**Victorian Certificate of Education
2020**

Letter

STUDENT NUMBER

ENVIRONMENTAL SCIENCE
Written examination

Thursday 26 November 2020

Reading time: 11.45 am to 12.00 noon (15 minutes)
Writing time: 12.00 noon to 2.00 pm (2 hours)

QUESTION AND ANSWER BOOK

Structure of book

Section	Number of questions	Number of questions to be answered	Number of marks
A	30	30	30
B	9	9	90
			Total 120

• Students are permitted to bring into the examination room: pens, pencils, highlighters, erasers, sharpeners, rulers and one scientific calculator.
• Students are NOT permitted to bring into the examination room: blank sheets of paper and/or correction fluid/tape.

Materials supplied
• Question and answer book of 33 pages
• Answer sheet for multiple-choice questions

Instructions
• Write your **student number** in the space provided above on this page.
• Check that your **name** and **student number** as printed on your answer sheet for multiple-choice questions are correct, **and** sign your name in the space provided to verify this.
• Unless otherwise indicated, the diagrams in this book are **not** drawn to scale.
• All written responses must be in English.

At the end of the examination
• Place the answer sheet for multiple-choice questions inside the front cover of this book.

Students are NOT permitted to bring mobile phones and/or any other unauthorised electronic devices into the examination room.

SECTION A – Multiple-choice questions

Instructions for Section A

Answer **all** questions in pencil on the answer sheet provided for multiple-choice questions.

Choose the response that is **correct** or that **best answers** the question.

A correct answer scores 1; an incorrect answer scores 0.

Marks will **not** be deducted for incorrect answers.

No marks will be given if more than one answer is completed for any question.

Unless otherwise indicated, the diagrams in this book are **not** drawn to scale.

Question 1

Which one of the following is the best measure of Earth's ecosystem diversity?

A.　the variety of ecosystems in the biosphere

B.　the abundance of forests in the lithosphere

C.　the genetic diversity of species in the atmosphere

D.　the relative abundance of species in the hydrosphere

Question 2

The creation of a seed bank is intended to

A.　provide seeds for sale at market prices.

B.　store genetic diversity for one plant species.

C.　store genetic material for future genetic manipulation.

D.　store seeds to support the maintenance of species diversity.

Use the following information to answer Questions 3–6.

Lord Howe Island in New South Wales is an area protected under international agreement. The island is home to several rare and endemic species, including the Lord Howe Island silvereye, a small bird species. Rats were introduced to the island when a steamship ran aground in 1918. Since that time there have been concerns that the small bird will become extinct due to competition with and predation from the rats.

Question 3

Which international agreement protects the environment of Lord Howe Island?

A.　World Heritage listing

B.　*Flora and Fauna Guarantee Act* (Vic)

C.　Convention on International Trade in Endangered Species

D.　*Environment Protection and Biodiversity Conservation Act 1999*

Question 4

The introduced rats are an example of

A.　an exotic species.

B.　a protected species.

C.　a symbiont species.

D.　an endemic species.

Question 5

The population of the Lord Howe Island silvereye is stable and has been estimated at about 5000 breeding birds. However, the International Union for Conservation of Nature still classifies the species as 'vulnerable'.

Which one of the following is the best reason why the Lord Howe Island silvereye is still classified as 'vulnerable'?

A.   The birds are at risk of inbreeding.

B.   The geographic range of the birds is restricted.

C.   The birds are at risk of genetic swamping.

D.   The species is likely to become extinct in the immediate future.

Question 6

In 2019, conservationists introduced chemically baited traps to eradicate the rats. Some of the island's residents were concerned about the effect of baiting on endemic species that might feed on dead rats over the course of the eradication program.

Which one of the following explains the residents' concerns?

A.   loss of prey for the rats

B.   overexploitation of the rats

C.   overpopulation of endemic species

D.   bioaccumulation in the tissues of endemic species

Use the following information to answer Questions 7 and 8.

The bare-nosed wombat is an Australian native animal found in Tasmania, the Bass Strait islands and mainland Australia. The Bass Strait islands' population is small and isolated from the other populations. Although their appearance is different from that of their mainland relatives, genetic studies have found that the Bass Strait islands' wombats have close genetic similarity to wombats found on the mainland and in Tasmania.

Question 7

In the case of the bare-nosed wombat, should variations in morphology alone be used as conclusive evidence of a high level of genetic diversity?

A.   No, as the wombats show no physical differences from their mainland relatives.

B.   Yes, as the wombats are different in physical appearance, despite their low population numbers.

C.   No, as genetic studies can provide further evidence of the level of genetic diversity in the population.

D.   Yes, as variations in morphology are conclusive evidence of a high level of genetic diversity in a population.

Question 8

When deciding whether to implement protection measures for the Tasmanian populations of the bare-nosed wombat, which one of the following considerations is of the least importance from an ecocentric viewpoint?

