

LUI

--	--	--	--	--	--	--	--	--	--

School code

--	--	--	--

School name

--

Given name/s

--

Family name

--

Attach your
barcode ID label here

Book

--

of

--

books used

External assessment 2022

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 (28 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
1.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
2.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
3.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
4.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
5.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
6.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
7.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
8.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
9.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
10.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
11.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
12.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
13.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
14.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
15.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
16.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
17.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
18.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
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"/>

Do not write outside this box.

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 28 marks.
-

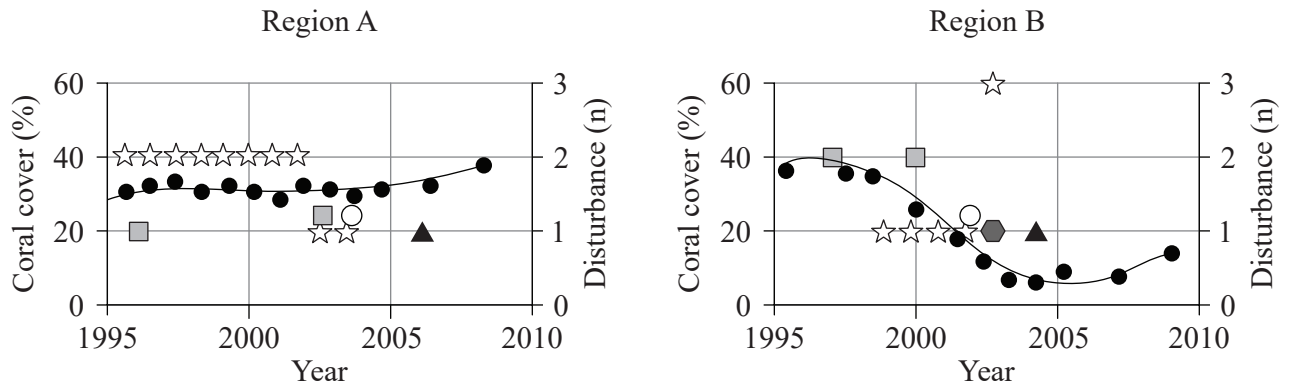
QUESTION 21 (3 marks)

Compare the catch rates of maximum sustainable yields and maximum economic yields.

Do not write outside this box.

QUESTION 22 (3 marks)

The graphs show temporal trends in percentage cover of hard coral in two regions, A and B.



Key

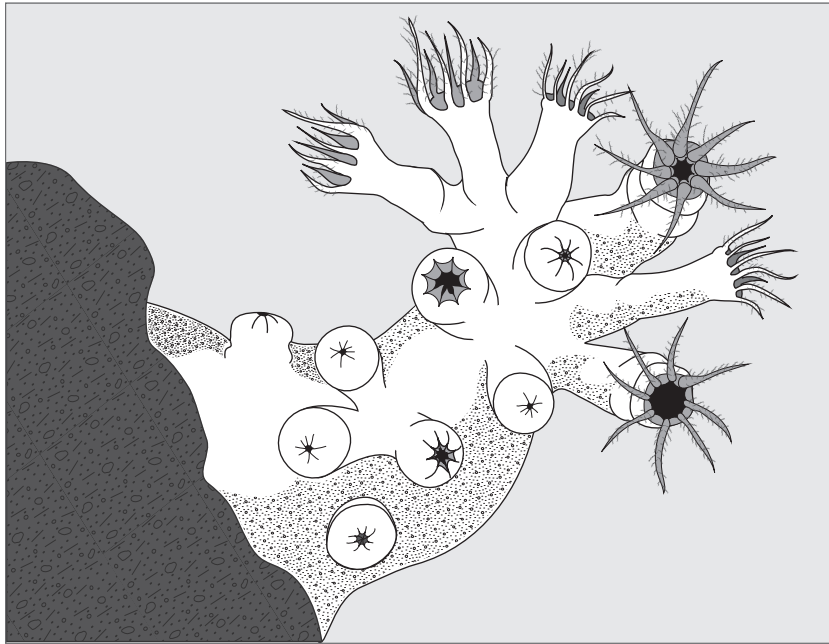
- Observed coral cover
- Coral cover line of best fit
- ☆ Crown-of-thorns starfish event
- Disease
- Multiple disturbances
- ▲ Unknown disturbance
- ◐ Bleaching

Compare the resilience of the reefs in regions A and B.

