

Cambridge International Examinations

Cambridge International Advanced Subsidiary and Advanced Level

	AS & A Level		
	CANDIDATE NAME		
	CENTRE NUMBER		CANDIDATE NUMBER
ω 	MARINE SCIE	NCE	9693/03
<u>ا</u>	Structured Que	estions	May/June 2014
0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	Paper 3		
U U			1 hour 30 minutes
4	Candidates ans	swer on the Question Paper.	
		Materials are required.	

READ THESE INSTRUCTIONS FIRST

Write your Centre number, candidate number and name on all the work you hand in.

Write in dark blue or black pen.

You may use an HB pencil for any diagrams or graphs.

Do not use staples, paper clips, glue or correction fluid.

DO NOT WRITE IN ANY BARCODES.

Answer all questions.

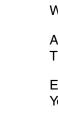
Write your answers in the spaces provided on the Question Paper.

At the end of the examination, fasten all your work securely together.

The number of marks is given in brackets [] at the end of each question or part question.

Electronic calculators may be used.

You may lose marks if you do not show your working or if you do not use appropriate units.





	Б.	
(a)	(i)	toms are important primary producers in marine ecosystems. State the habitat of diatoms.
	(ii)	Name one other type of phytoplankton found in the same habitat.
(b)	Phy sup	rtoplankton productivity has been studied because of their importance to human food ply.
	Ехр	olain why phytoplankton are important to human food supply.
		[2]
(c)		1.1 shows the variations in temperature of the surface waters in the oceans between 8 and 2009.
	Fig.	1.1 also shows the variations in the number of phytoplankton during this period.
temper	ature •••••	/°C number of phytoplankton
		1998 1999 2000 2001 2002 2003 2004 2005 2006 2007 2008 2009 year
		Fig. 1.1
	(i)	Describe the relationship between the number of phytoplankton and the temperature of the water.
		[1]

(ii)	Low temperatures cause the thermoclines to develop closer to the surface of the ocean.
	Explain what is meant by a thermocline.
	[2]
(iii)	Suggest why a decrease in depth of the thermocline could affect the number of phytoplankton in colder water.
	[3]
	[Total: 10]

- Sea water contains dissolved oxygen. The oxygen content of sea water is usually between 4 6 cm³ of oxygen per dm³ of sea water, 2

 - lower in warm sea water than in cold sea water,
 - very low where oxygen use balances oxygen replacement, at a depth of between 400 m - 1000 m.

(a)	(i)	Describe two ways in which oxygen can enter sea water.
		1
		2
		[2]
	(ii)	Suggest two types of marine community that live in areas where oxygen concentration is very low.
		1
		2[2]
(b)	Fea incl	tures of marine fish adapted to live in sea water with very low oxygen concentration ude slow movement,
	•	large gill surface area,
	•	increased ventilation mechanisms.
	-	lain how each of these features helps these fish to survive in very low oxygen centrations.
	slov	v movement
	larg	e gill surface area
	incr	eased ventilation mechanisms
		[6]

(c)	Tuna require a high oxygen supply to survive and are therefore found near the surface of oceans where oxygen content is greater.
	Describe the ventilation mechanism of tuna.
	[3]
	[Total: 13]

	` ,	Table 3.1	
	(b)	Table 3.1 shows some features of three species of whale.	٠,
		[11
3	(a)	Fertilisation in whales is internal. State one disadvantage of internal fertilisation.	

features	beluga whale narwhal whale		minke whale	
breeding frequency	1 offspring 1 offspring every 3 years every 3 years		1 offspring every 2 years	
gestation period / months (length of pregnancy)	14	15	10	
average mass of offspring at birth / kg	45–64	79–100	318–454	
feeding after birth	milk from mother up to 2 years	milk from mother 6–12 months	milk from mother 4–6 months	
social groups / number of whales in a pods	5–100	4–10	2–3	

With reference to the information in Table 3.1, answer (i) and (ii).

