



MARINE AND MARITIME STUDIES

ATAR course examination 2016

Marking Key

Marking keys are an explicit statement about what the examining panel expect of candidates when they respond to particular examination items. They help ensure a consistent interpretation of the criteria that guide the awarding of marks.

Section One: Multiple-choice

20% (20 Marks)

Question	Answer
1	b
2	c
3	a
4	a
5	a
6	d
7	c
8	a
9	b
10	d
11	c
12	d
13	b
14	b
15	b
16	c
17	d
18	c
19	b
20	a

Section Two: Short answer

50% (90 Marks)

Question 21

(16 marks)

- (a) Describe the type of entry recommended from a jetty with deep water below it, and give the steps a diver would take to enter the water in this manner once all equipment was ready. (4 marks)

Description	Marks
Giant stride entry	1
Stand at the edge of the platform with both fins hanging over the edge/Place the snorkel or regulator in your mouth.	1
Place a hand over your face so it secures both your mask and snorkel.	1
Check the area below you for any divers in the area/while standing straight up and looking at the horizon, step forward with either foot.	1
Total	4

- (b) Describe the steps a snorkeller would take at the surface to ensure that they have neutral buoyancy. (4 marks)

Description	Marks
With your lungs half-full/normal breath float at eye level (with no air in your BC)	1
If too buoyant – add small amounts weight until at eye level	1
If too negatively buoyant – remove small amounts weight until at eye level	1
Total	4

- (c) State **four** steps to consider when descending and ascending during a snorkel dive. Write your answers in the table below. (8 marks)

Description		Marks
One mark for each box.		
Steps to follow when descending	Steps to follow when ascending	1–8
Start from horizontal position	Look up and around	
Breath in before descending	Reach up	
Bend at the hips	Slowly ascend	
Kick once fins underwater/equalise ears	Establish buoyancy at the surface	
Total		8

Question 22

(15 marks)

(a) In this search, describe how the following work and the role of each.

(i) Magnetometer (3 marks)

Description	Marks
Towed behind a boat	1
Measures Earth's magnetic field and local changes caused by metals on the bottom	1
Role – measure strength and interruptions of magnetic fields caused by metallic objects	1
Total	3

(ii) Sonar (3 marks)

Description	Marks
Emits sonar pulses to the ocean bottom	1
Measures speed and direction of returning signal, converting it into an image	1
Role – create an image of the sea floor (using acoustics)	1
Total	3

(b) Aircraft are predominantly made of aluminium. Describe the observations that may be expected in the wreck of the aircraft due to corrosion after a period of two years. Explain the process that would have occurred to the metal. (5 marks)

Description	Marks
May be little corrosion at all	1
Pitting (small holes) corrosion is possible	1
Large corrosion where connected to other metals/loose electrics	1
Forms an oxide that protects it in most cases	1
Will form aluminium oxide if in contact with other metals or electricity	1
Total	5

(c) When the plane is found, it will be retrieved from the ocean floor. Explain the steps involved in its safe retrieval on site and its stabilisation in the laboratory. (4 marks)

Description	Marks
Use of lift bags to surface	1
Use of ROV's/other to surface	1
Stabilisation with fresh water	1
Light acids and bases to remove corrosion	1
Total	4

Question 23

(20 marks)

- (a) What is meant by a marine protected area and what is its purpose? (3 marks)

Description	Marks
Restrict human activity for a conservation purpose	1
Protect natural or cultural resources	1
Contribute to a sustainable marine environment and conservation of aquatic biodiversity	1
Total	3

- (b) Describe
- two**
- types of marine protected areas in Australia. In your description give an example and state where it can be found, who manages it and its benefits. (10 marks)

Any two of the following marine protected areas:

Commonwealth Protected Area

Description	Marks
Named correctly	1
Example explained – South West/North West/Northern/Coral Sea/Temperate East	1
Where – between 3 and 200 NM off coast	1
Management – often managed by the States or Navy or DQS	1
Benefits – protect offshore resources	1
Total	5

State Marine Parks and Reserves

Description	Marks
Named correctly	1
Example explained – Jurien Bay/Marmion marine Park/Ngari capes/Shoalwater Islands/Swan Estuary/Rotto/others	1
Where – various answers	1
Management – Fisheries managed	1
Benefits – protect fisheries resources/links with other management strategies	1
Total	5

