measures can be taken to prevent possible damage to people and property in these areas, such as structures that resist shaking movements of the earth.

- (b) Draw a labelled diagram of a building design that includes **three** structural features that would help it to withstand earthquakes. (6 marks)

Description	Marks
<p>Diagram (maximum 3 marks) showing:</p> <ul style="list-style-type: none"> • accurate labelled diagram (3 marks) • inaccurate diagram with labels (2 marks) • inaccurate drawn diagram lacking labels (1 mark) 	<p>1–3</p>
<p>Three relevant features labelled (1 mark for each label), e.g. any three of</p> <ul style="list-style-type: none"> • Hollow concrete bricks • Reinforced concrete roof • Stone foundations • Reinforced steel corner pillars 	<p>1–3</p>
<p style="text-align: right;">Total</p>	<p style="text-align: center;">6</p>

- (c) Explain **two** of these features in detail. (4 marks)

Description	Marks
Two features explained (maximum of 2 marks each) <ul style="list-style-type: none">Detailed explanation which includes appropriate terminology, examples or details (2 marks)Simplistic explanation lacking correct terminology, examples or detail (1 mark) Features: <ul style="list-style-type: none">Hollow concrete bricks to cause minimal damage if they fall in another earthquakeReinforced concrete roof to withstand materials falling on top of the buildingStone foundations to withstand earth shake and liquefaction impacts on foundationsReinforced steel corner pillars for strength and flexibility	1–4
Total	4

Question 22**(14 marks)**

- (a) Explain how temperature and rainfall patterns and prevailing winds contribute to the conditions that, in combination, can lead to intense bushfires. (6 marks)

Description	Marks
Temperature patterns 1 mark for each of the following points, to a maximum of 2 marks <ul style="list-style-type: none">Long term warming and drying trend has produced increased average temperaturesThe higher temperatures and drying has increased the load of dry fuel	1–2
Rainfall patterns 1 mark for each of the following points, to a maximum of 2 marks <ul style="list-style-type: none">Parts of Australia that are experiencing prolonged droughts, there is a longer period of drying out of vegetationLate summer has the highest temperatures and when there is little to no rain and associated low humidity the likelihood of bushfires increases	1–2
Prevailing winds 1 mark for each of the following points, to a maximum of 2 marks <ul style="list-style-type: none">In summer in Australia the winds from the hot, dry centre of the continent increase the intensity of bushfires. These winds push hot, dry air over the region that further lowers the humidity and increases the chance of bushfiresThe speed of the wind is also a factor in the rapid spread of bushfires	1–2
Total	6

- (b) Describe **two** strategies that could be used to reduce the impact of bushfires. (4 marks)

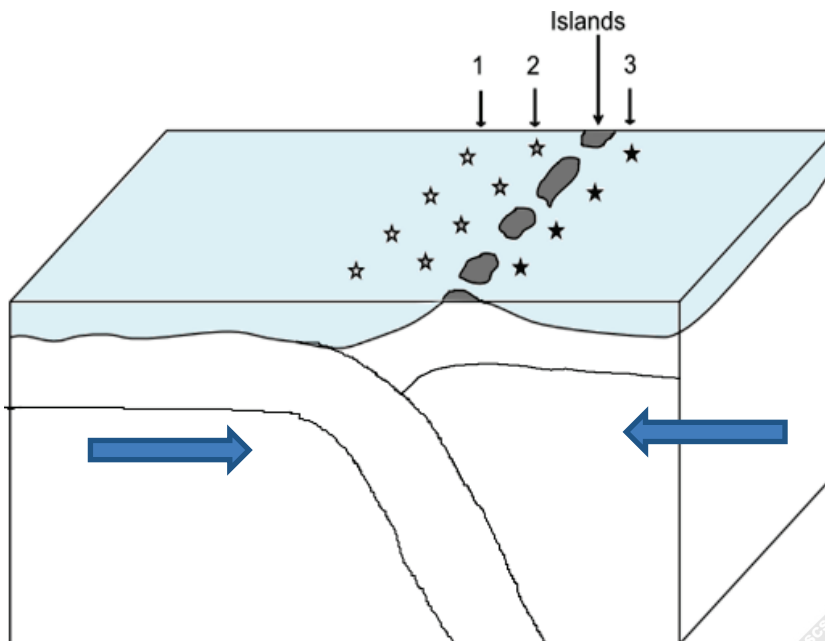
Description	Marks
Any 2 of the following, or similar – 2 marks each <ul style="list-style-type: none"> • Controlled burning in the cooler seasons (1 mark) This reduces the fuel load and hence the chance of a fire either starting or burning out of control. • Discourage building and habitation in areas surrounded by bush (1 mark) This reduces the fuel load and minimises the chance of a fire being started by accident in a home/garden setting. (1 mark) • Have a system of well-maintained fire breaks, (1 mark) to limit the spread of fire should one occur. (1 mark) 	1–4
Total	4

