TASMANIAN ASSESSMENT, STANDARDS & CERTIFICATION

External Assessment 2025

Attach your candidate label here

ENVIRONMENTAL SCIENCE

ESS315118

Section A

Pages: 16
Questions: 4
Information Sheet: 1

Preparation time for this exam: 15 minutes

Suggested working time: 36 minutes

Instructions:

- Answer **all** questions and **all** items within each question.
- Write your answers in the spaces provided in this exam paper.
- The exam is **three (3) hours** in length. The suggested working time for this section is **approximately 36 minutes**.
- The Environmental Science Information Sheet can be used throughout the exam.
- All answers must be written in **English**.
- You **must** make sure your answers address the listed criterion.

Marker use	
C2	/ 36

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Guide to Exam Structure

	Questions available	Questions to answer	Suggested working time	Marks available
Section A	4	4	36 minutes	36 marks
Section B	5	5	36 minutes	36 marks
Section C	5	5	36 minutes	36 marks
Section D	6	6	36 minutes	36 marks
Section E	4	4	36 minutes	36 marks
Totals	**24**	**24**	**180 minutes (3 hours)**	**180 marks**

Criterion

You **must** make sure your answers address:

- Criterion 2 develop, interpret and analyse experiments and investigations.

Question 1

Marker use

Scientists are interested in how drought conditions affect the survival of eucalyptus seedlings in a certain region. In a typical year, the region receives approximately 600 mm of rainfall. Recently, rainfall dropped to 180 mm during summer with long dry spells and higher-than-average temperatures.

Scientists are planning a laboratory experiment to examine how drought conditions affect the survival of eucalyptus seedlings. They propose the hypothesis:

Lower rainfall reduces the survival of eucalyptus seedlings.

a) Identify the:

i. Independent variable (IV): ..... /1

ii. Dependent variable (DV): .....

b) Describe an appropriate control group that could be used in this experiment. /2

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c) List **four (4)** variables that should be controlled in this experiment. /2

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Question 1 continues

Marker use

/4

d) Discuss **one (1)** limitation of a laboratory experiment in terms of **two (2)** of the controlled variables.

Controlled variable 1: .....

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Controlled variable 2: .....

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Total Q1

/9

Question 2

Marker use

A group of Environmental Science students conducted a field experiment to investigate how different types of fertiliser affect the growth of barley. They planted 60 barley seedlings in identical plots of soil. The seedlings were divided into three groups of 20.

Figure 1: Image of a typical mature barley crop.

- Group A received organic fertiliser (composted cow manure)
- Group B received synthetic fertiliser (Nitrogen Phosphorus Potassium (NPK) blend)
- Group C received no fertiliser.

All plots were equally spaced and received the same amount of water and sunlight. The experiment ran for 8 weeks, and plant height was measured weekly.

a) State the independent and dependent variables.

IV: .....

DV: .....

/1

b) Construct a valid hypothesis for this experiment.

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/2

Question 2 continues

Marker use

c) Describe **two (2)** features of the experimental design that make this a good scientific experiment for valid results.

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d) Explain **two (2)** possible improvements to the experimental design.

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Total Q2

/9

Question 3

Marker use

Salvinia molesta is an invasive aquatic plant. It floats on the surface of water and can form dense mats that take over waterways and reduce water quality.

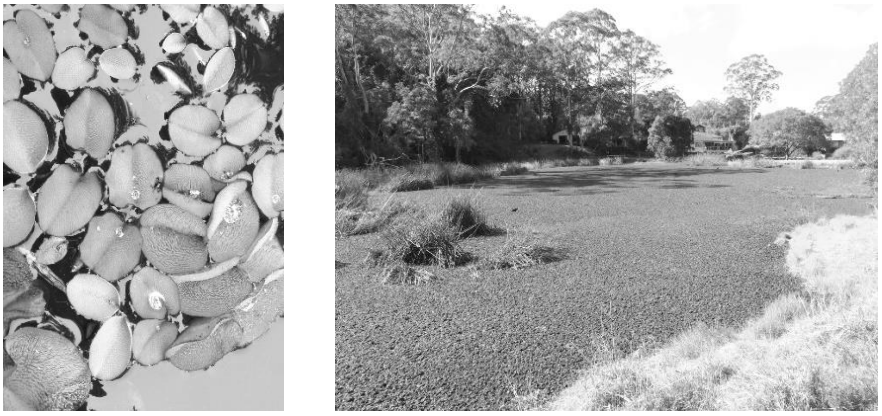

Figure 2: Salvinia molesta (left) and a wetland covered over by Salvinia molesta (right).

The Peel-Harvey Estuary in Western Australia has experienced rapid spread of *S. molesta*. Researchers used quadrat sampling across 10 estuary sites to assess the impact of *S. molesta* on native aquatic plant biodiversity. *S. molesta* was present at 5 estuary sites (Sites 1 to 5). *S. molesta* was not present at 5 sites (Sites 6 to 10).

Table 1 shows the mean (average) number of species found at each of the ten sites.