Fish Habitat Protection Areas

Description	Marks
Named correctly	1
Example explained – Abrolhos/Cottesloe/Kalbarri/Lancelin/others	1
Where – various answers	1
Management – Fisheries managed	1
Benefits – protect fisheries resources/ the culture and propagation of fish and experimental purposes related to that culture and propagation/the management of fish and activities relating to the appreciation or observation of fish.	1
Total	5

- (c) Explain the role of the International Whaling Commission, describe who can be a member and state its enforcement role. (7 marks)

Description	Marks
Explains: Operates under International Convention for the Regulation of Whaling (ICRW)	1-3
provide for the proper conservation of whale stocks	
make possible the orderly development of the whaling industry	
Describes: 88 members but changes/participation in the IWC is not limited to states involved in whaling/open to any country in the world that formally adheres to the 1946 Convention	1-3
voluntary international organization and is not backed up by treaty	
any member countries are free to simply leave the organization and declare themselves not bound by it if they so wish/ any member state may opt out of any specific IWC regulation	
States: the IWC has no ability to enforce any of its decisions through penalty imposition	1
Total	7

Question 24

(10 marks)

- (a) Distinguish between the terms 'native' and 'introduced'. (2 marks)

Description	Marks
Native – endemic to an area	1
Introduced – a species not in its normal ecosystem/has arrived there by human intervention	1
Total	2

- (b) Describe **two** methods that may prevent an organism that attaches to ships' hulls, such as the black-striped mussel, from entering Australian waters. (4 marks)

Description	Marks
Use of biofouling agents on ships hull such as antifouling paint	1–2
Biofouling management checking what is on ships hulls	1–2
Total	4

- (c) Describe **two** methods that are being used to minimise the spread and impact of introduced marine species. (4 marks)

Description	Marks
Any 2 of the following:	
• Ballast water management – ballast water management arrangements for vessels travelling between Australian ports	1–2
• Biofouling management – managing biofouling on ships/International vessel management/State & territory requirements	1–2
• Aquarium trade management – restrictions on the importation of live marine species into Australia	1–2
• Media campaign to alert public to introduced species that need to be removed	1–2
• Culling - physically removing the introduced species	1-2
Total	4

Question 25

(13 marks)

(a) Define the following terms.

(4 marks)

(i) citizen scientist

Description	Marks
A person who is not a professional scientist conducting scientific research on their own or under guidance of a professional scientist.	1
Total	1

(ii) demographics

Description	Marks
Measurable characteristics of a population	1
Total	1

(iii) conservation

Description	Marks
Preserving, guarding or protecting	1
Total	1

(iv) bio-productivity

Description	Marks
Amount and rate of production which occur in a given ecosystem over a given time period	1
Total	1

(b) Describe how the worldwide sighting and photo-identification system used in the whale shark program mentioned on page 16 works.

(5 marks)

Description	Marks
Take photo of whale sharks	1
Preferably left hand side pectoral fin	1
Upload to website	1
Spot analysis	1
Matching with database of past sightings	1
Total	5

(c) State another animal species on which the sighting and photographic identification technique may be used and outline how it would work for that species.

(4 marks)

Description	Marks
Answers may vary	
E.g. Manta rays/leopards/polar bears	1
Various markings on other animals	1
Amateur photographers or scientists take photos	1
Set up database	1
Total	4

Question 26

(16 marks)

- (a) State a possible hypothesis for this research. (2 marks)

Description	Marks
Answers must include independent and dependent variable e.g. Using snares will reduce the catch rate of Marron	1–2
Total	2

- (b) In this investigation state the following.

- (i) the independent variable (1 mark)

Description	Marks
Relates investigation/hypothesis to independent variable e.g. use of snares	1
Total	1

- (ii) the dependent variable (1 mark)

Description	Marks
Relates investigation/hypothesis to dependent variable e.g. catch rate of marron	1
Total	1

- (iii) **two** controlled variables (2 marks)

Description	Marks
Any two reasonable controlled variables e.g. same species measured/same waterways measured/same time of year measured	1–2
Total	2

- (c) Explain how loss of habitat and overfishing might affect the numbers of Western Rock Lobster in the wild.