A.   human benefit

B.   funding of selected species

C.   the precautionary principle

D.   maintaining species richness

Question 9

Coal is formed over time from decaying plant matter under great pressure.

Which one of the following is the best approximation of the time taken for coal to be formed?

A.   1 billion years

B.   100 million years

C.   2–3 million years

D.   100 000 years

Question 10

Which one of the following is not a fossil fuel?

A.   oil

B.   coal

C.   natural gas

D.   hydro-electricity

Question 11

Which one of the following is a statement of the first law of thermodynamics?

A.   The temperature of the world is steadily rising.

B.   The total energy of an isolated system is constant.

C.   The temperature of an isolated system steadily rises.

D.   The total energy of an isolated system steadily decreases.

Question 12

Which one of the following correctly describes natural gas as an energy source?

A.   renewable, fossil source

B.   renewable, non-fossil source

C.   non-renewable, fossil source

D.   non-renewable, non-fossil source

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Use the following information to answer Questions 13–15.

Emissions of carbon dioxide from various fuel types

Fuel type	Carbon content (kg_C/kg fuel)	Energy content (kWh/kg fuel)	Carbon dioxide emission relative to energy content (kg_{CO_2}/kWh)	Carbon dioxide emission relative to amount of fuel (kg_{CO_2}/kg fuel)
methane (natural gas)	0.75	15.4	0.18	2.8
diesel	0.86	12.7	0.25	3.2
black coal (bituminous)	0.65	8.4	0.28	2.4
brown coal (lignite)	0.30	3.9	0.28	1.1
wood	0.50	4.5	0.41	1.8

Data: Engineering ToolBox (2009), 'Combustion of Fuels – Carbon Dioxide Emission', online,
<www.engineeringtoolbox.com/co2-emission-fuels-d_1085.html>

Note: kg – kilograms, kWh – kilowatt hours

Question 13

Which one of the following statements is correct?

A. Wood has the lowest energy content.

B. Methane fuel contains the least amount of carbon per kilogram.

C. When combusted, diesel produces more carbon dioxide per kilogram than any of the other fuel types listed.

D. When combusted, one kilogram of black coal produces the same amount of energy as one kilogram of brown coal.

Question 14

Which unit is used to measure the amount of carbon dioxide produced by each fuel type during combustion, according to how much energy each type contains?

A. kilograms of carbon dioxide

B. kilowatt hours per kilogram of fuel

C. kilograms of carbon dioxide per kilogram of fuel

D. kilograms of carbon dioxide per kilowatt hour

Question 15

In order to generate the data in the table, scientists repeated the measurement of energy content in each of the fuels six times using the same procedure and equipment. The results they obtained were all within 0.2% of each figure listed in the table.

As there was a close agreement within each set of results, it can be said that there is a

A. high level of accuracy.

B. high degree of precision.

C. lack of bias during the experimental procedure.

D. lack of quantitative data within each of the sets.

Question 16

Urban environments contain many surfaces, such as roads and roofs, that stop rainwater from soaking into the ground and cause a higher amount of run-off to flow into drains, creeks and rivers. Run-off from these surfaces often carries rubbish, chemicals or pollutants.

This run-off can have a direct harmful impact on both the

A. biosphere and lithosphere.

B. atmosphere and lithosphere.

C. atmosphere and hydrosphere.

D. hydrosphere and biosphere.

Question 17

Water-sensitive urban design is an approach to planning and designing new urban developments that makes better use of run-off and manages impacts on creeks, rivers and other waterbodies.

Discussions with local government agencies and environmental interest groups about a specific water-sensitive urban design would be regarded as

A. part of the user-pays principle.

B. useful stakeholder involvement.

C. a minor step in the planning process.

D. important when the development is completed.

Question 18

Instead of allowing run-off to flow directly into a local creek, planners develop a strategy to store the water in a nearby pond ecosystem. This will help to clean the water and filter out any pollutants, and then divert it for use by local strawberry farms.

This strategy would be regarded as

A. designing for resource use efficiency.

B. having a negative impact on the strawberry farms.

C. a way of sequestering carbon in the environment.

D. decreasing the ecological sustainability of the local creek.

Question 19

As part of water-sensitive urban design, some developments include strategies to treat wastewater, such as sewage, and recycle it. In Victoria, the Environment Protection Authority (EPA) sets guidelines for the quality of recycled water and works with the Department of Health and Human Services to assess and monitor water quality.

The work of these agencies

A.   involves enforcing a regulatory framework.

B.   includes making regulations that will result in a decrease in water quality.

C.   is unnecessary because sewage should not be recycled for human use.

D.   is important so that the water quality standards set by developers are evaluated.

Use the following information to answer Questions 20 and 21.