Salvinia molesta was present		*Salvinia molesta* was not present	
Wetland site	Mean number of native aquatic plant species	Wetland site	Mean number of native aquatic plant species
Site 1	3	Site 6	7
Site 2	2	Site 7	6
Site 3	4	Site 8	8
Site 4	3	Site 9	7
Site 5	2	Site 10	6

Table 1: Mean (average) number of species at estuary sites.

a) State the sites that showed the greatest number of aquatic plant species with and without *S. molesta.*

/1

i. With: .....

ii. Without: .....

Question 3 continues

Marker use

b) List **four (4)** abiotic factors that the researchers are likely to have measured at each site. /2

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c) Explain **two (2)** reasons for the use of a quadrat sampling technique for this study. /2

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d) Evaluate if the researchers should, based on this study alone, conclude that the presence of *S. molesta* reduces the native aquatic plant diversity. /3

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e) Outline how additional information could be gained about the spread of *S. molesta* in the 120 km^2 Peel-Harvey Estuary. /2

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Total Q3 /10

Question 4

Marker use

The brush-tailed rock-wallaby (*Petrogale penicillata*) is a shy, nocturnal marsupial found in rocky outcrops and escarpments in eastern Australia.

Ecologists undertook a capture-mark-recapture study in a national park in New South Wales. Before a fox control program, they estimated the rock-wallaby population to be 130.

Figure 3: Brush-tailed rock-wallaby.

a) State the term for data collected before any management action. /1

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b) Explain why it is important to establish the population size of the brush-tailed rock-wallaby prior to the introduction of a fox control program. /2

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Question 4 continues

Marker use

/5

c) Evaluate the positive, negative and ethical considerations when conducting multiple recapture sessions.

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Total Q4

/8

Acknowledgements

Sources:

Figure 1: https://www.farminguk.com/news/two-new-barley-plant-genes-discovered_36541.html

Figure 2: https://plants.ces.ncsu.edu/plants/salvinia-molesta/

Figure 3: https://www.nationalparks.nsw.gov.au/-/media/npws/images/conservation-and-heritage/threatened-species/iconic-species-brush-tailed-rock-wallaby-petrogale-penicillata/brush-tailed-rock-wallaby-02.jpg

End of Section A

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ENVIRONMENTAL SCIENCE

ESS315118

Section B

Pages: 16
Questions: 5
Information Sheet: 1

Suggested working time: 36 minutes

Instructions:

- Answer **all** questions and **all** items within each question.
  - Spare diagrams have been provided at the end of this section. Indicate in the boxes provided if you have used the spare diagrams.
- Write your answers in the spaces provided in this exam paper.
- The exam is **three (3) hours** in length. The suggested working time for this section is **approximately 36 minutes**.
- The Environmental Science Information Sheet can be used throughout the exam.
- All answers must be written in **English**.
- You **must** make sure your answers address the listed criterion.

Marker use	
C5	/ 36

Guide to Exam Structure

	Questions available	Questions to answer	Suggested working time	Marks available
Section A	4	4	36 minutes	36 marks
Section B	5	5	36 minutes	36 marks
Section C	5	5	36 minutes	36 marks
Section D	6	6	36 minutes	36 marks
Section E	4	4	36 minutes	36 marks
Totals	**24**	**24**	**180 minutes (3 hours)**	**180 marks**

Criterion

You **must** make sure your answers address:

- Criterion 5 apply ecological concepts and processes.

Question 5

Marker use

An individual species can benefit another species (+), harm another species (-), or have no effect (o) on another species.

a) In Table 2, **two (2)** different species interactions are provided. Complete the table by stating the type of interaction between Species A and Species B. /1

Species Interactions	Effect on Species A	Effect on Species B	Type of Relationship
Species A: European rabbit (*Oryctolagus cuniculus*) **Species B:** Common brushtail possum (*Trichosurus vulpecula*)	–	–	
Species A: Dog tapeworm (*Echinococcus granulosus*) **Species B**: Dingo (*Canis lupus dingo*)	+	–	

Table 2: Species interactions.

Spare diagram used (X) ☐

b) Describe the interaction between:

i. The European rabbit (*O. cuniculus*) and the common brushtail possum (*T. vulpecula*). /1

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ii. The dog tapeworm (*E. granulosus*) and the dingo (*C. lupis*). /1

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c) Outline an example of **two (2)** species that demonstrate a commensalism interaction. /1

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Total Q5 /4

Question 6

Marker use

Kati Thanda-Lake Eyre, located in northern South Australia, is Australia's largest salt lake and lies below sea level. The lake floods infrequently. The following food web represents a simplified aquatic food web for Kati Thanda-Lake Eyre.