Do not write outside this box.

QUESTION 23 (3 marks)

The structure of a coral species is shown.



Identification key for classifying coral

1. Symmetry:

six-fold go to 2

eight-fold go to 3

2. Growth form:

solitary polyp *Order Actiniaria*

tube dwelling *Order Ceriantharia*

3. Attachment to substrate:

base attaches to hard substrate (sessile) *Order Alcyonacea*

bulbous pedicel attached into sand (non-sessile) *Order Pennatulacea*

Classify this coral using the identification key. Show your reasoning.

Do not write outside this box.

QUESTION 25 (6 marks)

Students conducted fish surveys at two sites on Heron Island.

Site A (14% coral cover)	
Fish species	Count (<i>n</i>)
Butterfly	6
Grouper	0
Moray eel	1
Parrot	29
Snapper	2
Sweetlip	1
Total	39
SDI	

Site B (65% coral cover)	
Fish species	Count (<i>n</i>)
Butterfly	25
Grouper	6
Moray eel	0
Parrot	7
Snapper	11
Sweetlip	0
Total	49
SDI	0.67

- a) Use Simpson's diversity index (SDI) to calculate the biodiversity of site A. Show your working.

[3 marks]

$$SDI = 1 - \left(\frac{\sum n(n-1)}{N(N-1)} \right)$$

Do not write outside this box.

b) Predict which site is likely to have higher coral diversity. Show your reasoning.

[3 marks]

QUESTION 26 (3 marks)

Identify three differences between intensive and extensive aquaculture systems.

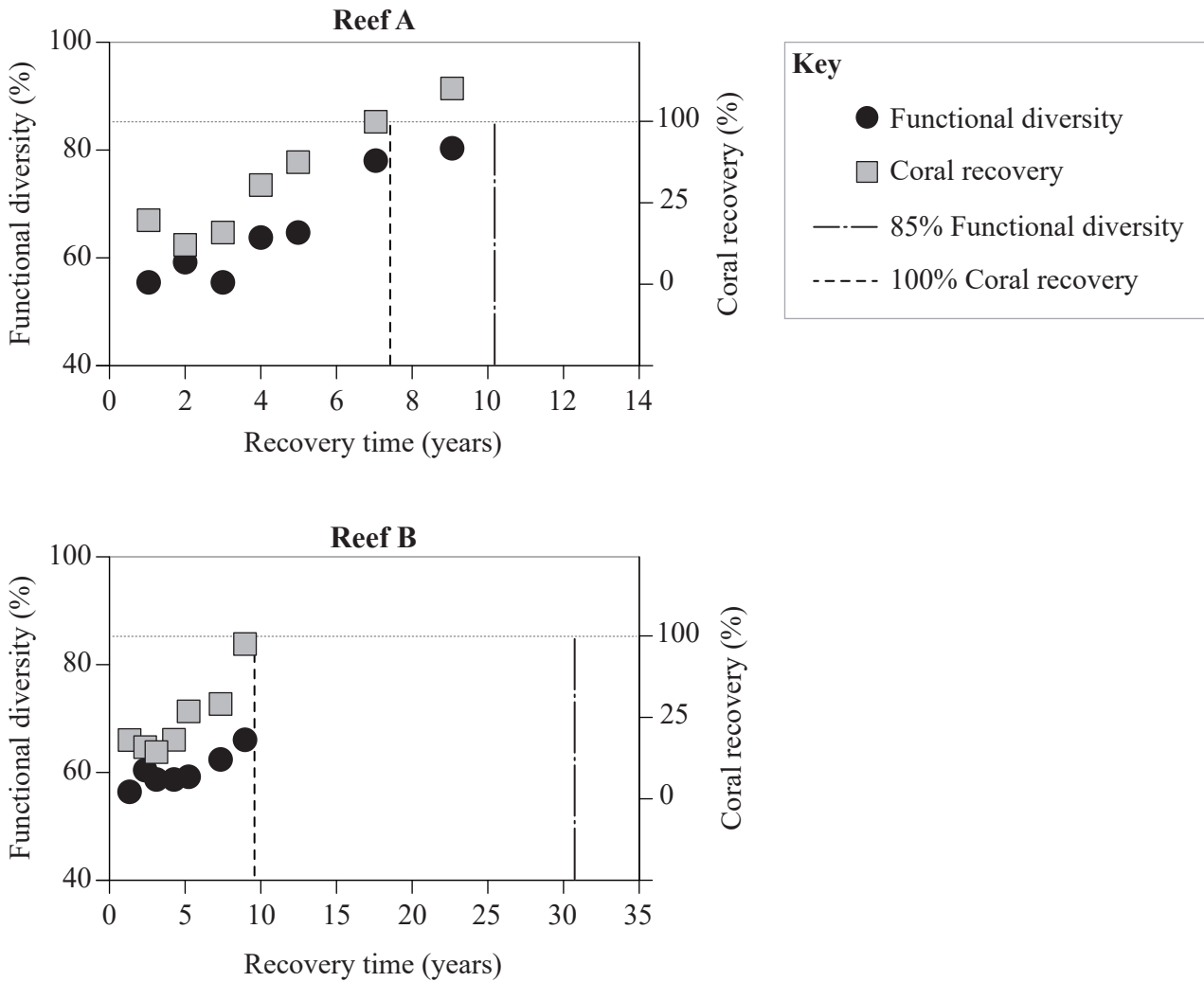
Do not write outside this box.