- (i) loss of habitat (3 marks)

Description	Marks
Inability to find protection from predators	1
Settlement of puerulus affected	1
Affects mating habits	1
Total	3

- (ii) overfishing (3 marks)

Description	Marks
Reduction in numbers directly	1
Fish caught faster than they reproduce	1
Decrease genetic diversity	1
Total	3

- (d) Describe the Leeuwin Current and explain its influence on the Western Rock Lobster life cycle. (4 marks)

Description	Marks
Current running north to south off Western Australian coast	1
Warm/low nutrients	1
Disperses eggs	1
Returns larvae to coast	1
Total	4

End of Section Two

Section Three: Extended answer

30% (40 Marks)

Question 27

(20 marks)

- (a) Discuss the importance of coral reefs in terms of their role in ocean ecosystems and significance for humans. (10 marks)

Description	Marks
Role in ecosystems	
Any 5 of:	
• 25% of all ocean species found in coral reefs i.e. wide range of organisms	1
• Provide habitat and shelter for many marine organisms	1
• Source of N and other nutrients for marine food chain	1
• Assist in C and N fixing	1
• Large areas of ocean, but small total area	1
• Help with nutrient recycling	1
Importance to humans	
Tourism	1
Fisheries	1
Coastal protection	1
Economic value	1
Homes to some people	1
Total	10

- (b) Describe the process of coral bleaching and explain how this can be attributed to the enhanced greenhouse effect. (6 marks)

Description	Marks
Loss of zooxanthellae	1
Whitening as a result	1
Algae pigmentation loss	1
Process is self-catalysing/less carbon added to algae not coral	1
Largest factor causing it is heat stress	1
Caused by warming oceans	1
Total	6

- (c) Describe **two** other consequences of global warming on marine habitats and coastal communities. (4 marks)

Description	Marks
Any two of the following:	
<ul style="list-style-type: none"> Ocean level/mean sea level increase Shrinking land ice releasing water into oceans and/or as ocean temperature rises the warm water expands. 	1–2
<ul style="list-style-type: none"> Change to global ocean currents With the warming of the oceans and melting of glaciers, more fresh water is released into oceans diluting and reducing density of water. This sinks more slowly and affects current. 	1–2
<ul style="list-style-type: none"> Ocean acidification A rise in atmospheric CO₂ will cause a rise in CO₂ in oceans, thus increasing acidity. 	1–2
<ul style="list-style-type: none"> Marine life changes Change in plankton quantities and ramifications on food chain. 	1–2
<ul style="list-style-type: none"> Change in weather Warmer waters more cyclones. 	1–2
<ul style="list-style-type: none"> Coast erosion Higher sea levels will increase erosion events. 	1–2
Total	4

Question 28

(20 marks)

- (a) For **three** pieces of snorkelling equipment you name, explain why each piece is used for snorkelling, how each piece is prepared for use and how its correct fitting can be ensured. (9 marks)

Description				Marks
1 mark for each of 3 boxes for 3 pieces of snorkelling equipment				
Snorkelling equipment	Description of why it is used	How it is prepared for use	How its correct fitting can be ensured	
Mask	Provides better vision	Cleaned/antifog/kept protected	No leaks/no hair/no tears/other	1-9
Fins	Provides leverage	Various/fitting check described/	Put on feet without slipping or being too loose	
Wetsuit	Warmth	Kept dry and out of sunlight	Not overly loose or tight/bending arm without discomfort	
Weight belt	Alter buoyancy	Float at eye level when holding breath	Fitted apparatus around abdomen	
Total				9

- (b) Explain why snorkelling or scuba diving in a buddy pair is advisable and explain the technique to complete a duck dive and safe descent. (8 marks)

Description		Marks
Any 5 of the following:		
<ul style="list-style-type: none"> • Logistical planning of the excursion • Evaluating the sea and weather conditions • Donning and doffing snorkelling equipment • Checking gear is correctly fitted and secure • Choosing the best location for water entry and exit • Assist with cramp removal, overexertion, or fatigue • Make suggestions to reduce the impact on the underwater environment • Alerting the group to interesting marine life and sea creatures 		1-5
Any 3 of the following:		
<ul style="list-style-type: none"> • Kick in forward direction • Breath normally then hold breath • Bend at waist and move downwards • Avoid hyperventilating • Kick once fins under water. 		1-3
Total		8