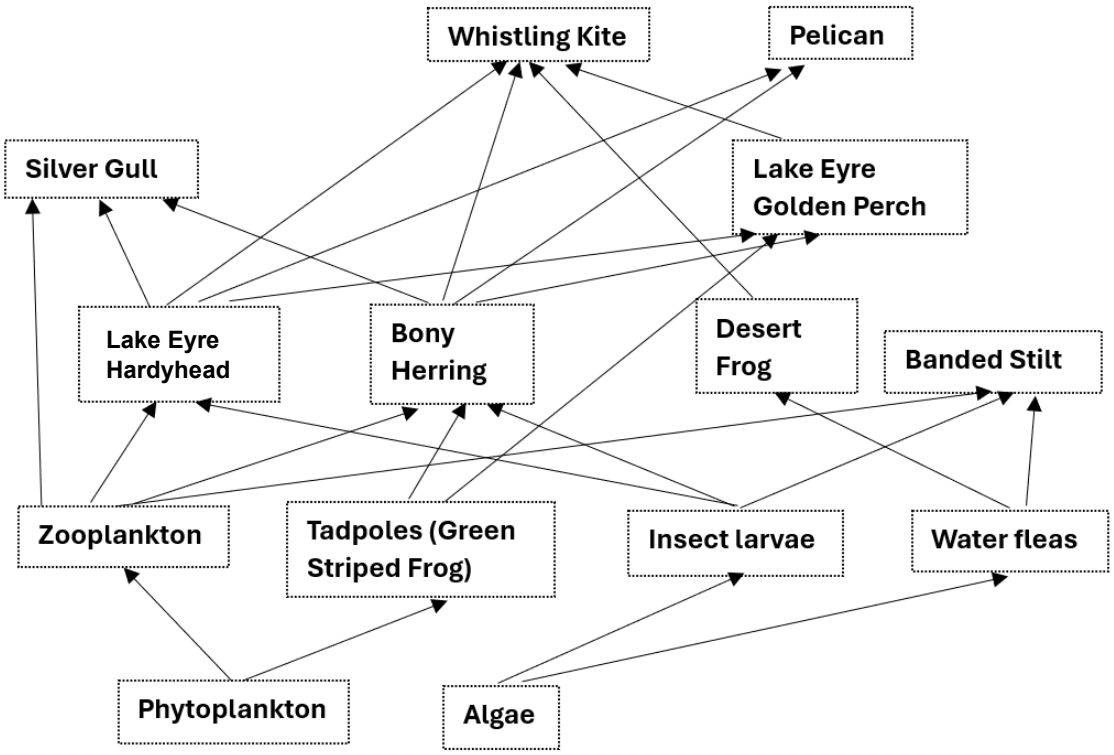

Figure 4: Aquatic food web for Kati Thanda-Lake Eyre.

a) Identify the following in the food web:

i. A producer: ..... /2

ii. A herbivore: .....

iii. A second-order consumer: .....

iv. The maximum number of trophic levels: .....

b) Identify a group of organisms that is not included in this food web. /1

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Question 6 continues

Marker use

c) Construct a food chain with at least **four (4)** trophic levels from the food web.

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d) Construct below a labelled pyramid of energy for the Kati Thanda-Lake Eyre aquatic ecosystem.

/2

e) Discuss potential differences between a pyramid of energy and a pyramid of biomass for the Kati Thanda-Lake Eyre aquatic ecosystem.

/2

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f) Discuss reasons why this inland saltwater ecosystem has fewer trophic levels than a tropical marine reef ecosystem.

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Total Q6

/11

Question 7

Marker use

Phosphorus is an essential component in living organisms. The following diagram depicts the phosphorus cycle for a natural area, away from human interference.

