



ATAR course examination, 2020 Question/Answer booklet

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STUDIES	

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Time allowed for this paper

Reading time before commencing work: ten minutes Working time: three hours

Materials required/recommended for this paper

To be provided by the supervisor

This Question/Answer booklet Multiple-choice answer sheet

Number of additional	
answer booklets used	
(if applicable):	

To be provided by the candidate

Standard items: pens (blue/black preferred), pencils (including coloured), sharpener,

correction fluid/tape, eraser, ruler, highlighters

Special items: up to three calculators, which do not have the capacity to create or store

programmes or text, are permitted in this ATAR course examination

Important note to candidates

No other items may be taken into the examination room. It is your responsibility to ensure that you do not have any unauthorised material. If you have any unauthorised material with you, hand it to the supervisor before reading any further.

Structure of this paper

Section	Number of questions available	Number of questions to be answered	Suggested working time (minutes)	Marks available	Percentage of examination
Section One Multiple-choice	20	20	20	20	20
Section Two Short answer	6	6	90	97	50
Section Three Extended answer	4	2	70	40	30
				Total	100

Instructions to candidates

- 1. The rules for the conduct of the Western Australian external examinations are detailed in the *Year 12 Information Handbook 2020: Part II Examinations*. Sitting this examination implies that you agree to abide by these rules.
- 2. Answer the questions according to the following instructions.

Section One: Answer all questions on the separate Multiple-choice answer sheet provided. For each question, shade the box to indicate your answer. Use only a blue or black pen to shade the boxes. Do not use erasable or gel pens. If you make a mistake, place a cross through that square, then shade your new answer. Do not erase or use correction fluid/tape. Marks will not be deducted for incorrect answers. No marks will be given if more than one answer is completed for any question.

Section Two: Write your answers in this Question/Answer booklet. Wherever possible, confine your answers to the line spaces provided.

Section Three: Consists of four questions. You must answer two questions. Write your answers in this Question/Answer booklet.

- 3. You must be careful to confine your answers to the specific questions asked and to follow any instructions that are specific to a particular question.
- 4. Supplementary pages for planning/continuing your answers to questions are provided at the end of this Question/Answer booklet. If you use these pages to continue an answer, indicate at the original answer where the answer is continued, i.e. give the page number.

Section One: Multiple-choice 20% (20 Marks)

This section has **20** questions. Answer **all** questions on the separate Multiple-choice answer sheet provided. For each question, shade the box to indicate your answer. Use only a blue or black pen to shade the boxes. Do not use erasable or gel pens. If you make a mistake, place a cross through that square, then shade your new answer. Do not erase or use correction fluid/tape. Marks will not be deducted for incorrect answers. No marks will be given if more than one answer is completed for any question.

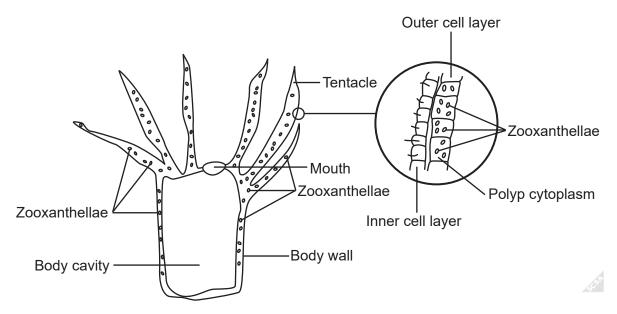
Suggested working time: 20 minutes.

- 1. Australia has strict quarantine laws to
 - (a) control Quarrants which are pests.
 - (b) maintain Australia's level of freedom from pests.
 - (c) control the importation of illegal substances.
 - (d) maintain the populations of carp and goldfish.
- 2. In coastal processes, the term 'sand budget' refers to
 - (a) the movement of sand onshore, offshore and along the shore.
 - (b) sand moving through shore drift.
 - (c) the amount of sand needed to counter beach erosion.
 - (d) the money available for sand bypass systems.
- 3. On which group of islands is the wreck of the Dutch East India Company (VOC) ship Batavia found?
 - (a) Pelsaert
 - (b) Abrolhos
 - (c) Easter
 - (d) Wallabi
- 4. As a diver descends, a feeling of pain in the ears sometimes occurs. This is caused by
 - (a) descending faster than 10 m per minute.
 - (b) air pressure inside the ear increasing.
 - (c) not equalising the pressure inside and outside the ear.
 - (d) water pressure on the eardrum.
- 5. Corals form a part of the planktonic group of animals. Into which group of plankton are they classified?
 - (a) Zanthoplankton
 - (b) Phytoplankton
 - (c) Meroplankton
 - (d) Holoplankton