The graph below shows approximate global average surface temperature versus years before present time.
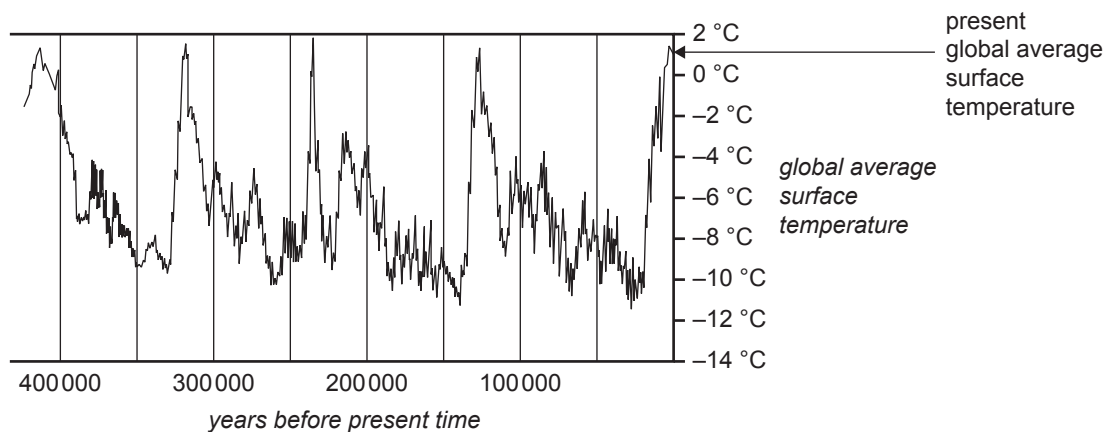
Data: adapted from Climate Data Information,
<www.climatedata.info/proxies/ice-cores>

The graph shows glacial and interglacial periods. Glacial periods (or ice ages) are colder, drier periods during which large ice sheets cover significant parts of Earth's surface. Interglacial periods are warmer periods where glaciers and ice sheets melt and reduce in size.

Question 20

Which one of the following gives the average time interval between warm periods?

A.   1 000 000 years

B.   500 000 years

C.   100 000 years

D.   10 000 years

Question 21

The rate of global temperature increase between ice ages (glacial periods) and warm peaks (interglacials) compared to the rate of temperature decrease between interglacials and ice ages

A.   is faster.

B.   is much slower.

C.   is approximately the same.

D.   cannot be determined from the data.

SECTION A – continued
TURN OVER

Use the following information to answer Questions 22 and 23.

Four identical clear-sided containers are filled with different gases at the same pressure, all at 22 °C: one contains pure oxygen, one contains pure carbon dioxide, one contains air collected in the year 2020 and one contains air from the year 1800.

The containers are randomly labelled E, F, G and H. The containers are exposed equally to infra-red lamps for one hour. A thermometer inside each container records the temperature.

The table below summarises the results of the experiment.

	Container E	Container F	Container G	Container H
Temperature after one hour	25 °C	23 °C	22.5 °C	22 °C

Question 22

Which container holds pure carbon dioxide?