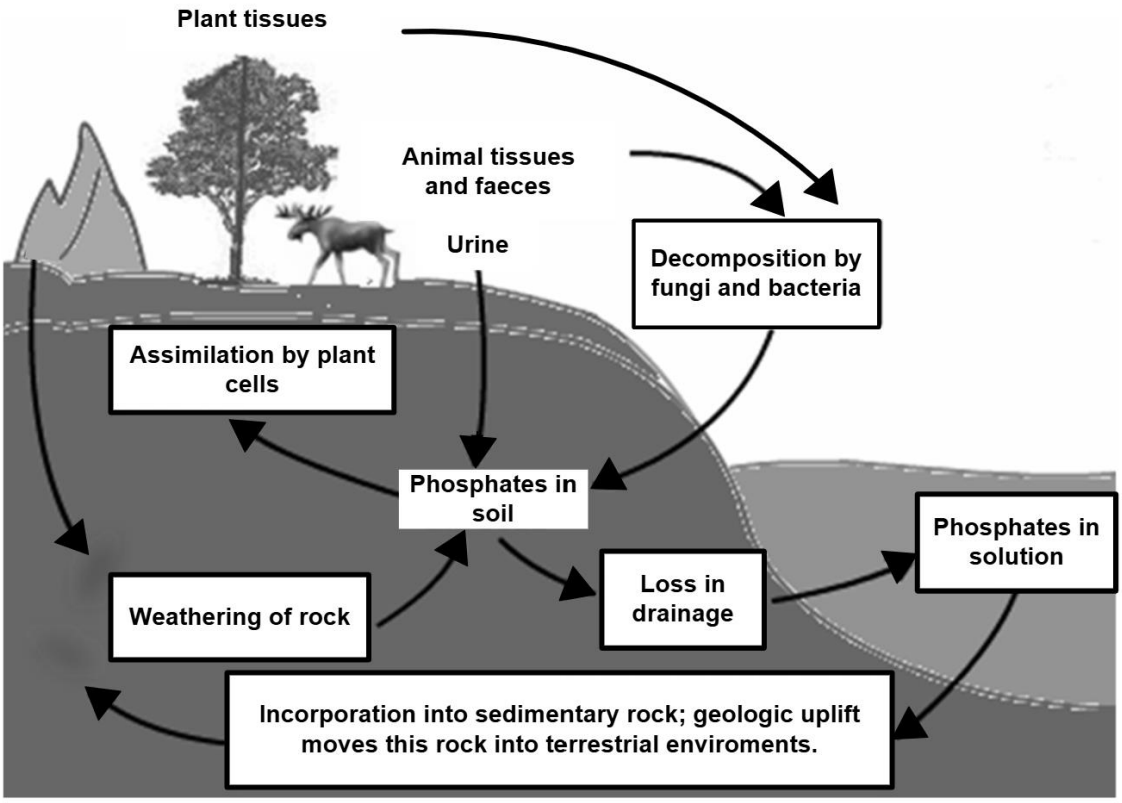

Figure 5: Phosphorus cycle in natural area.

a) State **two (2)** inputs of phosphates into the soil.

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b) State **two (2)** outputs of phosphates from soils.

/1

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Question 7 continues

Marker use

c) If a phosphorus cycle diagram was depicted for an agricultural area where large scale crops such as wheat are grown:

/1

i. State **one (1)** likely additional input of phosphates into the soil.

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ii. State **one (1)** likely additional output of phosphates from the local ecosystem.

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d) Describe **two (2)** similarities and **two (2)** differences between the phosphorus cycle and the nitrogen cycle.

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Total Q7

/7

Question 8

Marker use

The European honeybee (*Apis mellifera*), an introduced species, and the green carpenter bee (*Xylocopa aerata*), a native and endangered species, are both pollinators and inhabit Kangaroo Island in South Australia. Their characteristics are shown in Table 3.

Figure 6: European honeybee (left) and green carpenter bee (right).

Characteristic	European honeybee (*Apis mellifera*)	Green carpenter bee (*Xylocopa aerata*)
Social structure	Highly social (lives in colonies)	Solitary
Reproductive rate	High (multiple queens, swarming)	Low (few offspring per season)
Foraging	Many plant species	Specific native plant species
Nesting behaviour	Cavities in trees, walls, or hives	Tunnels in soft, dead wood
Habitat and climate	Urban, rural, wild; temperate to warm climates	Dry bushland; temperate to warm climates

Table 3: Characteristics of European honeybee and green carpenter bee.

a) State which of the **two (2)** species is the specialist.

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/1

b) State which of the **two (2)** species has the greatest zone of tolerance.

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/1

Question 8 continues

Marker use

c) Discuss the extent to which the green carpenter bee and the European honeybee compete for resources.

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d) Using the niche concept, evaluate the effect of the European honeybee on the green carpenter bee.

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Total Q8

/8

Question 9

Marker use

Over the past twenty years the number of galahs (*Eolophus roseicapilla*) has increased in the grassland and woodland areas of Tasmania from a low initial population. These areas have plenty of dead and dying trees that provide nest hollows, as well as paddocks that provide grass seeds for food. The extension of the galah's range and increase in population may be a result of global warming.

a) On the axes in Figure 7 **draw and label** a graph of the likely population of the galah over the last 20 years and then into the future as the population reaches carrying capacity. /3

Figure 7: Galah population in Tasmania over time.

Spare diagram used (X) ☐

b) State the term used to describe the shape of your graph. /1

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c) In recent years the number of raptors (birds of prey) such as eagles and hawks has increased. Explain why this is a good indicator of healthy ecosystems. /2

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Total Q9 /6

Spare Diagrams

Question 5 a)

Species Interactions	Effect on Species A	Effect on Species B	Type of Relationship
Species A: European rabbit (*Oryctolagus cuniculus*) **Species B:** Common brushtail possum (*Trichosurus vulpecula*)	–	–	
Species A: Dog tapeworm (*Echinococcus granulosus*) **Species B**: Dingo (*Canis lupus dingo*)	+	–	

Table 2: Species interactions.

Question 9 a)

Figure 7: Galah population in Tasmania over time.

