External assessment 2025

Multiple choice question book

Marine Science

Paper 1

General instruction

- Work in this book will not be marked.

Queensland Government | QCAA Queensland Curriculum & Assessment Authority

Section 1

Instruction

- Respond to these questions in the question and response book.

QUESTION 1

Identify the primary structure corals use for disabling prey.

(A) mouth

(B) tentacles

(C) nematocysts

(D) zooxanthellae

QUESTION 2

Alcyonacea are

(A) soft corals.

(B) hard corals.

(C) hermatypic.

(D) reef-forming.

QUESTION 3

Identify an indirect consequence of ocean acidification for planktivores such as corals.

(A) increase in bleaching

(B) decrease in ocean pH

(C) decrease in available food

(D) increase in accretion of their skeletons

QUESTION 4

Government organisations can effectively manage marine parks because of their

(A) absence of diplomatic constraints.

(B) ability to enforce decisions.

(C) political influence.

(D) speed of response.

QUESTION 5

Identify the stage of coral reef colonisation that involves microscopic corals attaching to a reef structure.

(A) spawning

(B) settlement

(C) site selection

(D) larval dispersion

QUESTION 6

A barrier reef differs from a fringing reef by having a

(A) reef crest.

(B) deep lagoon.

(C) narrow reef flat.

(D) gently sloping reef front.

QUESTION 7

Fisheries that are managed using fixed quotas are controlled by

(A) electronic monitoring.

(B) dynamic spatial zoning.

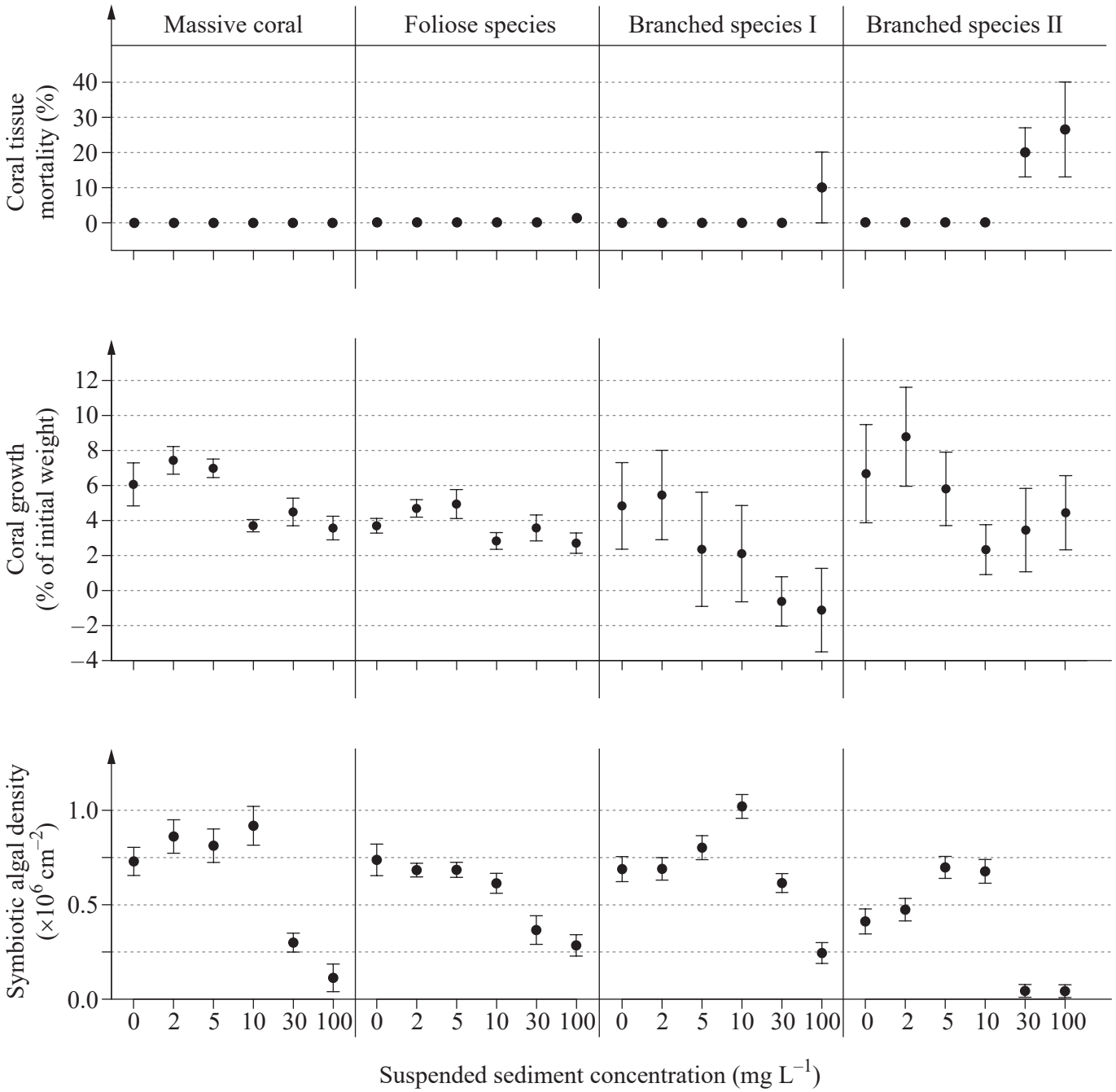
(C) setting a total allowable catch.