A.   E

B.   F

C.   G

D.   H

Question 23
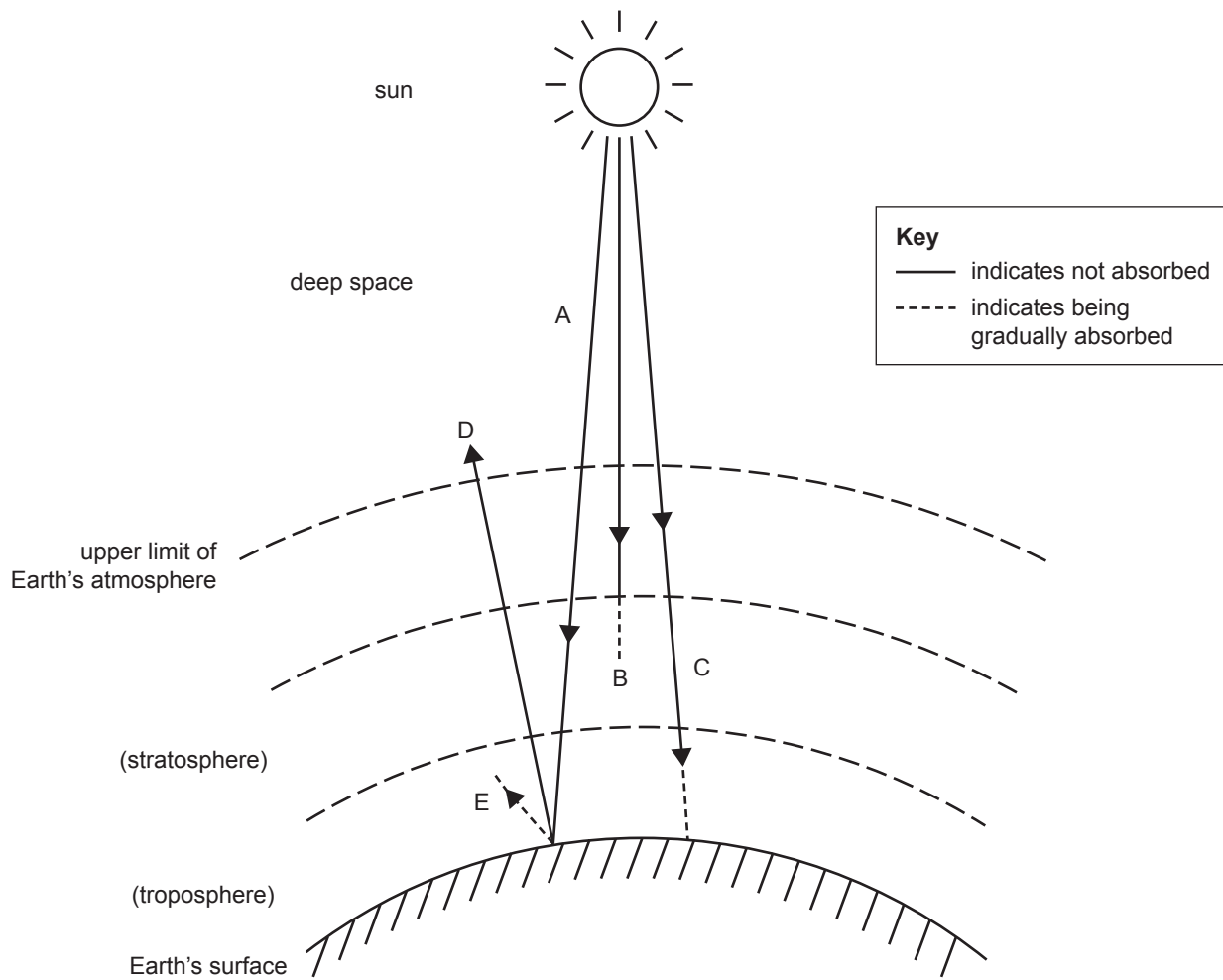
Which container holds air collected in the year 2020?

A.   E

B.   F

C.   G

D.   H

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Question 24

The diagram below shows the sun, Earth and parts of Earth's atmosphere. The lines and arrows A–E indicate different forms of radiation.

Which lines and arrows indicate infra-red radiation?

A. D only
B. A and D
C. A and B
D. C and E

Use the following information to answer Questions 25 and 26.

In 2019 scientists published climate change projections for a Victorian city. The table below shows the temperature projections for two possible sets of future greenhouse gas emissions into the atmosphere: medium emissions and high emissions. For each of the years 2030, 2050 and 2090, the median temperature rise is given, with the likely temperature rise range in brackets.

Average daily maximum temperature, 1986–2005	Greenhouse gas emissions scenario	Projected changes (°C)		
		2030	**2050**	**2090**
20.4 °C	medium	0.9 (0.8–1.3)	1.6 (1.0–2.0)	2.2 (1.8–3.4)
	high	1.2 (1.0–1.6)	1.9 (1.5–2.7)	4.0 (2.8–5.3)

Data: JM Clarke, M Grose, M Thatcher, V Round and C Heady, 'Greater Melbourne Climate Projections 2019', CSIRO, Melbourne, Australia, 2019, <https://publications.csiro.au/rpr/pub?pid=csiro:EP195032>

Question 25

The baseline for temperature projections is the average daily maximum temperature between 1986 and 2005, rather than the previous year's average daily maximum temperature.

This is because

A. Earth's albedo is rising.

B. climate varies from year to year.

C. greenhouse gases are increasing in the atmosphere.

D. the previous year's average daily maximum temperature is likely to be higher than the 1986 to 2005 average.

Question 26

Climate projections for each scenario are presented with a range of likely temperature increases because

A. cities are hotter than the surrounding countryside.

B. projections are based on the exact future sequence of events.

C. projections are based on past temperature trends that have been extended into the future.

D. climate models vary and the response of climate to rising greenhouse gas levels is not perfectly understood.

Question 27

The natural greenhouse effect is the process whereby atmospheric greenhouse gases

A. cause the albedo effect.

B. create natural variability in climate.

C. increase in concentration due to human activities.

D. maintain Earth's surface temperature at a higher level than it would be without them.

Question 28

Carbon sequestration is enhanced by

A. the burning of biofuels.

B. the introduction of water purification systems.

C. a reduction in the sale of single-use plastic bottles.

D. the planting of native trees within remnant vegetation.

Question 29

Which one of the following contributes to 'scientific uncertainty'?