Acknowledgements

Sources:

Figure 5: https://thescienceway.blogspot.com/2014_09_01_archive.html

Figure 6: edis.ifas.ufl.edu

Figure 6: https://www.wheenbeefoundation.org.au/news-events/buzz/the-green-carpenter-bee/

End of Section B

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ENVIRONMENTAL SCIENCE

ESS315118

Section C

Pages: 12
Questions: 5
Information Sheet: 1

Suggested working time: 36 minutes

Instructions:

- Answer **all** questions and **all** items within each question.
- Write your answers in the spaces provided in this exam paper.
- The exam is **three (3) hours** in length. The suggested working time for this section is **approximately 36 minutes**.
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Marker use	
C6	/ 36

Guide to Exam Structure

	Questions available	Questions to answer	Suggested working time	Marks available
Section A	4	4	36 minutes	36 marks
Section B	5	5	36 minutes	36 marks
Section C	5	5	36 minutes	36 marks
Section D	6	6	36 minutes	36 marks
Section E	4	4	36 minutes	36 marks
Totals	**24**	**24**	**180 minutes (3 hours)**	**180 marks**

Criterion

You **must** make sure your answers address:

- Criterion 6 apply concepts and processes of ecosystem change.

Question 10

Marker use

In early 2025, Australia experienced a mix of extreme weather events.

During this period, the Bureau of Meteorology reported that the El Niño–Southern Oscillation (ENSO) was in a neutral phase, indicating that neither El Niño nor La Niña conditions were present in the tropical Pacific Ocean.

a) Summarise the weather conditions experienced in Australia in the early months of 2025 that could suggest Australia was experiencing an:

i. El Niño event

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/1

ii. La Niña event

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/1

b) Outline the conditions in the Pacific Ocean that are experienced during an El Niño event.

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Total Q10

/4

Question 11

Marker use

The Tarkine is located in a high rainfall part of Tasmania and incorporates a variety of ecosystems including coastal areas, sedge, wet sclerophyll, mixed forests and one of the largest temperate rainforest systems in the world.

Figure 8: Image of Tasmania showing Tarkine region (left) and photo of Huon pine growing on a riverbank (right).

Huon pines are found within the Tarkine. They are slow growing and some Huon pines are estimated to be thousands of years old. They are drought sensitive and bushfires usually result in tree death.

a) Describe **two (2)** likely reasons why older Huon pines are usually found along riverbanks within rainforest areas. /2

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b) Discuss the effect of fire frequency on the distribution of forest types in the Tarkine. /3

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Question 11 continues

Marker use

c) Outline why protecting rainforests containing Huon pine is considered important, in terms of forest regeneration.

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Total Q11

/7

Question 12

Marker use

The following graph shows the global monthly atmospheric carbon dioxide (CO_2) levels and the smoothed average between 2016 and 2020.

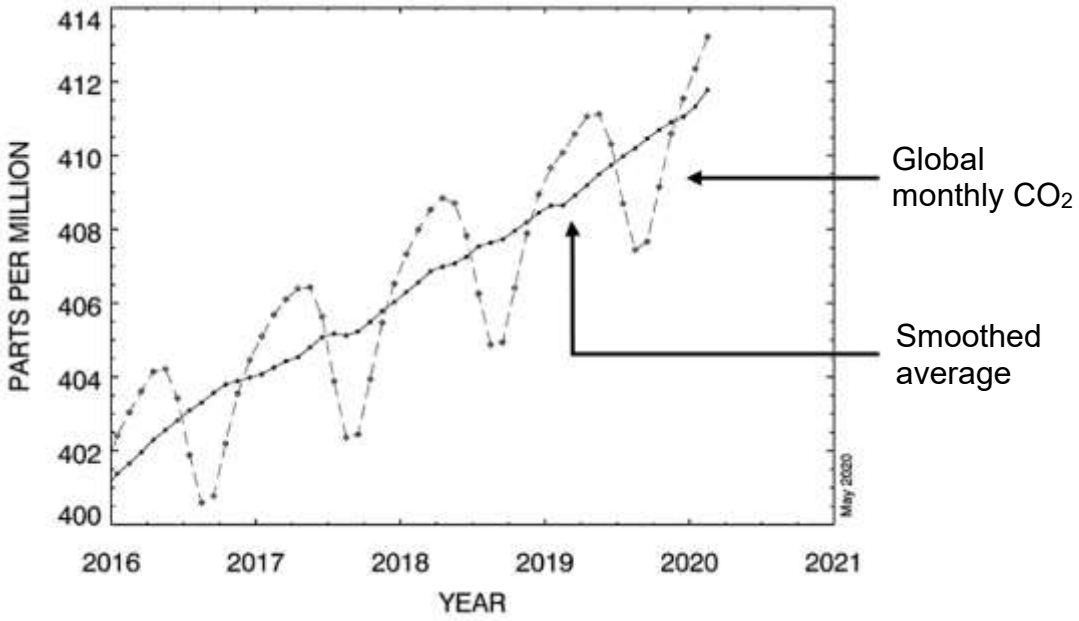

Figure 9: Global monthly atmospheric carbon dioxide levels.

a) Use the information in the graph to answer the following questions.

i. State the highest global monthly CO_2 level during 2017.

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/1

ii. If the current trend continues, estimate the smoothed average CO_2 level at the beginning of 2021.

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/1

b) Describe the patterns and trends in the global monthly CO_2 levels over the four-year period shown in the graph.

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/2

Question 12 continues

Marker use

c) Explain why it is important to consider both the monthly CO_2 values and the smoothed average when analysing atmospheric CO_2 data.