(D) limiting effort to maximise profit.

QUESTIONS 8–9

Questions 8–9 refer to the data and information shown.

An experiment was conducted to model the effects of increased turbidity on the mortality, growth and symbiotic algal density of corals. Four coral species were exposed to increasing levels of turbidity for 42 days. Turbidity was measured using suspended sediment concentrations (mg L^{-1}). The results are shown.



QUESTION 8

Identify the suspended sediment concentration that resulted in the highest coral growth.

(A) 2 mg L^{-1}

(B) 5 mg L^{-1}

(C) 10 mg L^{-1}

(D) 100 mg L^{-1}

QUESTION 9

Suspended sediment concentration greater than 10 mg L^{-1} resulted in

(A) branched corals adapting to the high turbidity.

(B) increased bleaching in all species.

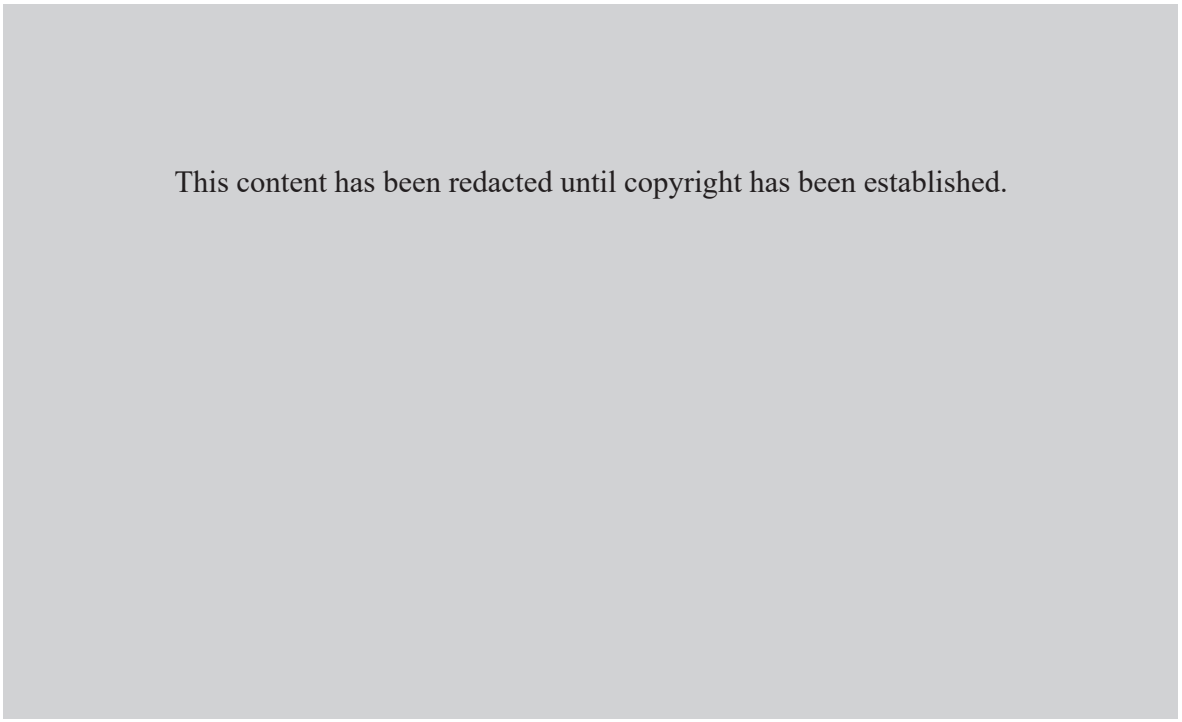
(C) increased mortality in all species.