- 6. Divers should have neutral buoyancy on the surface. What will happen to their buoyancy if they were to breath out?
 - (a) they will float higher
 - (b) they will sink
 - (c) nothing, as they are at the surface
 - (d) depends upon the gear they have
- 7. When entering the water from a jetty 1.5 metres above water level, the **best** technique to use is
 - (a) giant stride.
 - (b) backward roll.
 - (c) dive.
 - (d) climbing down.
- 8. Two effective methods of recording data from a snorkelling excursion are through the use of
 - (a) making audio recordings of observations and taking photographs.
 - (b) writing on slates and telling the rest of the group.
 - (c) writing observations in your logbook and taking photographs.
 - (d) writing observations on slates and taking photographs.
- 9. The **best** method of mapping an underwater wreck site is to use
 - (a) magnetometer readouts.
 - (b) sonar printouts.
 - (c) transect lines.
 - (d) photomosaics.
- 10. Which of the following currents flows northward along the coast of Western Australia in summer?
 - (a) Naturaliste
 - (b) Leeuwin
 - (c) West Australian
 - (d) South Australian
- 11. If using fins when snorkelling, what is the **most** efficient method of kicking at the surface?
 - (a) keeping the legs and body in a horizontal straight line
 - (b) bending legs at the hip and keeping the body horizontal
 - (c) it doesn't matter, as you are at the surface
 - (d) bending or arching the body and keeping the legs horizontal

- 5
- 12. One benefit of an artificial reef would be to
 - (a) increase the habitat.
 - (b) create a spit on the lee side.
 - (c) reduce pollution.
 - (d) change a local current's flow direction.
- 13. Which of the following bodies of ice could lead to a rise in seawater levels if it were to melt?
 - (a) a large glacier in South America
 - (b) a large iceberg in the Atlantic Ocean
 - (c) ice floating off the coast of Antarctica
 - (d) the Arctic icecap
- 14. Below is a diagram of a coral polyp. Which part of the polyp is responsible for starting the bleaching process?

Coral Polyp Longitudinal Section



- (a) zooxanthellae
- (b) mouth region
- (c) tentacles
- (d) polyp cytoplasm
- 15. An underwater site is partially buried in sand-like material containing possible artefacts. Which of the following is a recommended method of clearing this material so more of the wreck site can be revealed?
 - (a) sifting the material at the removal site then removing the debris
 - (b) using water/mud pumps to move the material to the surface
 - (c) using air lifts to remove the material and filter it on the surface
 - (d) moving the material to a different place and return it when finished

- 16. An experiment to measure the population size of a mollusc that is found on a number of Western Australian reefs is being designed. Which of the following would give the **most** valid result?
 - (a) use a large size sample from a reef in the mid-west of Western Australia
 - (b) collect data from a number of different reef locations
 - (c) repeat the data collection a number of times on the same reef
 - (d) collect molluscs from reefs found in the north of Western Australia
- 17. A person was going to buy a new wetsuit and liked one made up of many brightly-coloured panels. A friend said that the colours would scare the fish away and make the diving pointless. The shop assistant said this was **not** a problem, because
 - (a) colours disappear as you go deeper.
 - (b) colours fade with age.
 - (c) colours add to the camouflage effect.
 - (d) fish are colour blind.
- 18. Many plankton move up and down in the water column over a 24-hour period. This type of migration is called
 - (a) daily migration.
 - (b) vertical migration.
 - (c) diurnal migration.
 - (d) phototropic migration.
- 19. When diving, which depth change would have the greatest proportional effect on the volume of air in a person's lungs?
 - (a) 0 m 10 m
 - (b) 10 m 20 m
 - (c) 30 m 40 m
 - (d) 60 m 70 m
- 20. Every year, a number of swimmers die as a result of the phenomenon known as 'shallow water blackout', even when they can easily stand up. Which of the following is **most** likely a cause of shallow water blackout or shallow water drowning?
 - (a) free diving to over 15 m
 - (b) holding one's breath when ascending
 - (c) breathing fast after one surfaces
 - (d) hyperventilating before a duck dive

End of Section One

Section Two: Short answer

50% (97 Marks)

This section has **six** questions. Answer **all** questions. Write your answers in the spaces provided.