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d) Outline **one (1)** possible reason for the annual fluctuations in CO_2 levels.

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e) Discuss **two (2)** potential environmental consequences if the trends shown by the data continue.

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Total Q12

/12

Question 13

Marker use

Salvinia molesta is a declared aquatic weed in Australia. The Salvinia weevil (*Cyrtobagous salviniae*) was first introduced to Australia in the 1980s as a biological control for *S. molesta*. Testing has shown that there are no known negative ecological impacts of the Salvinia weevil in Australia. The main concern with the introduction of the Salvinia weevil is that it is less effective when water temperatures are below 20°C**.**

Table 4 shows the average monthly surface water temperature at a site where there has been a new *S. molesta* outbreak.

Month	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Avg Temp (°C)	25	25	23	21	18	14	13	14	16	18	20	23

Table 4: Site average monthly surface water temperature.

a) Using the data, state **one (1)** month when the Salvinia weevil would be effective. /1

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The most effective approach to control *S. molesta* is an Integrated Weed Management approach. This approach combines biological control together with other methods after considering site specific environmental characteristics and infestation levels.

b) Describe **two (2)** other methods that could be utilised in removing *S. molesta* in an Integrated Weed Management approach. /4

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Question 13 continues

Marker use

c) For **one (1)** of your selected methods, discuss any potential negative environmental impacts of its use.

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Total Q13

/7

Question 14

Marker use

The Australian Institute of Marine Science has been monitoring mass coral bleaching throughout the Great Barrier Reef since the early 1980s.

Explain how climate change and the associated mass coral bleaching affects the **three (3)** types of biodiversity (genetic, species and ecosystem) in the Great Barrier Reef.

a) Genetic biodiversity

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b) Species biodiversity

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c) Ecosystem biodiversity

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End of Section C

Total Q14

/6

Acknowledgements

Sources:

Figure 8: https://www.roamingdownunder.com/tarkine.html

Figure 8: https://www.huonpine.com/huon-pine-in-the-flesh/ (photo courtesy of Jill Smith Salamanca Images)

Figure 9: https://www.sciencephoto.com/media/1116569/view/global-monthly-atmospheric-carbon-dioxide-levels

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External Assessment 2025

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ENVIRONMENTAL SCIENCE

ESS315118

Section D

Pages: 12
Questions: 6
Information Sheet: 1

Suggested working time: 36 minutes

Instructions:

- Answer **all** questions and **all** items within each question.
- Write your answers in the spaces provided in this exam paper.
- The exam is **three (3) hours** in length. The suggested working time for this section is **approximately 36 minutes**.
- The Environmental Science Information Sheet can be used throughout the exam.
- All answers must be written in **English**.
- You **must** make sure your answers address the listed criterion.

Marker use	
C7	/ 36

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Guide to Exam Structure

	Questions available	Questions to answer	Suggested working time	Marks available
Section A	4	4	36 minutes	36 marks
Section B	5	5	36 minutes	36 marks
Section C	5	5	36 minutes	36 marks
Section D	6	6	36 minutes	36 marks
Section E	4	4	36 minutes	36 marks
Totals	**24**	**24**	**180 minutes (3 hours)**	**180 marks**

Criterion

You **must** make sure your answers address:

- Criterion 7 apply concepts relating to human dependence and impact on ecosystems.

Question 15

Marker use

a) Define the term ecological footprint.

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b) Australia's ecological footprint is significantly larger than the global average. Describe **two (2)** realistic strategies that either individuals or governments in Australia could implement to reduce its ecological footprint.

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Total Q15

/5

Question 16

Marker use

Ecosystem services are the benefits that humans derive from natural ecosystems and are categorised into provisioning services, regulating services, cultural services and supporting services.

a) Intensive farming practices lead to soil degradation and reduced crop yields.

i. State an ecosystem service and its category that is being disrupted due to reduced crop yields. /1

Ecosystem service: .....

Ecosystem category: .....

ii. Discuss **one (1)** supporting service that is being disrupted and how this could affect long-term agricultural productivity. /2

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b) A local council restored a riverbank for walking trails and birdwatching. Explain how this riverbank restoration enhances cultural services. /2

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Total Q16 /5

Question 17

Marker use

Depending on its location, atmospheric ozone can be either harmful or beneficial.

Ozone near ground level is considered a pollutant. On some hot, calm days in Sydney, particularly in periods of heavy traffic, air quality warnings are issued due to high atmospheric ozone levels.

a) Outline why low-level ozone is considered an atmospheric pollutant. /1

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b) Describe the conditions that lead to the formation of ground-level ozone. /2

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c) State **two (2)** other atmospheric pollutants that would be measured as part of air quality monitoring. /1

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d) During summer, the UV index in parts of Australia reaches extreme levels, prompting health warnings. Describe how the depletion of stratospheric ozone contributes to this situation. /2

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Total Q17 /6

Question 18

Marker use

Researchers studying mercury contamination among the Yanomami Indigenous people in the Amazon collected hair samples from 300 individuals along the Mucajaí River. The region is heavily impacted by illegal gold mining which releases mercury into the rivers that the Yanomami use. The Yanomami diet relies heavily on fish. The results showed that 84% of those tested had mercury levels at or above the safe limit of 2 μg/g and 10.8% had levels above 6 μg/g, which is considered dangerous. Researchers concluded that the primary pathway of mercury exposure is through eating fish, not drinking water.

a) State the term that refers to the increasing mercury levels within an individual over time. /1

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b) Explain why some individuals may have had a much higher mercury level than others. /3

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The researchers found that larger, carnivorous fish such as catfish had significantly more mercury than smaller, herbivorous fish species.

c) Name and explain the processes leading to this finding.