(D) decreased growth in all species.

QUESTIONS 10–11

Questions 10–11 refer to the data and information shown.

The graphs show the catch and total allowable commercial catch (TACC) in the northern and southern region of a lobster fishery from 1983–2023.



QUESTION 10

Which year did the catch in the northern region first reach the TACC?

(A) 1994

(B) 2003

(C) 2009

(D) 2012

QUESTION 11

Draw a conclusion about the use of the TACC in the lobster fishery.

(A) Its early implementation has ensured the northern region is sustainable.

(B) The catch in the northern region has not reached it since its introduction.

(C) It has been ineffective as a management strategy across the entire fishery.

(D) It has ensured the southern region is sustainable but not the northern region.

QUESTION 12

Why does the carbonate system operate on geological timescales?

(A) Decomposition of organic matter takes longer in the ocean than in air.

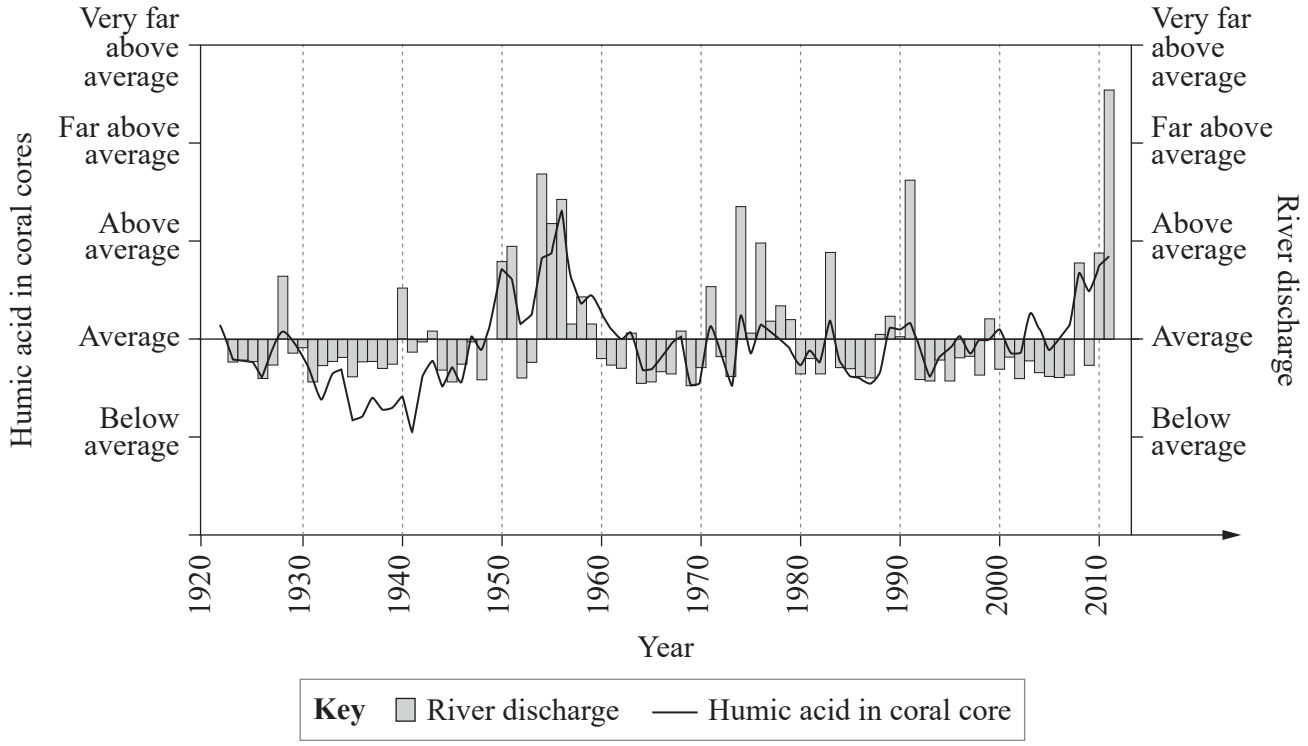
(B) The atmosphere acts as a carbon sink, making diffusion into the ocean difficult.

