

Year 12 MMS Semester 1 Sample Exam Answers

Section A: Multiple Choice

1	B	6	B	11	B	16	B
2	A	7	C	12	B	17	B
3	B	8	A	13	C	18	C
4	D	9	C	14	A	19	A
5	B	10	B	15	C	20	C

Section B: Short Answer

Qu21 (11 marks)

a) (1 mark)

- Plastic/rubber

b) (3 marks) Any 3 of:

- Fins make snorkelling easier
- ↓ energy used
- can snorkel for longer time periods
- ↑ enjoyment

c) (2 marks)

- cramps in foot/leg
- blisters

d) (2 marks)

- straight legs (not bent knees)
- rotate from the hips in long strokes

e) (3 marks)

- rinse in freshwater
- dry in indirect sunlight/shade
- pack away once dry in air-tight container (protect)

Qu22 (17 marks)

a) (2 marks) Any two of:

- temperature & salinity driven
- global conveyor belt
- connect the world's oceans in one continuous flow

b) (2 marks)

- heat distribution
- distribution of nutrients from polar regions

c) (5 marks)

Any 5 of (in logical sequence):

- temperature and salinity driven
- cold water = more dense = sink
- salty water = more dense = sink
- warm water = less dense = rise
- less salty water = less dense = rise
- this vertical movement pushes water along.

d) i) (1 mark)

- shut down/slowing

d) ii) (7 marks)

- enhanced greenhouse effect leads to ↑ global warming.
- this ↑ temp in polar regions
- ↓ brine exclusion as polar regions are not sufficiently cold enough
- ↓ volume of water sinking in polar regions
- plus melting of ice ↑ FW input in polar regions
- FW is less dense than SW further ↓ brine exclusion and push/force/momentum.

Qu 23 (15 marks)

a) (2 marks) Any 2 of:

- ↑ recreation (surfing/fishing)
- ↑ ecotourism
- ↑ economy to local businesses

a) ii) (2 marks) Any 2 of:

- ↑ space/habitat for recruitment
- ↑ population size as ↓ competition for resources
- As colonisation of reef occurs, ↑ complexity of food webs and thus ↑ food available

b) i) (2 marks)

- Material will not deteriorate into toxic/harmful chemicals
- Suitable substrate for organisms to colonise

b) ii) (2 marks)

- Will not interfere with sand movement along coastline
- Turn an accreting beach into an eroding one (and vice versa)

c) i) (1 mark)

- Leeuwin current

c) ii) (2 marks)

- Producers
- such as encrusting algae and juvenile foliose algae

c) iii) (4 marks)

- Artificial reef provides ↑ space/habitat
- New spp/individuals colonise into the new area
- Both tropical and temperate spp can recruit to the reef and
- Establish a new community of organisms which leads to ↑ biodiversity.

Qu 24 (26 marks)

a) i) (4 marks)

- Chlorophyll a pigment is present in chloroplasts
- Chloroplasts are present in photosynthetic organisms such as phytoplankton

- Measure of chlorophyll a = abundance of phytoplankton
- Which gives a measure of productivity.

a) ii) (2 marks)

- ↑ chlorophyll a
- ↑ phytoplankton/↑ productivity

a) iii) (2 marks)

- ↓ chlorophyll a
- ↓ phytoplankton/↓ productivity

a) iv) (3 marks)

- Northern hemisphere summer
- High chlorophyll a in northern polar regions
- Summer conditions ↑ light availability ↑ PHS ↑ productivity

a) v) (3 marks) Any 3 of:

- Land masses produce run-off following rain
- Rivers/streams discharge to oceans
- Carry nutrients to ocean which
- ↑ PHS rates and chlorophyll a concentration

b) i) (1 mark)

- Eddies

b) ii) (3 marks) Any 3 of:

- Eddies mix the water vertically
- Bring the nutrient rich water into the light zone
- ↑ productivity
- take O₂ and nutrients downwards

c) i) (4 marks)

- Phytoplankton spp can exist at different depths in light zone
- Distribution is species dependent
- ↑ accuracy of data generated
- May reveal unknown patterns rather than being masked by overall picture.

c) ii) (4 marks)

