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Given name/s

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Family name

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Attach your
barcode ID label here

Book

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books used

External assessment 2021

Question and response book

Marine Science

Paper 1

Time allowed

- Perusal time — 10 minutes
- Working time — 90 minutes

General instructions

- Answer all questions in this question and response book.
- QCAA-approved calculator permitted.
- Planning paper will not be marked.

Section 1 (20 marks)

- 20 multiple choice questions

Section 2 (40 marks)

- 8 short response questions





DO NOT WRITE ON THIS PAGE

THIS PAGE WILL NOT BE MARKED



Section 1

Instructions

- Choose the best answer for Questions 1–20.
- This section has 20 questions and is worth 20 marks.
- Use a 2B pencil to fill in the A, B, C or D answer bubble completely.
- If you change your mind or make a mistake, use an eraser to remove your response and fill in the new answer bubble completely.

| | A | B | C | D |
|----------|----------------------------------|-----------------------|-----------------------|-----------------------|
| Example: | <input checked="" type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |

| | A | B | C | D |
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| 19. | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| 20. | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |

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Section 2

Instructions

- Write using black or blue pen.
 - If you need more space for a response, use the additional pages at the back of this book.
 - On the additional pages, write the question number you are responding to.
 - Cancel any incorrect response by ruling a single diagonal line through your work.
 - Write the page number of your alternative/additional response, i.e. See page ...
 - If you do not do this, your original response will be marked.
 - This section has eight questions and is worth 40 marks.
-

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QUESTION 21 (4 marks)

a) How many years ago did coral reefs first appear in Australian waters?

[1 mark]

b) Describe how changes in sea levels formed the Great Barrier Reef.

[3 marks]

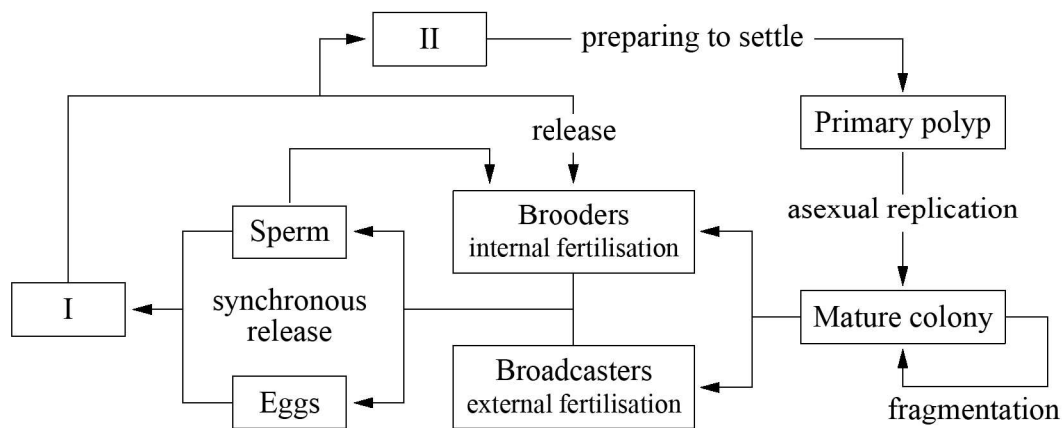
QUESTION 22 (3 marks)

Describe how herbivorous fish populations benefit coral reefs.

Do not write outside this box.

QUESTION 23 (9 marks)

The diagram outlines the life cycle of a typical reef-forming hard coral.



- a) Identify the stages of the life cycle labelled I and II.

[2 marks]

I: _____

II: _____

- b) Explain the importance of currents for coral dispersal.

[4 marks]

Do not write outside this box.

c) Explain the process of site selection for coral species.

[3 marks]

QUESTION 24 (3 marks)

Coral trout (*Plectropomus leopardus*) were monitored at a reef.

| Number of coral trout | |
|---|----|
| Captured, marked and released | 25 |
| Captured one week later | 24 |
| Number of marked individuals recaptured | 8 |

a) Determine the estimated size of the coral trout population using the Lincoln index,

$$N = \frac{M \times n}{m}$$

[1 mark]

b) Explain one limitation when using the Lincoln index to estimate the size of the coral trout population.

[2 marks]

Do not write outside this box.

QUESTION 25 (6 marks)

The structure of a coral polyp is shown.

Stimulus redacted.

View: <https://thebeginnersreef.com/why-are-your-corals-not-growing/>

- a) Identify the anatomical features labelled I and II.

[2 marks]

I: _____

II: _____

- b) Describe the process of night feeding in corals.