- (c) Using an Australian example, describe **two** ways in which bushfires can have a beneficial effect on the components of a natural ecosystem. (4 Marks)

Description	Marks
Refer to an Australian example Beneficial effects description (maximum 2 marks for each beneficial effect) <ul style="list-style-type: none"> • Detailed, accurate clearly described effect (2 marks) • Poorly described, lacking detail and/or confusions/misconceptions (1 mark) Example beneficial effects: <ul style="list-style-type: none"> • Increases biological diversity as some species are fire tolerant and others are fire vulnerable • Stimulates germination of some plant species • Maintains the numbers of fire vulnerable species, preventing a monoculture • Increases competition to re-establish within an ecological community • Enables succession within an ecological community • Encourages faunal species to expand their habitat • Provides an alternative food source for faunal species through the plant succession • Any other reasonable effect 	1–4
Total	4

Question 23

(12 marks)



- (a) On the front of the above diagram, draw in the **most** likely arrangement of the tectonic plates in this setting, showing the directions of relative movement with arrows. (4 marks)

Description	Marks
Drawn in correct plate arrangement showing subduction to the right	1–2
Drawn in correct plate movements directions (converging plates)	1–2
Total	4

- (b) The islands are home to a number of active volcanoes. What type of volcano would you expect to form at this tectonic location? (1 mark)

Description	Marks
Composite volcano or stratovolcano	1
Total	1

- (c) On the basis of your knowledge of this type of volcanic eruption, assess the relative risk to local populations from the volcanoes formed on these islands. You should justify your assessment with reference to the characteristics of the magma. (4 marks)

Description	Marks
High risk	1
Justification: Any three points (1 mark each, maximum of 3 marks)	1–3
<ul style="list-style-type: none"> • High gas / volatiles content • Medium to high viscosity • Therefore pressure can build up until volcano explodes. Note: A student who misses one of the above points but provides extra detail in their answer may be awarded the missing mark, e.g. an explanation of why the gas content is so high (subducting wet oceanic crust) or why the magma has a high viscosity (high silica content) (Maximum 1 mark for extra detail)	
Total	4

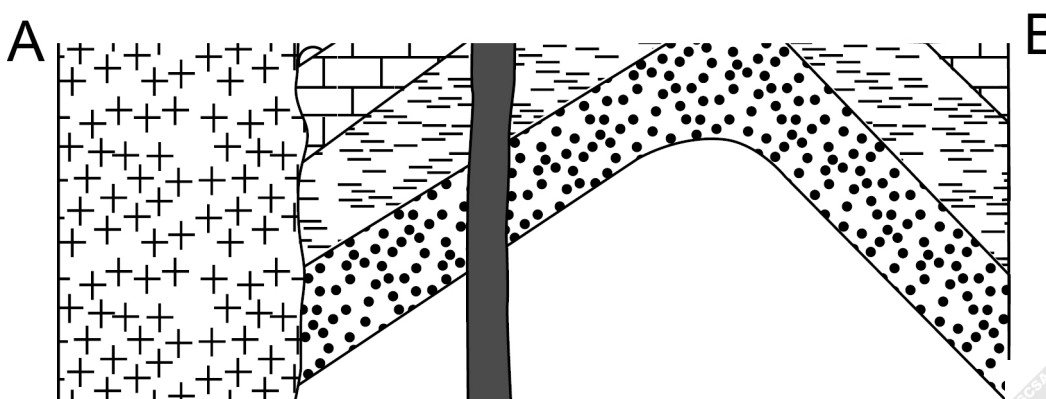
- (d) Describe **three** measures that could be taken to reduce the likely impact on local human populations by these volcanoes. (3 marks)