Name: ..... /3

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Explain: .....

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Total Q18 /7

Question 19

Marker use

A bloom caused by the microalgae *Karenia mikimotoi* has been spreading along South Australia's southern coast since March 2025. Discoloured water, white foam and foul odours have been observed. Individuals from over 200 marine species have been recorded dead. Scientists believe that the deaths are due to low oxygen levels in the water as a result of the algal bloom.

a) Describe the process that leads to the lowering of dissolved oxygen levels in the water due to the algal bloom. /2

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b) Ocean temperatures have been 2.5 degrees warmer than average this year and the weather has been consistently calm, hot and dry. Explain why these conditions may have led to such an extensive algal bloom. /2

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c) Similar algal blooms have been observed in fresh water polluted by sewage. Explain how increased sewage in water can lead to high biological oxygen demand. /2

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Total Q19 /6

Question 20

Marker use

Secondary salinity in agriculture refers to the accumulation of salts in soil due to human activities, particularly the clearing of native vegetation and poor irrigation practices.

a) Describe how clearing native vegetation and poor irrigation practices increase soil salinity.

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b) Discuss **two (2)** agricultural practices that may assist in controlling soil salinity.

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Total Q20

/7

End of Section D

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TASMANIAN ASSESSMENT, STANDARDS & CERTIFICATION

External Assessment 2025

Attach your candidate label here

ENVIRONMENTAL SCIENCE

ESS315118

Section E

Pages: 12
Questions: 4
Information Sheet: 1

Suggested working time: 36 minutes

Instructions:

- Answer **all** questions and **all** items within each question.
- Write your answers in the spaces provided in this exam paper.
- The exam is **three (3) hours** in length. The suggested working time for this section is **approximately 36 minutes**.
- The Environmental Science Information Sheet can be used throughout the exam.
- All answers must be written in **English**.
- You **must** make sure your answers address the listed criterion.

Marker use	
C8	/ 36

Guide to Exam Structure

	Questions available	Questions to answer	Suggested working time	Marks available
Section A	4	4	36 minutes	36 marks
Section B	5	5	36 minutes	36 marks
Section C	5	5	36 minutes	36 marks
Section D	6	6	36 minutes	36 marks
Section E	4	4	36 minutes	36 marks
Totals	**24**	**24**	**180 minutes (3 hours)**	**180 marks**

Criterion

You **must** make sure your answers address:

- Criterion 8 apply principles and processes related to ecologically sustainable management of the environment.

Question 21

Marker use

Plastic pollution in oceans affects marine ecosystems and biodiversity, and is a global issue. The volume of plastic entering the oceans is increasing. Large accumulations of plastic debris have formed in five major ocean gyres, including the Great Pacific Garbage Patch.

a) Describe **three (3)** approaches to sustainable development that could help reduce the amount of plastic that enters the oceans.

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b) Evaluate if plastic pollution in oceans is a “Tragedy of the Commons”.

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Total Q21

/9

Question 22

Marker use

/3

a) For each of the scenarios outlined below, state which one of three strategies of sustainable development best applies: **precautionary and anticipatory principle**, **full cost pricing**, and **efficient use of resources.** Each strategy should be used only once.

Scenario	Sustainability Strategy (Answer)
Scenario 1: A country introduces a new tax on petrol that reflects not only the cost of production but also its environmental damage.	
Scenario 2: A manufacturing company upgrades its machinery to reduce energy consumption and switches to using recycled materials in its production process.	
Scenario 3: A city delays building a factory near a wetland until an environmental study confirms it will not harm local wildlife.	

Question 22 continues

Question 22 continued

Marker use

/6

b) For each of the scenarios outlined below, assign **one (1)** principle of sustainability: **intragenerational equity**, **intergenerational equity** or **ecological integrity**. Explain your choice. Each principle should be used only once.

Scenario 1: The Northern Territory government partners with Indigenous communities to co-manage national parks, ensuring that traditional knowledge is respected and that local communities benefit from eco-tourism.

Principle of sustainability: .....

Explanation: .....

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Scenario 2: The Tasmanian Wilderness World Heritage Area (TWWHA) is protected by conservation laws, with restrictions on logging, mining and development.

Principle of sustainability: .....

Explanation: .....

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Scenario 3: The Ningaloo Coast, a UNESCO World Heritage site in Western Australia, is protected by conservation measures that limit tourism, fishing and development.

Principle of sustainability: .....