A. the experience of the researcher

B. whether the experiment measures what is intended

C. variation due to limitations of the measuring equipment

D. the difference between the hypothesis and the experimental results

Question 30

The concepts of sustainability and ecologically sustainable development (ESD) are different because

A. sustainability is the goal and ESD is a process to achieve the goal.

B. sustainability values anthropocentrism and ESD values biocentrism.

C. sustainability considers only social factors, whereas ESD considers social, environmental and economic factors.

D. ESD emphasises intragenerational equity, whereas sustainability emphasises intergenerational equity.

SECTION B

Instructions for Section B

Answer **all** questions in the spaces provided.

Unless otherwise indicated, the diagrams in this book are **not** drawn to scale.

Question 1 (16 marks)

The presence of a healthy number of insects is crucial to maintaining balanced ecosystems.

In terms of abundance, insects are the dominant form of animal life on Earth. Close to one million insect species have been described to date, whereas around 5416 mammal species have been identified.

Scientists sought to measure how the diversity of insect life at a location in rural Victoria has changed over time. They took measurements from the same location during the same two weeks of the year in 1995, 2005 and 2015.

The scientists calculated Simpson's Index of species diversity (D) to compare the diversity of insects over the time period.

The index (D) can be calculated using the following formula.

$$\text{Simpson's Index of species diversity: } D = 1 - \frac{\sum\left[n_i\left(n_i - 1\right)\right]}{N\left(N - 1\right)}$$

Note: $\sum$ refers to the 'sum of'

n_i means the total number of organisms of each individual species

N means the total number of organisms of all species

This formula should produce a value between 0 and 1. A higher index value (that is, a number closer to 1) indicates higher species diversity.

a. Calculate Simpson's Index of species diversity (D) for the site in 2005 in the blank spaces provided in the table below. The index values for 1995 and 2015 have already been calculated.   3 marks

Insect type	1995			2005			2015		
	n_i	$n_i - 1$	$n_i(n_i - 1)$	n_i	$n_i - 1$	$n_i(n_i - 1)$	n_i	$n_i - 1$	$n_i(n_i - 1)$
leafhopper	4	3	12	1			2	1	2
slater	17	16	272	11			6	5	30
honey bee	20	19	380	21			18	17	306
Christmas beetle	4	3	12	1			2	1	2
cicada	4	3	12	3			1	0	0
bogong moth	30	29	870	20			2	1	2
dragonfly	7	6	42	2			1	0	0
butterfly (all species)	22	21	462	16			7	6	42
cricket	4	3	12	2			2	1	2
			$\sum[n_i(n_i-1)]$ $= 2074$			$\sum[n_i(n_i-1)]$ $=$			$\sum[n_i(n_i-1)]$ $= 386$
	N = 112	N(N − 1)	112×111 $= 12\,432$	N =	N(N − 1)		N = 41	N(N −1)	41×40 $= 1640$
	D =		$1 - \dfrac{2074}{12432}$	D =			D =		$1 - \dfrac{386}{1640}$
	D =		0.833	D =			D =		0.765

b. Describe the trend in species diversity over time at the sample site. Use data to support your answer.   2 marks

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c. Suggest **two** improvements to the study that may increase the accuracy of its results. Make the meaning of the term 'accuracy' clear in your answer.

3 marks

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d. **i.** The same rural location may be home to a range of mammal species.

Describe the mark-recapture sampling method that could be used to estimate the population size of a mammal species.

2 marks

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ii. Explain whether the mark-recapture sampling method described in **part d.i.** would be suitable for sampling insects.

2 marks

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e. Explain **one** way in which insects are an essential part of healthy ecosystems.

2 marks

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f.   One strategy to maintain the diversity of insects is improved targeting of pesticides in agricultural areas.

Explain how this strategy can help maintain the diversity of insects.   2 marks

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Question 2 (12 marks)

After severe environmental changes, such as those caused by a volcanic eruption, conservationists work to rehabilitate animals and plants in an affected area. This strategy includes active animal rescue, where injured native animals are removed from the changed habitat. These animals are then placed in wildlife sanctuaries.

a. In terms of maintaining native animal populations, suggest why only injured animals are removed from damaged habitats, rather than the healthy animals. 2 marks

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b. Outline **one** technique that is employed by conservationists to ensure the genetic diversity of a species is maintained after the removal of individuals from a population. Explain how this technique either maintains or increases genetic diversity. 3 marks

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c. Suggest another conservation technique that could be employed after a volcanic eruption. Explain how this technique may promote biodiversity. 3 marks

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The paradise parrot, previously found in New South Wales and Queensland, is thought to have become extinct due to predation in the 1920s.

d.   Is the extinction of the paradise parrot an example of a mass extinction? Explain your answer.   2 marks

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e.   What conservation category would the paradise parrot have been assigned to just prior to the extinction? Explain your reasoning.   2 marks

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Question 3 (12 marks)

The main beach of a coastal town is experiencing ongoing problems with erosion. To protect the coastal environment, 45 years ago the town council built a one-metre-high stone seawall. Between the seawall and the town are vegetated sand dunes that are an important habitat for a number of threatened plant and reptile species. The town is built on low-lying, flat land. The beach area has decreased due to erosion, particularly over the last three years. At the southern end of the beach is a rocky point that is part of an offshore marine reserve. Many recreational scuba divers and snorkellers use the reserve.