QUESTION 27 (2 marks)

Describe an aspect of fisheries management that applies the precautionary principle.

QUESTION 28 (3 marks)

The graphs show functional diversity and coral recovery over time for two reefs after each reef has experienced a severe disturbance event.



Do not write outside this box.

References

Question 22

Graphs derived and/or adapted from

The PLOS ONE Staff 2014, 'Disturbance and the Dynamics of Coral Cover on the Great Barrier Reef (1995–2009)', *PLOS ONE*, vol. 9, no. 6, e99742, <https://doi.org/10.1371/journal.pone.0099742>. Used under the Creative Commons Attribution License

Question 23

Diagram derived from

Conti-Jerpe, IE & Freshwater, DW 2017, 'Hedera caerulescens (Alcyonacea: Alcyoniidae), a new genus and species of soft coral from the temperate North Atlantic: Invasive in its known range?', *Invertebrate Systematics*, vol. 31, no. 6, pp. 723–733, <https://doi.org/10.1071/IS16069>.

Vitor 2016, *Ko Lanta*, [https://commons.wikimedia.org/wiki/File:Pink_soft_coral_\(5474803362\).jpg](https://commons.wikimedia.org/wiki/File:Pink_soft_coral_(5474803362).jpg). Licensed CC BY-SA 2.0

Question 28

Graphs adapted from

Figure 3 in Jones, KA, Osborne, KO & Logan, M 2014, 'Contrasting rates of coral recovery and reassembly in coral communities on the Great Barrier Reef', *Coral Reefs*, vol. 33, pp. 553–563, <https://doi.org/10.1007/s00338-014-1148-z>. Used under a Creative Commons Attribution Licence.



© State of Queensland (QCAA) 2022

Licence: <https://creativecommons.org/licenses/by/4.0> | Copyright notice: www.qcaa.qld.edu.au/copyright — lists the full terms and conditions, which specify certain exceptions to the licence. Third-party materials referenced above are excluded from this licence. | Attribution: © State of Queensland (QCAA) 2022