[3 marks]

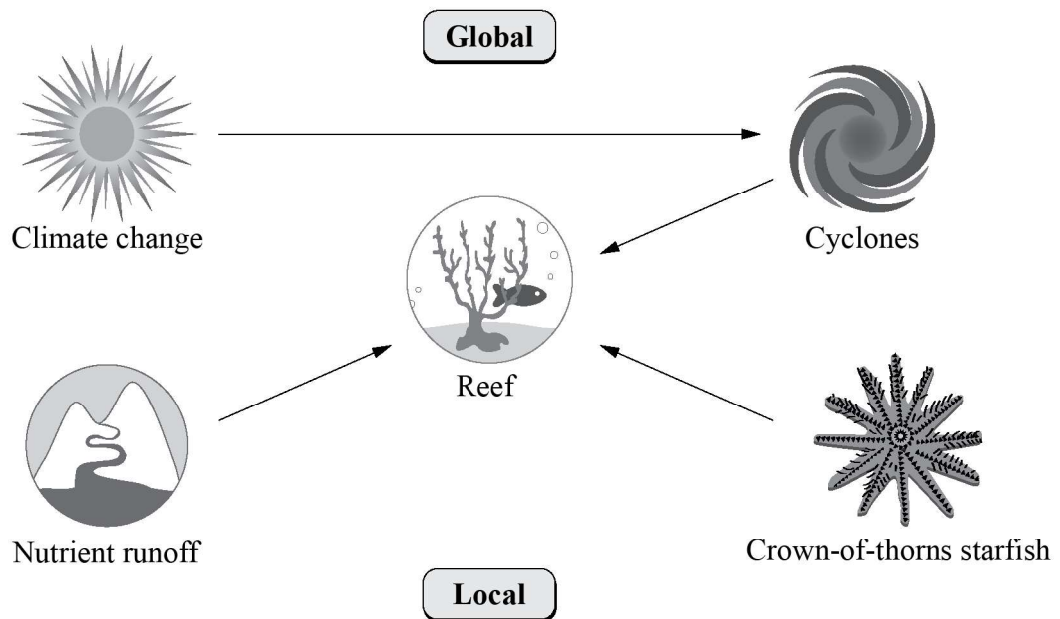
- c) Identify the relationship between coral polyps and zooxanthellae.

[1 mark]

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QUESTION 26 (6 marks)

The diagram shows some of the pressures that affect coral reefs.



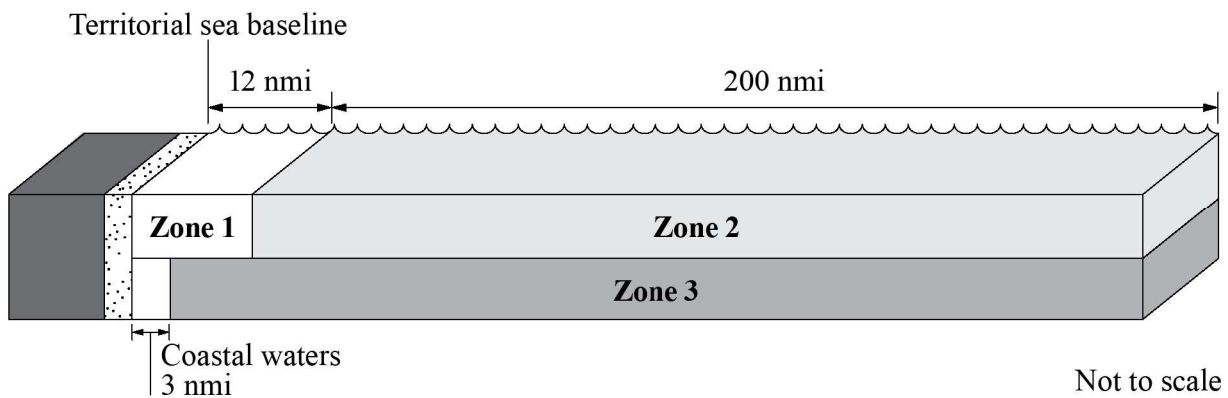
Explain how the interaction of the pressures shown affects coral reefs.

[illegible]

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QUESTION 27 (5 marks)

The diagram shows the marine zones in nautical miles (nmi) for Australian waters.



- a) Identify the Australian Fishing Zone (AFZ). [1 mark]
-
- b) Identify the level of government that manages commercial fisheries in the AFZ. [1 mark]
-
- c) Explain what fixed quotas are and how they are used to achieve sustainable fisheries. [3 marks]

Do not write outside this box.

QUESTION 28 (4 marks)

Explain how alterations in thermal regimes caused by climate change affect the distribution of fish populations along Australia's east coast.

END OF PAPER

Do not write outside this box.

References

Question 23

Adapted from XcepticZP & Spaully 2018, *Coral life cycles*, Wikipedia, https://en.wikipedia.org/wiki/Coral#/media/File:Coral_Life_Cycles_ZP.svg CC BY-SA 1.0

Question 24

Adapted from XcepticZP & Spaully 2018, *Coral life cycles*, Wikipedia, CC BY-SA 1.0, https://en.wikipedia.org/wiki/Coral#/media/File:Coral_Life_Cycles_ZP.svg.

Question 25

Adapted from Richard 2019, 'Corals not growing? Here could be some reasons why', *The Beginners Reef*, <https://thebeginnersreef.com/why-are-your-corals-not-growing/>.

Question 26

Figure adapted from Wolff NH, Mumby PJ, Devlin M, Anthony KRN. Vulnerability of the Great Barrier Reef to climate change and local pressures. *Glob Change Biol.* 2018;00:1–14. <https://doi.org/10.1111/gcb.14043>

Question 27

Adapted from Mobsby, D & Curtotti, R 2018, *Figure 1: Australian maritime zones*, 'Snapshot of Australia's commercial fisheries and aquaculture', ABARES <https://www.agriculture.gov.au/abares/products/insights/snapshot-of-australias-commercial-fisheries-and-aquaculture>, Creative Commons Attribution (CC-BY) 4.0 International licence



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