(C) The system depends on the burning of fossil fuels to release carbon from sedimentary rocks.

(D) Calcium carbonate sediments stored in the deep ocean do not easily mix with upper ocean layers.

QUESTION 13

The graph shows coral core measurements of humic acid, which is found in high concentrations in soils, and annual discharge from a river close to an onshore reef.



Use the data to infer why coral cores can be used as a proxy for measuring surface run-off onto reefs.

(A) Humic acid is not found in coral cores.

(B) The amount of coral growth will vary depending on the season.

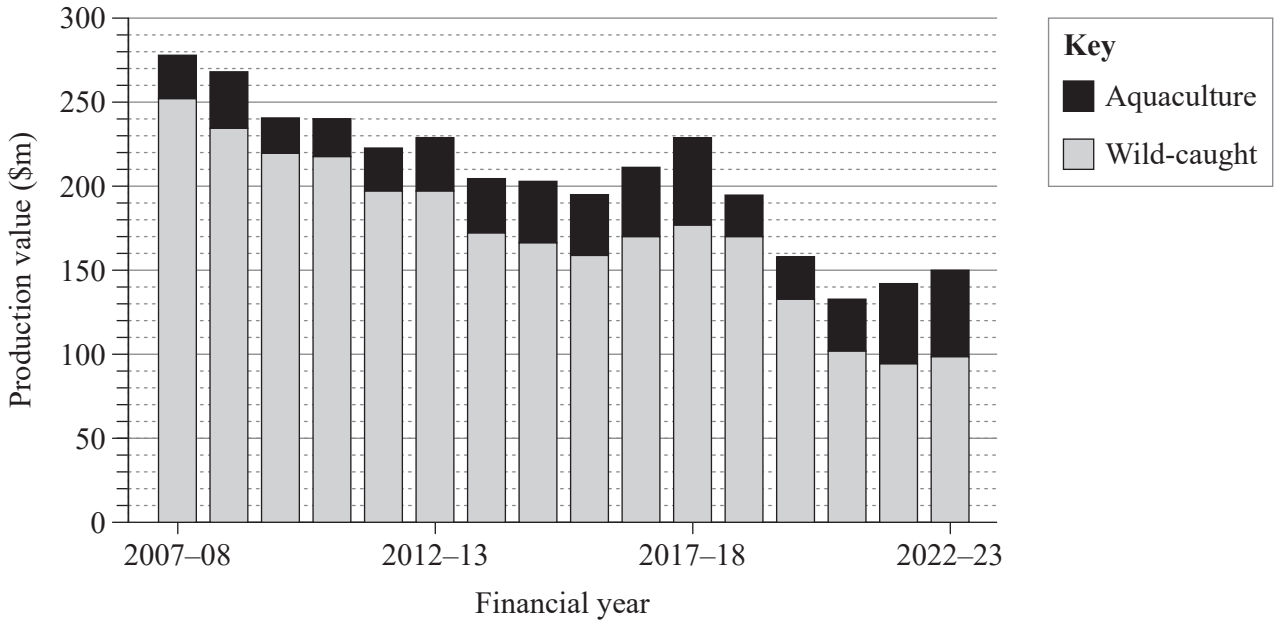
(C) Coral density declines when river discharge is low, forming a stress band in the coral core.