Last winter the seawall was topped by storm waves, causing damage to the wall and the loss of indigenous plants on the sand dunes. Climate change models indicate higher sea levels are expected in the future, with projected increases for the year 2090 being between 0.51 m (intermediate warming scenario) and 0.70 m (high warming scenario). Rising sea levels combined with waves during a storm surge are likely to cause accelerated beach and dune erosion, and increased risk of flooding of low-lying areas.

The town council is developing a management plan and considering a number of proposals regarding the seawall and erosion of the beach and sand dunes. One proposal is to repair the seawall and increase its height by half a metre. A second proposal is to do nothing because seawalls are very costly, and the natural processes and impacts of erosion are not fully understood locally. The group putting forward this second proposal believes the sea level will not rise to the levels predicted in either warming scenario.

a. It is suggested that the proposal to repair the damaged seawall and increase its height by half a metre should be regarded as an ecologically sustainable development.

    Use the principles of intergenerational equity, and conservation of biodiversity and ecological integrity to help justify this suggestion.   5 marks

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b. Using the appropriate sustainability principle, explain why the second proposal (that is, to do nothing to the seawall) would be regarded as an incorrect approach. Explain how the principle applies to this situation. 3 marks

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c. A first step in developing a management plan is to identify the potential risks of each proposal regarding the seawall.

Once these potential risks are identified, what else should be done in terms of the risk management process? 2 marks

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d. Local Environmental Science students have been asked to help collect scientific data about species living within the offshore marine reserve.

Identify **one** health and safety concern and **one** ethical concern that the students should manage when collecting this data in the field. 2 marks

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Question 4 (8 marks)

A remote island uses a 50 MW natural-gas-fired power station for its electricity supply. This station is just able to meet the island's peak electricity demand.

a. Identify and describe **one** environmental disadvantage of using the natural-gas-fired power station for the island's electricity supply. 2 marks

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b. The island's government seeks to replace, as far as possible, energy from the power station with energy from a wind farm. Each wind turbine is capable of reliably providing 500 kW of power.

How many turbines would be required to replace the natural-gas-fired power station? Show your working. 2 marks

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c. Identify and describe **two** disadvantages of the wind farm proposal. 4 marks

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Question 5 (6 marks)

According to the Intergovernmental Panel on Climate Change's 'Fifth Assessment Report', one unit of nitrous oxide has a global warming potential of 265 and one unit of sulfur hexafluoride has a global warming potential of 23 500.

a.   Explain what the term 'warming potential' means in relation to a greenhouse gas.   2 marks

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b.   Calculate and compare the relative warming potential of one unit of sulfur hexafluoride to one unit of
      nitrous oxide.   2 marks

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c.   Suggest why climate scientists are more concerned about the impact of greenhouse gases, such as
      carbon dioxide, methane and nitrous oxide, than a gas like sulfur hexafluoride, which has a higher
      global warming potential.   2 marks

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Question 6 (4 marks)

Two international modelling teams created the following graph, which shows two different peak oil scenarios.

World oil production (1855–2010) and two peak oil scenarios

Source: adapted from G Maggio and G Cacciola, 'When will oil, natural gas, and coal peak?', in *Fuel*, vol. 98, August 2012, pp. 111–123, <https://doi.org/10.1016/j.fuel.2012.03.021>
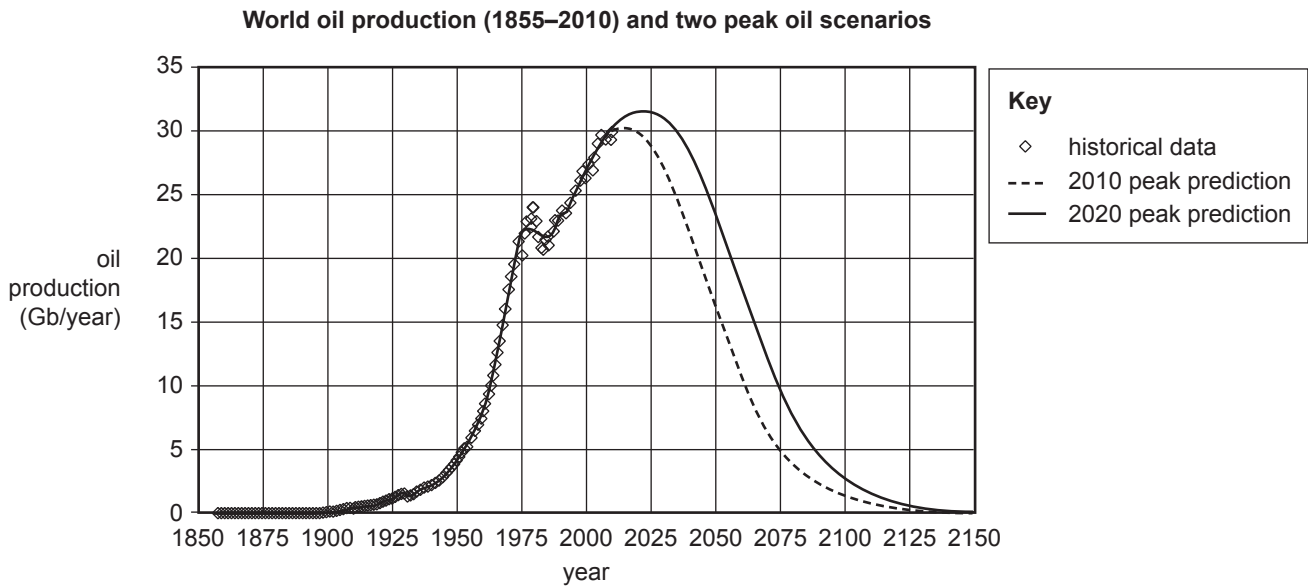
a. Using the graph above, explain the concept of 'peak oil'. 2 marks