- Open ocean = ↓ productivity
- Less phytoplankton present as nutrients are limited/settled to bottom
- Light penetrates further
- as there are less particles (plankton & sediments) to diffuse the signal

Qu 25 (11 marks)

a) (5 marks)

Title: Percentage of coral showing signs of bleaching at Split Solitary

	Pomfrey point	Coral corner
2005	7.5	7
2006	6	2.5
2007	3.5	3.5

b) (6 marks)

- High water temperatures that are sustained
- take coral polyps out of their tolerance range
- Stresses coral
- Coral polyp eject zooxanthellae from tissue
- As zooxanthellae provides pigment/colour to coral polyps
- Without zooxanthellae coral polyps appear white, bleached appearance.

Qu 26 (10 marks)

a) (3 marks)

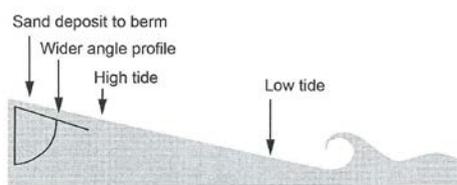
- B
- Erosion scarp, offshore sand bar and steep profiles
- are all indicators of an eroding profile.

b) (3 marks)

- offshore sand bar
- source of sand to be deposited on beach when the wave energy ↓
- leads to the formation of an accreting beach profile.

c) (4 marks)

Accreting beach



- micro-ridges form berm
- swash zone
- shallow profile
- constructive waves

Section 3: Extended Answer

Qu 27 (25 marks)

a) (6 marks)

- Positive buoyancy is where upthrust is greater than the mass of the object
- The object will float when submerged in water.
- Neutral buoyancy is where the upthrust is equal to the mass of the object
- The object will stay level
- Negative buoyancy is where the upthrust is smaller than the mass of the object.
- The object will sink

b) (5 marks)

(2-3 marks, 5 marks max)

- Archimedes principle states that when an object is immersed in water, it will
- displace a volume of water
- mass of displaced water is equal to the upthrust.

(2-3 marks, 5 marks max)

- The cuttlefish floats in aquaria as it displaces a greater volume of water
- And therefore mass of water
- Than its mass in air.

c) (10 marks)

- Hypothesis (2) – *Eg If a cuttlefish has a dense cuttlebone, then it will sink (& vice versa)*
- IV (1) – density of cuttlebone
- DV (1) – position in water – sinking or floating
- CV (2) – age/sex/health/species/size of cuttlefish. Temperature/salinity/water quality of water

Method (4 marks)

A logical method, which may include (but are not limited to the following)

- A number of cuttlefish (same species/age/sex/health/size) with different known cuttlebone densities - at least three individuals of each cuttlebone density.
- identical set up in tanks with same volume/temperature/quality of water
- the position in the water column is measured once the cuttlefish are settled in the environment.
- Repeat measurements of individual cuttlefish at least three times and then average the results of these repeats to reduce the effect of individual variation.
- Average the results of the three individuals at each density interval.

d) (4 marks)

- $150/10 + 1$
- 16atm
- $V_1P_1=V_2P_2$ ($V_1=20\text{ml}$, $P_1 = 1\text{atm}$, $P_2=16$)
 $20 \times 1 = 16 \times V_2$
- 1.25ml

Qu 28 (25 marks)

a) (6 marks)

Role 1

- Habitat/nursery for juvenile fish
- ↑ recruitment for that species

- ↑ population of spp that form fisheries (fish stock) and therefore ↑ stability of community via ↑ complexity of food webs (↑ food available)

Role 2

- ↓ velocity of water via shelter/natural breakwater
- ↓ erosion of coastal environments
- Preserve marine habitats (coastal)

b) (5 marks) Any 5 of:

- Sewerage pollution provides ↑ nutrients (N & P)
- Can change population of associated species of community
- eg. bloom of bacteria/algae which ↓ light availability to producers
- ↓ productivity of community ↑ disease
- ↓ biomass available to trophic levels
- ↓ species abundance & diversity and
- ↓ stability/resilience of community.

c) (7 marks) Any 7 of:

- Climate change is due to enhanced greenhouse effect
- Results in global warming that ↑ the temperature of seawater
- ↑ water temperature will ↓ rate at which O_2 dissolves.
- ↑ temperature also causes thermoclines that prevent mixing between layers
- This will ↓ O_2 available for marine organisms to use in cell respiration
- And will ultimately ↓ population sizes
- ↓ spp diversity and ↓ productivity
- and form suboxic and hypoxic zones in the ocean.

d) (6 marks)

Any 6 of the following in logical order

- Ocean acidification ↓ pH of water
- Due to more CO_2 dissolving as there is
- ↑ in CO_2 in atmosphere due to anthropogenic sources
- Dissolved CO_2 converts to carbonate ion
- Which more readily combines with Ca^{2+}
- Leads to ↓ in formation of $CaCO_3$
- Which forms the skeleton of hard corals
- ↓ reef building

Qu 29 (25 marks)

a) i) (5 marks)

- water carries sediment as it moves downstream
- the water particles move back and forth past the foundation material

- with tidal flow (upstream) and downstream movement (as rivers are connected to the ocean)
- this would have caused an abrasive effect against the foundation ↑ weathering rate
- and the water would have transported the weathered particles away via the process of erosion.

a) ii) (6 marks)

- high wave energy
- due to tidal movement pushing water upstream
- ↑ boat traffic due to Fremantle Port
- and recreational boats leaving the river located marinas/sailing clubs to access oceanic sites
- area is bounded by seawalls that reflect energy back at the same intensity
- rather than dissipate energy.

b) (10 marks)

Groyne

- eg Cottesloe/Sth Cottesloe
- are used to trap sand and
- ↑ beach width
- constructed perpendicular to coastline
- must have longshore drift operating to function effectively.

Breakwater

- eg. Hillary's Marine/Austral shipyard
- built parallel to coastline
- offshore so that that waves break away from coastline
- to reduce wave energy
- providing safe anchorage to boats and calm travel water.

c) (4 marks)

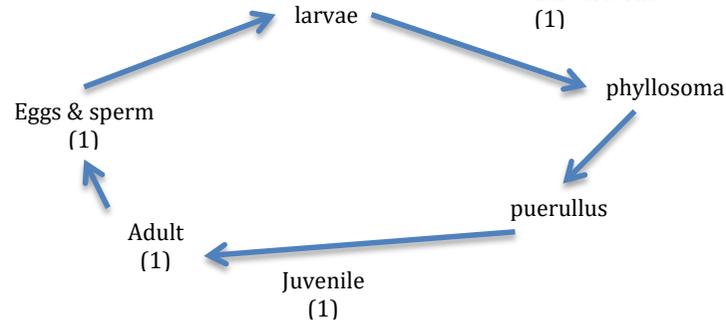
- sand budget is the balance of sand in and out of a beach system

Any three of the following sources of income

- rivers and streams
- cliff erosion
- longshore drift (in)
- wind (on shore)
- beach nourishment
- animal and plant remains

Qu 30 (25 marks)

a) (5 marks)



b) (6 marks)

Phytoplankton

- planktonic plants/cells that carry out PHS (are producers/autotrophic)
- eg. Diatoms, coccolithophores, silicoflagellates

Zooplankton

- planktonic animals that are heterotrophic (can't make their own food)
- eg. Salps, krill, rock lobster phyllosoma, fish larvae

c) (3 marks)

- phyllosoma larvae forms zooplankton component
- is a predator of lower order consumers
- is prey for higher order consumers

d) (6 marks)

- ↓ recruitment = ↓ number of juveniles settling in habitat
- this will ↓ population of Sth Rock lobster (and therefore stock size)
- this would lead to ↓ in production of biomass in community
- as Sth Rock lobster are mid-level in food web
- ↓ transfer of energy
- as ↓ food available for higher order consumers.

e) (5 marks)

- enhanced greenhouse effect ↑ water temperature due to
- ↑ heat retained by lower atmosphere
- and resultant heat transfer to ocean
- an ↑ temp will lead to ↓ larval growth there will be ↓ recruitment as there are less larvae surviving
- ↓ population size.

Semester 1 Exam reflection

My greatest strengths in content knowledge were...

Content areas I still need to work on are...

The style of question I handled really well include...

The style of question I still need to work on include...

Aspects of exam technique that I used really well include...

Aspects of my exam technique I need to work on before my next exam are...

End of marking key ☺