(D) There is a relationship between the amount of humic acid in coral cores and river discharge volumes.

QUESTIONS 14–15

Questions 14–15 refer to the data and information shown.

The graph shows the value of abalone production by sector from 2007–08 to 2022–23.



QUESTION 14

Identify the financial year that the proportion of aquaculture production value to total production value was lowest.

(A) 2009–10

(B) 2011–12

(C) 2020–21

(D) 2021–22

QUESTION 15

How has the value of abalone production changed from 2007–08 to 2022–23?

(A) The value of aquaculture has increased because wild-caught abalone levels have become more sustainable.

(B) Total production value has nearly halved while aquaculture production value has nearly doubled.

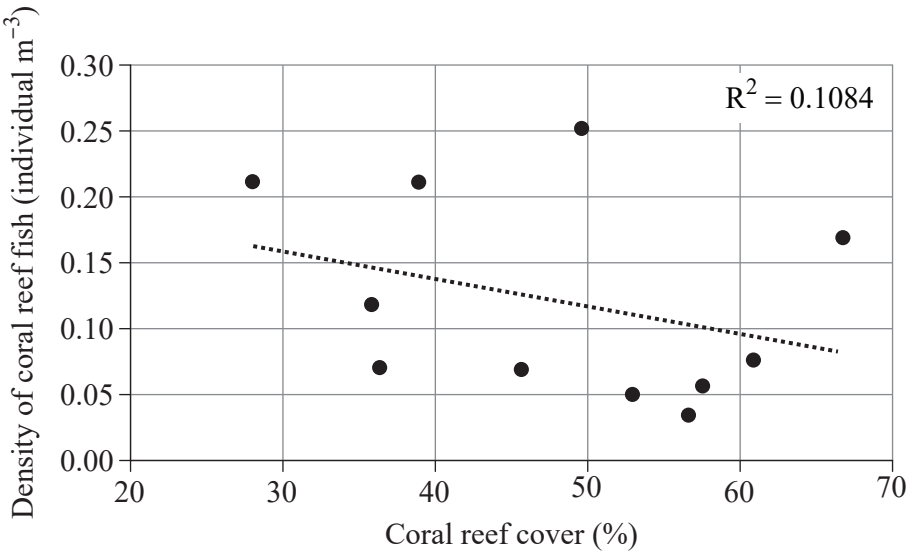
(C) The contribution of aquaculture to total production value has increased every year.

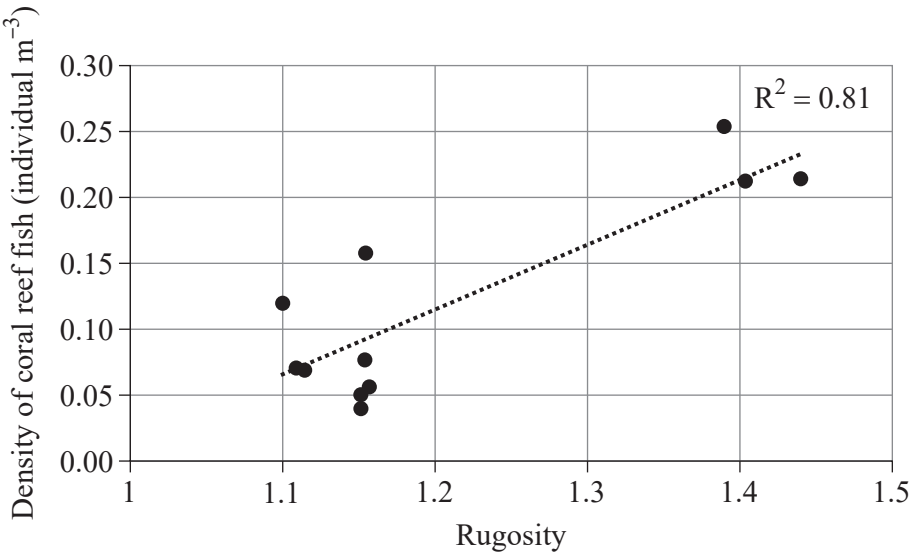
(D) The proportion of wild-caught abalone to total production value has not changed.