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b. The increasing demand for oil since the 1800s has resulted in the drilling of many wells and the construction of offshore oil rigs.

Describe **one** negative environmental impact that can result from the extraction and transport of crude oil from these sources. 2 marks

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Question 7 (10 marks)

The table below shows annual average temperatures since the year 2000 globally and as recorded at a weather station in an Australian city.

Year	Annual average temperature (°C)	
	Global	**City**
2000	14.38	16.27
2001	14.52	16.32
2002	14.61	15.91
2003	14.60	16.20
2004	14.52	15.89
2005	14.66	15.73
2006	14.62	16.14
2007	14.64	16.61
2008	14.53	16.05
2009	14.64	16.51
2010	14.71	15.99
2011	14.59	16.01
2012	14.63	15.66
2013	14.67	16.17
2014	14.73	16.08
2015	14.88	15.93
2016	15.00	16.40
2017	14.90	16.51
2018	14.83	16.22

Data (global): adapted from NASA Goddard Institute for
Space Studies, <www.giss.nasa.gov>

a. List, in order from highest to lowest, the three warmest years globally since 2000. 1 mark

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b.   State **two** reasons why the warmest year since 2000 recorded in the city did not occur in the same year
as the warmest year globally.   2 marks

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c.   Charlotte argues that the global temperature data **does not** show a warming trend as 2018 was cooler
than 2017.

Comment on the scientific merit of her argument.   2 marks

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d.   What are **two** main causes of sea level rise?   2 marks

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e. Which two of the following are likely to be impacts of the enhanced greenhouse effect?

- loss of species
- global population growth
- more frequent and longer heatwaves
- reduction in the availability of fossil fuels

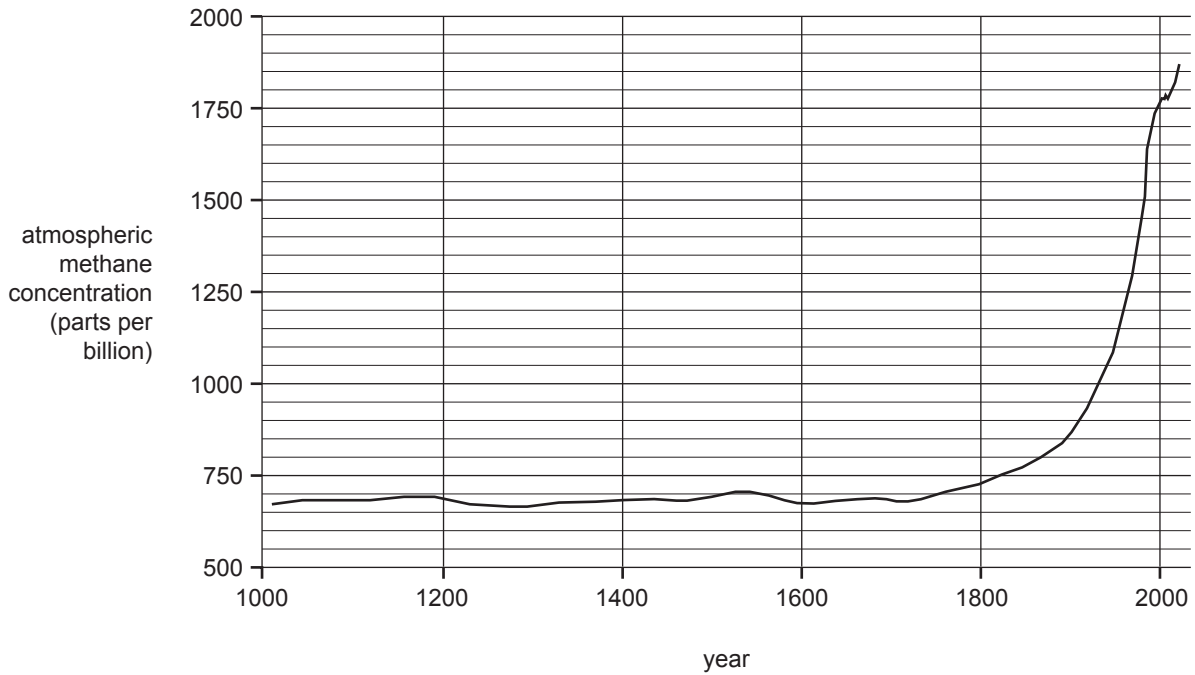Explain why each impact is likely to occur. 3 marks