Explanation: .....

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Total Q22

/9

Question 23

Marker use

The TWWHA is in the southwest and central west of Tasmania. It protects a vast wilderness area and Aboriginal archaeological sites.

a) Explain why there must be an Environmental Management Plan for the TWWHA. /2

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b) State **two (2)** stakeholders who should be consulted in the preparation of the TWWHA Environment Management Plan. /1

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The orange-bellied parrot (OBP) is critically endangered. In the summer, the OBP breeds within the TWWHA. The OBP migrates for the rest of the year to coastal regions of Victoria and South Australia. These regions incorporate conservation reserves, Ramsar-listed wetlands, Crown land, private properties and unprotected coastal areas.

Figure 10 below shows the migration routes and habitats of the OBP.

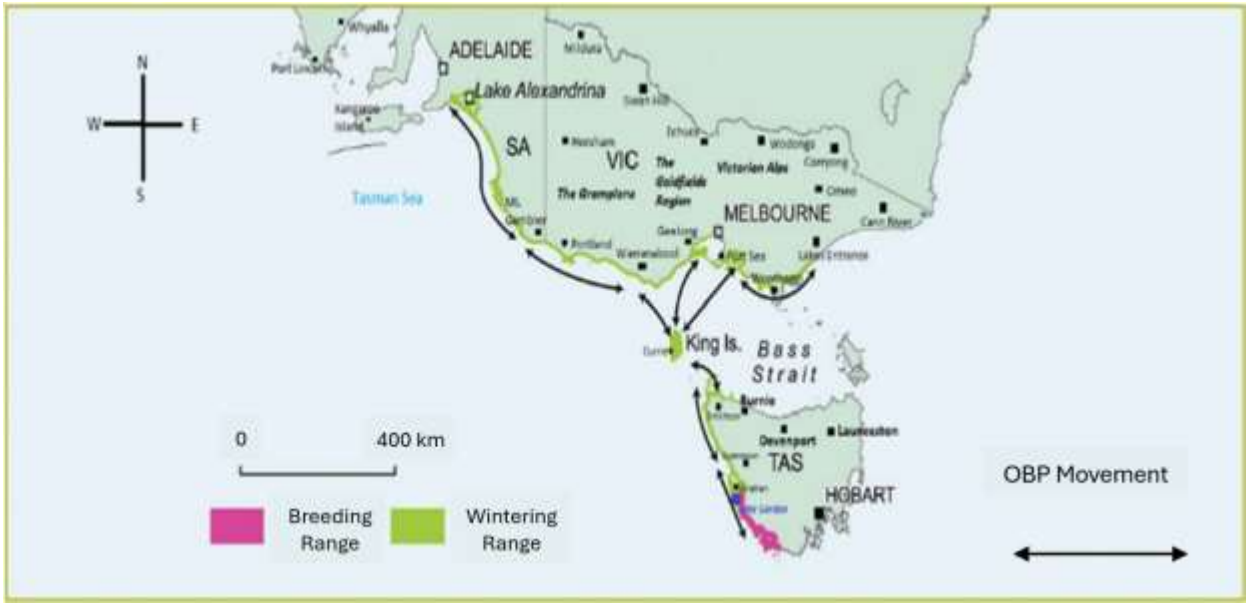

Figure 10: Migration routes and habitats of the orange-bellied parrot.

Question 23 continues

Marker use

c) State a piece of legislation that protects the OBP. /1

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d) In Victoria, cooperation from landowners and local communities is required as part of the OBP conservation effort. Explain how education can assist in conservation of the OBP. /2

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e) Within the comprehensiveness, adequacy and representativeness (CAR) system framework, discuss the protection of the OBP across its **two (2)** habitats (Tasmania and the mainland). /3

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Question 23 continues

Marker use

The following table summarises the OBP population and conservation efforts since the 1980s.

	OPB wild adult population estimate	Conservation efforts
1980s	150–200	Initial population monitoring; awareness of population decline
1990s	100–150	Captive breeding and habitat protection programs began
2000s	less than 100	Captive breeding expanded; habitat restoration began
Early 2010s	less than 50	Emergency captive-bred releases; wild nest supplementation began
Late 2010s	less than 20	Intensive captive breeding; increased captive-bred releases
2020s	Steadily increased to nearly 150.	Ongoing intensive management including predator control

Table 5: Summary of OBP population and conservation efforts.

f) Evaluate if conservation efforts have been successful.

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Total Q23

/12

Question 24

Marker use

The Tasmanian salmon farming industry is the state's largest primary industry.

However, the industry faces growing scrutiny due to environmental concerns. While the industry continues to expand, its future growth is increasingly challenged by environmental pressures and the need to maintain its social license to operate (SLO).

By considering the positive and negative impacts of the Tasmanian salmon industry, evaluate if the industry has an SLO.

/6

Positive impacts: .....

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Negative impacts: .....

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Evaluation: .....

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Total Q24

/6

Acknowledgements

Sources:

Figure 10: https://853371837556463884.weebly.com/2-location-and-distribution.html

End of Section E

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