QUESTIONS 16–17

Questions 16–17 refer to the data and information shown.

The relationship between the density of coral reef fish and both the percentage of coral reef cover and rugosity were measured on several different reefs. The results are shown.





QUESTION 16

Which option describes the relationship between the density of coral reef fish and rugosity?

(A) no relationship

(B) an inverse relationship

(C) a weak negative linear relationship

(D) a strong positive linear relationship

QUESTION 17

Which conclusion can be drawn from this data?

(A) There is a relationship between increasing habitat complexity and coral reef fish density.

(B) Rugosity has less of an effect on coral reef fish density than coral cover.

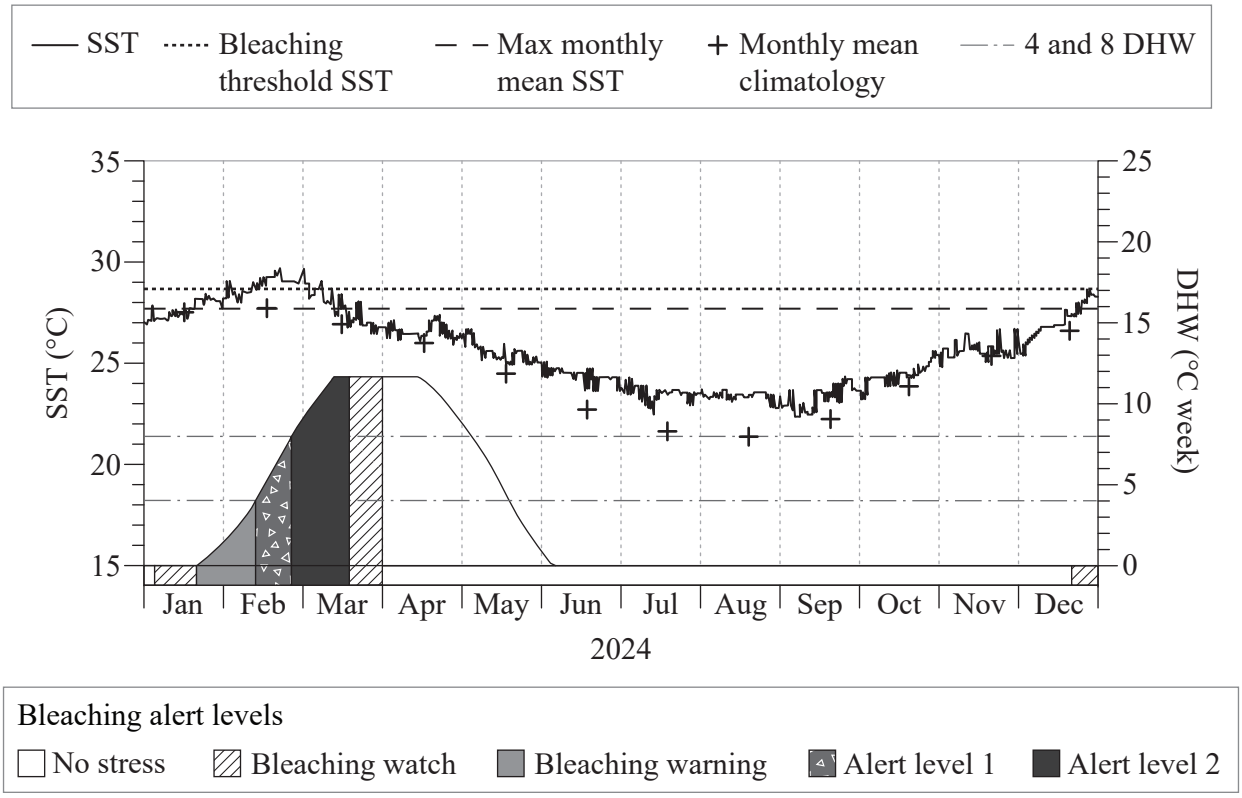
(C) Coral reef fish density increases with an increase in coral cover.