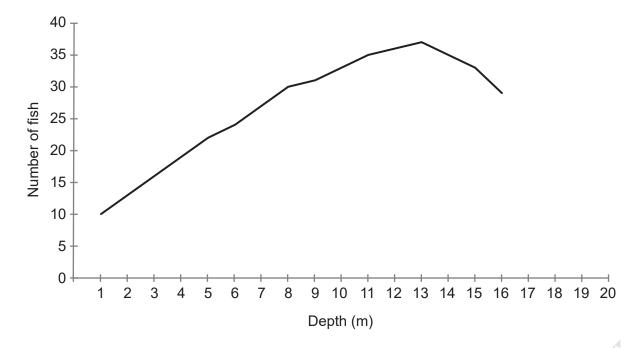
Supplementary pages for planning/continuing your answers to questions are provided at the end of this Question/Answer booklet. If you use these pages to continue an answer, indicate at the original answer where the answer is continued, i.e. give the page number.

Suggested working time: 90 minutes.

Question 21 (20 marks)

A scientist was investigating a variety of factors affecting the distribution of fish populations around a reef area. Each variable relating to the distribution of fish was controlled as much as possible.

One of the resultant graphs looked like the one below.



(a) Give a title for this graph. (2 marks)

Question 21 (continued)

(b)	Name	each of the following variables that would have been used to arrive at this graph. (2 marks
	• ir	ndependent variable:
	• d	ependent variable:
(c)	List th	nree variables the experimenter would have had to control. (3 marks
(d)	Write	an hypothesis that, when tested, may have caused the results shown in the graph. (3 marks
fish n		enter came to the following conclusion: 'From these results it can be said that as the decreased, the depth increased.' This conclusion does not agree with the results graph.
(e)	(i)	Rewrite this statement so that it reflects the graph results more accurately. (3 marks

	(ii)	Support your answer to question (e)(i), using the results shown in the grap (3	oh. 3 marks)
a popu female	ular edib e when a h size lii	tudies on this reef, a number of recommendations were made. One was the ble fish species was being over-fished. This fish species changes from male above 45 cm in length. As a result of this finding, a recommendation was mit be introduced, so that only fish over 50 cm in length were allowed to be n how this size limit would lead to a sustainable fishery for this species. (4)	e to ade that

9

Question 22 (19 marks)

The greenhouse effect
Sun Greenhouse gases C C C C Earth

Sta	te what is happening in the above diagram at points	(3 marks)
A: _		
C: _		
Wh	at two things are occurring at point D in the above diagram?	(2 marks)

(c) (i) What is the difference between the types of energy at points A and D in the above diagram? (1 mark)

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(ii)	Explain how this difference in energy results in the heating of the at Refer to the greenhouse effect diagram in your answer.	(4 mar
Other	than carbon dioxide (CO.). list three greenhouse gases	(3 mar
Other	than carbon dioxide (CO ₂), list three greenhouse gases.	(3 ma
		`
List tv	vo ways in which the enhanced greenhouse effect is having an impac	ct on marin
	vo ways in which the enhanced greenhouse effect is having an impacts and describe how each of these impacts is brought about.	
		ct on marine (6 ma

11

Question 23 (22 marks)

Describe the procedure involved in a snorkeller or diver establishing neutral the surface.	(5 marks
Explain why a mask may become cloudy or foggy during a dive.	(3 marks
In air, sound waves travel at 345 metres per second, while in sea water, sou travel at 1531 metres per second. Explain how this difference affects a diver	
locate the source of a sound while underwater.	(3 marks

Outline two practices or processes that divers should follow to cope with the the higher speed of sound in water.	effects of (4 marks)
Describe one method of releasing a lower leg cramp while in the water.	(3 marks)
If a snorkeller was to ascend quickly to the surface, would you expect them to a barotrauma? Explain why you think this.	suffer from (4 marks)

Question 24

(14 marks)

	tists have been measuring the acidity of the Earth's oceans for a number of years and that acidity has been increasing.	have
(a)	Explain how this increase in ocean acidity has occurred. (4 m	arks)
	effect of this oceanic acidification is the weakening of crustacea exoskeletons and, in ular, the skeletons of some plankton.	
(b)	Explain why this decline in plankton skeleton integrity could affect a population of larger fish such as snapper or dhufish and the effect you would expect in the longer term.	ge arks)