- (c) Following a snorkelling session, equipment should be cared for. Identify **three** steps that should be taken to ensure equipment is maintained after a dive. (3 marks)

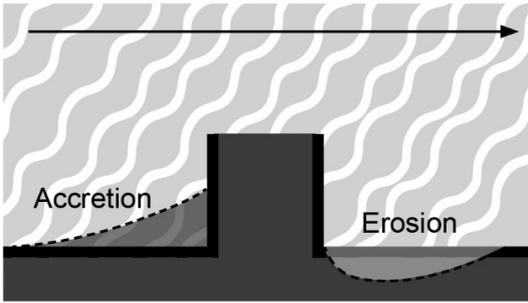
Description		Marks
Any 3 of the following:		
<ul style="list-style-type: none"> • Wash in fresh water • Dry out of direct sunlight • Dry out of direct heat • Store in a dry/cool place/out of direct sunlight 		1-3
Total		3

Question 29

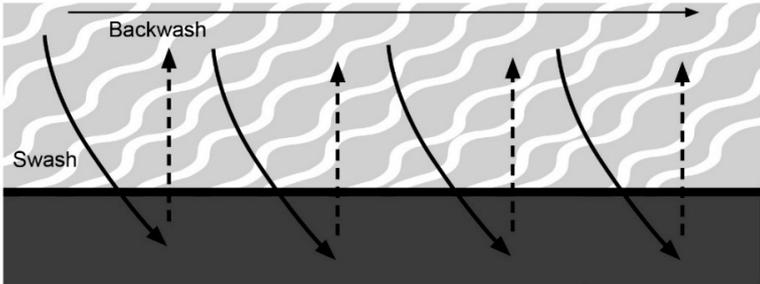
(20 marks)

(a) Explain, with the aid of diagrams, the two processes listed below related to coastal erosion problems. (9 marks)

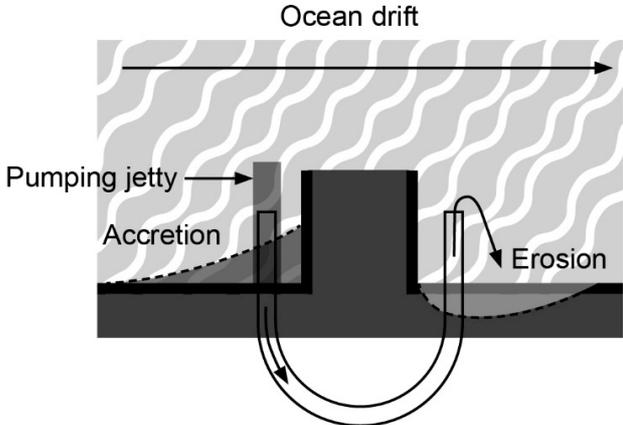
(i) accreting and eroding beaches

Description	Marks
<p>Diagram</p> 	1
Accretion – build-up of sand on beaches	1
Erosion – removal of sand from beaches	1
Caused by water movement along a beach	1
Linked/erosion causes accretion somewhere else	1
Total	5