(D) Rugosity is determined by coral cover.

QUESTIONS 18–20

Questions 18–20 refer to the data and information shown.

The graph shows the sea surface temperature (SST), degree heating weeks (DHW) and bleaching threshold for a reef.



QUESTION 18

Identify the highest sea surface temperature recorded on the reef.

(A) 24.7 °C

(B) 28.0 °C

(C) 28.7 °C

(D) 29.5 °C

QUESTION 19

Using Shelford's law of tolerance, this reef shifted beyond its optimal conditions at

(A) 4 DHW.

(B) 8 DHW.

(C) 27.6 °C.

(D) 28.7 °C.

QUESTION 20

Determine when mass coral bleaching would be most likely to occur.

(A) January

(B) February

(C) March

(D) May

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References

Questions 8 & 9

Jones R, Giofre N, Luter H M, Neoh T L, Fisher R & Duckworth A 2020, 'Responses of corals to chronic turbidity', *Scientific Reports*, 10(1), 1–13, https://www.nature.com/articles/s41598-020-61712-w.

Questions 10 & 11

Linnane A, McGarvey R, Feenstra J, Mark K & Graske D 2023, *Northern Zone Rock Lobster* (*Jasus edwardsii*) Fishery Status Report 2022/23, https://pir.sa.gov.au/__data/assets/pdf_file/0003/441804/NZ_Rock_Lobster_2022_23_Status_Report_-_FINAL.pdf

Linnane A, McGarvey R, Feenstra J, Mark K & Hawthorne P 2023, *Southern Zone Rock Lobster (Jasus edwardsii) Fishery Status Report* 2022/23, https://pir.sa.gov.au/__data/assets/pdf_file/0005/441806/SZ_Rock_Lobster_2022_23_Status_Report_-_FINAL.pdf

Question 13

Rodriguez-Ramirez A, Grove CA, Zinke J, Pandolfi JM & Zhao J 2014, 'Coral Luminescence Identifies the Pacific Decadal Oscillation as a Primary Driver of River Runoff Variability Impacting the Southern Great Barrier Reef', *PLoS* ONE, vol. 9, no. 1, p. e84305, https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3885547/.

Questions 14 & 15

Curtotti, R, Dylewski, Cao, A and M, Tuynman H 2023, Australian fisheries and aquaculture outlook to 2027−28, ABARES research report, Canberra, March, DOI: https://doi.org/10.25814/vzbj-nw33. CC BY 4.0.

Questions 16 & 17

Nugraha WA, Mubarak F, Husaini E & Evendi H 2020, 'The Correlation of Coral Reef Cover and Rugosity with Coral Reef Fish Density in East Java Waters', *Jurnal Ilmiah Perikanan dan Kelautan*, https://www.researchgate.net/publication/340229904_The_Correlation_of_Coral_Reef_Cover_and_Rugosity_with_Coral_Reef_Fish_Density_in_East_Java_Waters.

Questions 18 to 20

NOAA Coral Reef Watch 2024, 'NOAA Coral Reef Watch Great Barrier Reef Virtual Stations Time Series Data for the Southern GBR', *Coral Reef Watch*, https://coralreefwatch.noaa.gov/product/vs/timeseries/great_barrier_reef.php#gbr_southern.

Data and information provided in this paper may have been developed or adjusted for exam purposes and should not be taken as factual.