(c)	State two effects this acidification could have on a marine habitat, other than the loss of exoskeletons and food chain problems. Explain the process(es) involved in each effect. (6 marks)

Question 25 (13 marks)

Around the world, a number of researchers study whale sharks. They use a photograph-based technique to identify individual animals. These identifications are recorded on an international database.

international	e process involved in adding the photograph of individual whale shall database.	(5 mark
Explain how determining	v the photographic identification of individual whale sharks can help their migration patterns.	in (3 marl

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c)	Explain why it is important to know whale shark migration patterns. (3 marks
)	What special characteristic(s) would another animal need to possess for a photographic
,	identification technique to be used to identify individuals? (2 marks

Question 26	(9 marks)

In a local estuarine river system the fish stocks are declining and it is thought to be due to an increase in nutrient levels.

	pollutants that may affect the nutrient levels in this estuarine river sys	stem. (2 ma
State how eariver system	each of the two pollutants you named in part (a), could enter the estune.	arine (2 ma
	an increase in nutrient levels in the estuarine river system could hat through the process of eutrophication.	ve led (5 ma

End of Section Two

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Section Three: Extended answer 30% (40 Marks)

This section contains **four** questions. You must answer **two** questions. Write your answers on the lined pages provided following Question 30.

Supplementary pages for planning/continuing your answers to questions are provided at the end of this Question/Answer booklet. If you use these pages to continue an answer, indicate at the original answer where the answer is continued, i.e. give the page number.

Suggested working time: 70 minutes.

Question 27 (20 marks)

Along the coast of Western Australia, sand movements are common at many beaches. There are a number of potential solutions to the problem of sand movements.

The sand movements have a variety of causes, but tend to mainly involve wind and wave action.

(a) With the aid of labelled diagram(s), explain the cause of a longshore drift and how both it and wind lead to sand movements. (10 marks)

At a number of river or estuary mouths, such as at Mandurah (the Peel Inlet) and the seaward end of the Dawesville Cut, there is a build-up of sand that will eventually close each opening and so stop vessels from entering the ocean. In an attempt to stop these closures, a groyne was built but, eventually the opening started to silt up and threatened to close the mouths due to sand movements. A number of solutions to silting have been suggested.

- (b) Explain, with the aid of labelled diagram(s), an efficient system that could operate at these locations to reduce the effect of sand movement. (5 marks)
- (c) Discuss, with the aid of labelled diagram(s), how an artificial reef could be used to reduce erosion at a beach. (5 marks)

Question 28 (20 marks)

The sustainability of a number of Western Australian fisheries are (or were) under threat. Various strategies have been used to address the threat or maintain their present sustainability.

- (a) Explain, using examples, **four** management strategies that the Western Australian Government (through the Department of Fisheries) could use to improve the sustainability of a fish stock. For each strategy, give **one** example of a fishery where it has been employed and state how it could aid the sustainability of that fishery. (16 marks)
- (b) What evidence would be needed to support the continued use of these management strategies, to ensure sustainability of the fish stock? How could this evidence be obtained? (4 marks)

Question 29 (20 marks)

There has been a story going around a local town about an old shipwreck and you have just heard it. This wreck is supposedly in a remote area which explains why no one has really set out to find it and it does sound a bit of a 'story'. You become interested in finding out whether there is a wreck and gathering information about it.

(a) Describe the steps you should take to identify the ships that may have been wrecked and to identify their possible location(s). (3 marks)

In your search, you find reference to two possible wrecks and their approximate locations. These are fairly close together and generally match the story you have been given.

One of these vessels was from the early 1800s and the other, built of iron, was from the late 1800s.

(b) Explain **four** techniques you could use to locate the possible wreck(s) and state why each method is either suitable or unsuitable for each vessel type. (12 marks)

It has been suggested there would be a number of iron artefacts either under the ocean or buried on nearby land.

(c) Describe **one** method used for the conservation of iron artefacts that are found under the ocean and **one** method for those found on land. (5 marks)

Question 30 (20 marks)

Biosecurity has become a major concern for both Australia and the world as a whole.

- (a) Define the term 'biosecurity' and give **two** examples of methods employed to maintain maritime biosecurity. (5 marks)
- (b) Describe **three** ways in which introduced species can affect the Australian marine environment. (6 marks)
- (c) Identify **three** ways in which Australia can minimise risks to its maritime biosecurity. For each, state how it minimises risk. Support your answer with an example for each risk minimisation you have identified. (9 marks)

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Supplementary page	
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