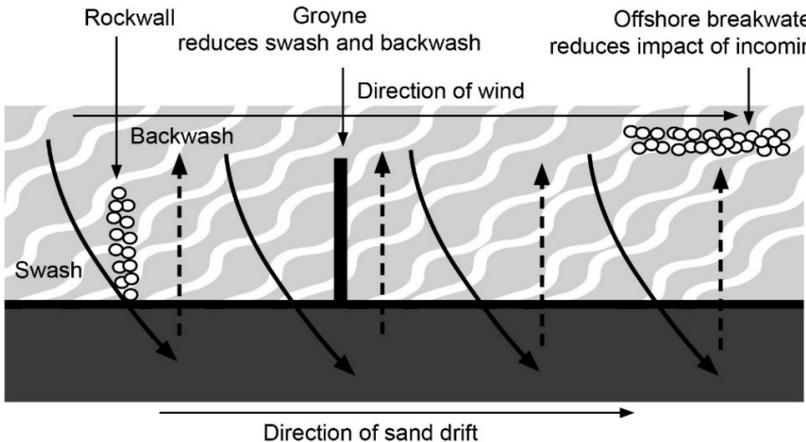
(ii) sand budgets

Description	Marks
<p>Sand moved from one place to another in zig-zag patterns (diagram)</p> 	1
The total amount of sand moved in accretion and erosion	1
Longshore drift	1
Other sediment sources involved/rivers/estuaries/cliff erosion	1
Total	4

- (b) Explain, with the aid of diagrams, the features, roles and impacts of sand bypass systems in solving this problem. (6 marks)

Description	Marks
<p>Diagram</p> 	<p>1-2</p>
<p>Features – Area of removal and area of deposition</p>	<p>1</p>
<p>Roles – Remove from one area (deposition area) and replace in another (erosion area)</p>	<p>1-2</p>
<p>Impacts – Any one of the following</p>	<p>1</p>
<ul style="list-style-type: none"> • Reduces erosion • Expensive • Not natural 	<p>1</p>
<p style="text-align: right;">Total</p>	<p>6</p>

- (c) Explain, with the aid of diagrams, the features, roles and impacts of physical barriers in solving this problem. (5 marks)

Description	Marks
For any of the following Physical barriers – include groynes/rock walls/offshore breakwaters/Gabions/	
<p>Diagram</p> 	1-2
Feature – explained e.g. solid structure/made of rocks or suitable material such as rubble/placed horizontal or parallel to the eroding shore	1
Roles – explained e.g. lowers energy of approaching waves/reduces sand movement past the structure/diverts water in different direction	1
Impact – explained e.g. reduced energy of waves/provides habitats for some organisms/provides fishing platforms	1
Total	5

Question 30

(20 marks)

- (a) Describe the historical context of the Dutch East India Company (VOC) ship *Batavia*. Include the purpose of the journey, **three** significant people involved in the final journey and details of it being wrecked. (8 marks)

Description	Marks
Purpose of journey – bring back spices/deliver some materials to port of Batavia(Java)	1–2
People involved with role – any 3 of the following: <ul style="list-style-type: none"> Francisco Pelsaert – Commander Ariaen Jacobsz – Skipper/mutineer Jeronimus Cornelisz – Under merchant/mutineer Wiebbe Hayes – soldier/resistance 	1–3
Wreck – (4 th June) 1629	1
Struck Morning Reef/Abrolhos Islands	1
Sunk/40 people drowned/survivors on islands/Pelsaert left to get help	1
Total	8

- (b) Explain the methods that were used to locate the wreck. (4 marks)

Description	Marks
Historical records – archive records of ships journey/VOC records	1–2
Physically searching/diving – Hugh Edwards organised search expeditions of possible areas of the Abrolhos	1–2
Total	4

- (c) Describe a method that was used to survey the wreck. (2 marks)

Description	Marks
Any one of the following: <ul style="list-style-type: none"> Underwater photography – 3 types of photography used to record the wreck Grid mapping – Taut wire base line with a right angle to record position 	1–2
Total	2

- (d) Describe a method used to recover artefacts from the wreck. (2 marks)

Description	Marks
Any one of the following: <ul style="list-style-type: none"> Lift bags – used to lift items off the bottom in early stages of the excavation Gas filled canisters/barrels with ropes attached 	1–2
Total	2

(e) Describe a method used to preserve (4 marks)

(i) the wooden parts of the ship; and

Description	Marks
Any 1 of the following:	
<ul style="list-style-type: none"> • Soaked in fresh water to remove salts • Polyethylene Glycol (PEG) to stabilise cellulose • Stored in cool/dry environment top stabilize polyethylene glycol 	1–2
Total	2

(ii) the metal parts of the ship.

Description	Marks
Any 1 of the following:	
<ul style="list-style-type: none"> • Soaked in fresh water to remove salts • Electrolytic reduction to prevent further corrosion • Stored in cool/dry environment to reduce corrosion 	1–2
Total	2

End of questions

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