Description	Marks
Any three reasonable human impact minimisation measures (1 mark each, maximum of 3 marks) Examples include but are not limited to: <ul style="list-style-type: none"> • Satellites used to monitor the temperature and shape of active volcanoes • Sensors measure levels of sulfur dioxide and carbon dioxide gas • Seismometers record earthquakes as magma rises to fill the volcano • Tilt meters record any change in the shape of the volcano • Volcanoes can be studied for the increase in pressure prior to an eruption. • Areas at risk identified on hazard maps. • People practise evacuation procedures. • Lava flows may be diverted by spraying them with water, or even bombing them • Emergency services can be trained to be ready for an eruption and deal with injuries etc • Emergency supplies can prepared such as food, water etc. • Provide an after eruption plan to return the area to normal with plans for clearing up the mess and repairing the damage. 	1–3
Total	3

Question 24

(15 marks)

- (a) On the axes provided draw a geological cross-section from 'A' to 'B' to a depth of 400 m. (6 marks)



Description	Marks
Sedimentary layers drawn	1
Anticline drawn, with dip away from axis	1
Anticline dip accurate and layers in correct order	1
Discordant vertical dyke	1
Discordant contact between granite and sedimentary layers	1
No topography shown	1
Total	6

- (b) Use the information shown on the map and your cross-section drawn in part (a) to complete the following: (4 marks)

Description	Marks
Name the oldest rock unit shown on the cross-section: sandstone	1
Name the youngest rock unit shown: dolerite	1
Name the type of fold formed by the sedimentary layer: anticline	1
Name the intrusive feature formed by the dolerite: dyke	1
Total	4

- (c) Use the information shown on the map, your cross-section and your knowledge of natural processes to answer the following:

- (i) Name and explain the principle by which you determined the youngest rock type in part (b). (2 marks)

Description	Marks
Principle of cross cutting relationships	1
A rock type which cuts through another is younger	1
Total	2

- (ii) Name the type of forces that produced the fold shown in the cross-section and suggest a tectonic environment where the folding may have occurred. (2 marks)

Description	Marks
compressional forces	1
subduction zone or continental collision zone	1
Total	2

- (iii) The student noticed that surrounding the granite intrusion there was a thin zone within the country rock in which the sediments had been altered. Suggest a name for this thin zone. (1 mark)

Description	Marks
metamorphic aureole or baked zone	1
Total	1

Section Three: Extended answer

30% (30 Marks)

Question 25 (compulsory)

(15 marks)

With reference to the graph shown above, discuss how the Earth's climate has changed over geological time. In your answer you need to:

- (a) describe the variation in ocean temperature revealed in this record over the past 5 million years and explain the implications of this variation for the Earth's climate, glacial ice and sea level over the same period. (8 marks)

Description	Marks
Graph description - Short wavelength oscillations	1
Graph description - mean that is initially stable then falls	1
Graph description - amplitude of oscillation increasing over this period	1
1 mark for each relevant point. For example: <ul style="list-style-type: none"> cooling of average global temperatures increasing glacial ice sea levels will fall increasing variability in climate (glacial interglacial periods) change in rainfall patterns changes to rainfall frequency and intensity expanding polar caps increase in exposed land. Any other relevant points acceptable. At least one point for each three areas required.	1–5
Total	8