Impact 1 _____

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Impact 2 _____

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Question 8 (8 marks)

The graph below shows atmospheric methane concentrations (in parts per billion) from around the year 1000 to the year 2020.

Source: MethaneLevels.org, <www.methanelevels.org>;
2° Institute, <www.2degreesinstitute.org>

a. Explain why atmospheric methane concentrations remained relatively steady from around the year 1000 until the year 1800.

2 marks

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b. Calculate the change in methane concentration between the years 1800 and 2020, expressing your answer as a percentage.

2 marks

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c.   List **two** sources of methane that have contributed to the increase in the atmospheric concentration of the gas since the year 1800.   2 marks

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d.   What impact has the increase in atmospheric concentration of methane had on global temperature and why has it had this effect?   2 marks

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Question 9 (14 marks)

Students conduct an experiment to study global warming by modelling the greenhouse effect.

The experiment consists of two beakers, A and B, each with a light source (modelling the sun) and a temperature probe. The base of each beaker is black to represent Earth's surface.

Beaker A contains carbon dioxide. Beaker B is filled with air.

The lights are switched on at the same time and the temperature in each beaker is recorded every two minutes.

The experimental set-up is shown in the diagram below.
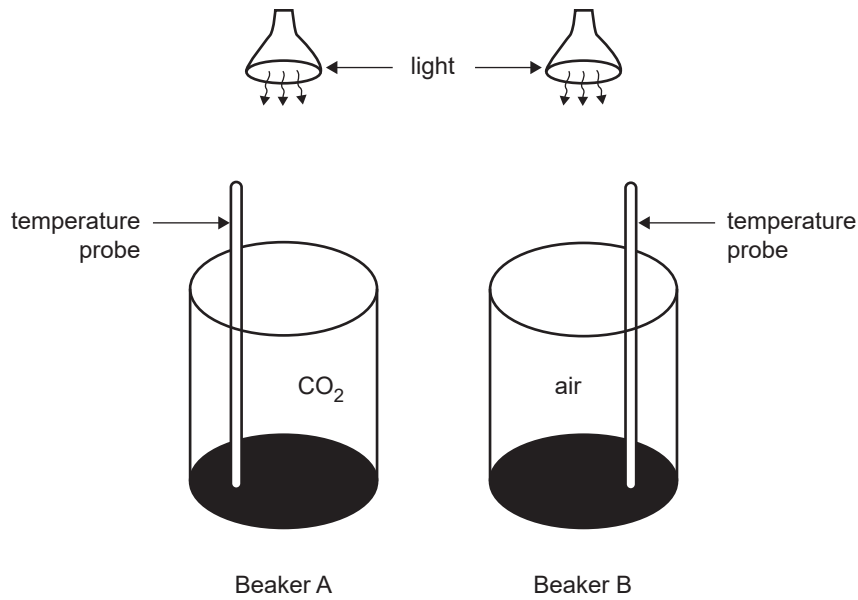
Beaker A   Beaker B

a. Write a hypothesis relevant to the experiment. 2 marks

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_____

b. Explain the purpose of Beaker B. 2 marks

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_____

_____

c.   List one independent variable, one dependent variable and one controlled variable for this experiment.   3 marks

Independent variable _____

Dependent variable _____

Controlled variable _____

The following data was recorded.

Time (minutes)	Temperature in Beaker A (CO_2) (°C)	Temperature in Beaker B (air) (°C)
0	24.0	24.0
2	26.5	25.5
4	29.0	27.0
6	30.5	28.0
8	31.5	28.5
10	32.0	29.0

d. On the grid on page 33, plot a graph of this data. Include:
- a title
- labelling and suitable scales on both axes
- points correctly plotted with curves of best fit, and a legend.   5 marks

DO NOT WRITE IN THIS AREA

Title _____

Legend [ ] [ ]

e. Explain whether the data supports the hypothesis given in **part a.**   2 marks

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END OF QUESTION AND ANSWER BOOK