- (b) outline how changes in climate, glacial ice and sea level may have affected early human societies and discuss **two** implications of global climate change for future human societies. (7 marks)

Description	Marks
1 mark for each area describing the effects in the past. maximum 3 marks Examples: <ul style="list-style-type: none"> climate change: may have resulted in change to traditional food sources or resulted in human settlements being forced to move towards warmer climates in search of food. (i.e. towards the equator) glacial ice: may have restricted range of habitable space sea level drops: may have opened or closed human migration routes. (i.e. forming land bridges) 	1–3
Any two relevant implications, these may imply an increase or decrease in global warming. 1 mark for each named implication, 1 mark for describing implication. maximum 4 marks Examples: <ul style="list-style-type: none"> Increasing sea levels reduce available land. Increased temperatures reduce arable land in many areas Extinction of species of importance to humans. Increased extreme weather events may affect crop production. Allow other examples for different climate change. Answer must relate to human societies.	1–4
Total	7

Question 26

(15 marks)

- (a) Using two examples, explain what is meant by the term 'renewable energy resources'.
(4 marks)

Description	Marks
Renewable energy sources are those that can be renewed or sustained indefinitely in human time scales or without using up resources; or Those where the rate at which the energy is used is equal to or slower than the rate at which it is produced. Simply stating that they will not run out is not sufficient.	1–2
Need two correct examples for 2 marks. 1 mark each Examples can include: wind, waves, tides, geothermal (hot rock), solar, hydro-electricity; biomass. (Do not allow nuclear.)	1–2
Total	4

- (b) For each of the above examples describe how the energy is released or utilized and outline the advantages and disadvantages involved in the development and/or continued operation of each energy source.
(6 marks)

Description	Marks
1 mark for describing how the energy is released / utilized for each example. The description must name the device / technology or process involved. maximum 2 marks Examples: <ul style="list-style-type: none"> • Solar (Photovoltaic) panel, which converts the energy into electricity. • Turbines are turned by moving water / tides which in turn rotates a generator which converts it to electricity. • Water is heated to steam by geothermal energy, turning turbines and a generator which converts it to electricity. 	1–2
Advantages and Disadvantages 1 mark for an advantage and 1 mark for a disadvantage for each example. maximum 4 marks Example answer - Solar Advantages: <ul style="list-style-type: none"> • very suitable for WA's sunny climate • small units can be conveniently fitted in homes, farms or outback mines • once installed produces no CO₂ or other pollutants • source of energy – sunlight – is free. Disadvantages: <ul style="list-style-type: none"> • very expensive to install • requires technical sophistication to produce/maintain • useless at night, under prolonged cloud or in winter at high latitudes • energy storage required for times when sun is not shining • cannot produce quantities of power for 'base load' or very large populations. 	1–4
Total	6

- (c) Identify **one** site in Western Australia where a renewable energy resource has been developed, and explain both the reason that this location was chosen as well as the specific environmental impacts involved with its development and/or continued operation. (5 marks)

Description	Marks
<p>Allow 2 marks for the reason. (The name of the development is not awarded marks without reasoning supplied.)</p> <p>1 mark for name of development and simplistic single point reason for location. e.g. Albany wind farm because it is a very windy area.</p> <p>2 marks for a correctly named development with more than one reason stated or a very well explained single reason. e.g. Albany wind farm because the site elevation and proximity to the coastline contributes to the fact that there are just seven days per year when the wind is not strong enough to turn the turbines. The farm is also a short distance to the main electricity transmission system which reduces power loss and decreases infrastructure costs.</p>	1–2
<p>Allow 3 marks for environmental impact. e.g. Albany wind farm:</p> <ul style="list-style-type: none"> • noise • long blades may kill birds or bats • access roads / tourists • conspicuous site on hill • close to sea • provides power for Albany, so reduces CO₂ emissions • disturbance to ecosystem during construction. • wind generators produce electric and magnetic fields. <p>Any other reasonable points.</p>	1–3
Total	5

Question 27

(15 marks)

- (a) Identify **two** sources of fresh water available for human use and **one** source of fresh water which is not readily available for human use with current technologies. (3 marks)

Description	Marks
<p>Any two practical sources available for human use. 1 mark for each source.</p> <p>Example sources include but are not limited to:</p> <ul style="list-style-type: none"> • precipitation • surface runoff • meltwater from glaciers and ice sheets • groundwater / dams / rivers / lakes • seawater desalination. 	1–2
<p>Any source / reservoir of freshwater which is not readily available for human use with current technologies (1 mark)</p> <p>Example sources include but not limited to:</p> <ul style="list-style-type: none"> • Soil moisture • Atmospheric water vapour • Biological water (water stored in living things). 	1
Total	3

- (b) Both human activity and natural factors can contribute to a decrease in the availability of fresh water. Describe **two** human activities that can pollute fresh water sources as well as **two** other factors that might contribute to a severe fresh water shortage. For each activity and factor described, explain both the environmental effects as well as effects on humans directly. (8 marks)

Description	Marks
<p>Human activities</p> <p>Any two relevant human activities that pollute fresh water. One must be an impact on humans and the other must be about other aspects of the environment. Examples need to be detailed, accurate, clear descriptions. 2 marks for each example.</p> <p>There are no marks for identifying the activities alone.</p> <p>Examples include but are not limited to:</p> <ul style="list-style-type: none"> • chemical pollution from the overland inflow of sewage, oils, dissolved nitrates and other soluble compounds polluting drinking water available to either humans or animals in the environment. • chemical pollution from ground water contaminated by sewage, oils, dissolved nitrates and other organic and inorganic soluble compounds etc → polluting drinking water resources. Impacts on stygofauna. • increase salinity from the inflow of water from regions where native vegetation has been cleared. Results in loss of arable land for future crops (human food source) or loss of habitat, salt water entering waterways etc • Increased eutrophication due to increases in nitrate concentration resulting in mass death of organisms from anoxic conditions. 	1–4
<p>Natural or non-polluting factors</p> <p>Any two natural or non-polluting human actives that reduce the availability of fresh water. One must be an impact on humans and the other must be about other aspects of the environment. Examples need to be detailed, accurate, clear descriptions. 2 marks for each example.</p> <p>Factor includes but not limited to:</p> <ul style="list-style-type: none"> • climate change • reduced rainfall • overuse of surface water • over extraction of groundwater. <p>Impacts include but are not limited to:</p> <ul style="list-style-type: none"> • restricting growth of irrigated crops and pastures • decreasing the availability of food sources for either humans or animals in the environment. • restricting the growth and operation of manufacturing processes which require water as a raw material and/or a source of cooling • decreasing the availability of habitat for fresh water organisms. • restrictions on the use of water in domestic situations • restrictions on the use of water in public amenities, e.g. maintaining parks and gardens • increasing eutrophication due to increases in nitrate concentration. 	1–4
Total	8

- (c) Explain **two** ways to improve the sustainability of Western Australia's sources of fresh water. (4 marks)

Description	Marks
<p>Any two relevant suggestions 2 marks for each to a maximum of 4 marks.</p> <p>2 marks - detailed, accurate, clearly described. 1 mark - poorly described, lacking detail and/or confusions or misconceptions.</p> <p>Examples include but are not limited to:</p> <ul style="list-style-type: none">• public education of users (agricultural, industrial, domestic) in more efficient ways to use water and the reasons for restrictions• legislate restrictions and structure usage charges to encourage reduced consumption• treat and recycle wastewater, possibly using this water to recharge ground water aquifers• upgrade water treatment facilities, expand storm water and sewage collection• diversify sources through investment in infrastructure such as desalination plants, new groundwater sources• build more desalination plants to reduce our reliance on other sources of fresh water.	1–4
Total	4

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