	(i)	Suggest why whales have a long gestation period.
		[1]
	(ii)	Describe the relationship between the average mass of the offspring at birth and the number of whales in the social group.
		[1]
(c)	Sug	gest one disadvantage to the mother of producing milk to feed young whales.
		[1]

(d)	in social groups may help the survival of the young.
	[2
(e)	Many species of whale are endangered and are protected from hunting by humans. Suggest one reason, other than hunting, that may contribute to the falling populations or many species of whale.
	[1]
	[Total: 7

4	(a)	(i)	Information about about sustainable	recruitment into fish populations is collected in order to make decisions fishing.
				ant by the term <i>recruitment</i> .
				F4'
		(ii)	State two factors	that may influence the level of recruitment of a fish population.
				[2]
				ationship between the numbers of mature fish in an area in a specific of 3-year old fish in the same area three years later.
				number of mature fish
				Fig. 4.1
		(i)	Describe the rela 3-year old fish thre	ationship between the number of mature fish and the number of see years later.

(ii)	Suggest an explanation for this relationship.
	ro:

(c) Table 4.1 shows the quantity of fish caught in the North Sea by the European Economic Community between 1960 and 2002.

Table 4.1

	fish caught / tonnes				
Country	1960	1970	1980	1990	2002
Denmark	284527	528 127	1806191	1328251	1249656
United Kingdom	343 002	410775	389417	343205	295 367
Germany	305776	284 685	90217	108990	69836
Netherlands	92119	121 524	213365	256597	146835
France	149769	202948	100861	64860	55 379
Sweden	71 899	124790	86 465	116695	131 991
Belgium	30 094	26547	32 065	26889	14657
Total	1227186	1699396	2718581	2245487	1963721

The North Sea is considered to have been overfished since the 1970s and in need of more regulation of fishing.

The EEC introduced a Common Fisheries Policy in 1983 that was used until 2002 when it was modified to give more power to individual countries to manage their fishing effort. Two aspects of this policy are

- to set a total allowable catch for the North Sea,
- to set a national quota for each country.

With reference to the data in Table 4.1, evaluate the success of the Common Fisheries Policy in regulating overfishing.
[3]

[Total: 11]

5 (a) Figure 5.1 shows the world production of food by aquaculture from 1985 to 2010.

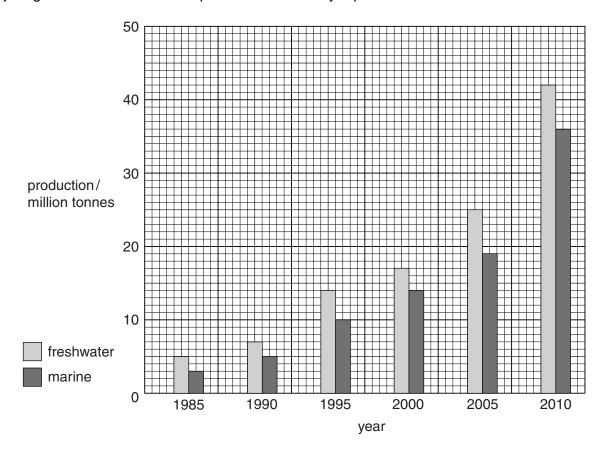


Fig. 5.1

(i) Calculate the percentage increase in **total** production from 2000 to 2010. Show your working.

(ii) China has one of the fastest growing aquaculture industries. In 2010, the total aquaculture production by China was twice that of the rest of the world.

Calculate the estimated aquaculture production by China in 2010. Show your working.

(b) Table 5.1 shows three requirements for the development of aquaculture on a large scale and three of the methods by which these requirements may be met.

Table 5.1

method	requirement 1 availability of stock	requirement 2 availability of clean water	requirement 3 availability of food	
1	catch wild fish and rear them	use offshore sea cages	feed live wild fish	
keep a breeding stock 2 and rear fertilised eggs in a hatchery		net an estuary or bay area	pellets made from fish waste from human food production	
3	catch wild adults, strip eggs and sperm and rear fertilised eggs in a hatchery	build ponds and pump water through from the sea	processed wild fish not used for human food	

For each of the requirements in Table 5.1, identify which method an intensive marine

aquaculture development might use in order to be sustainable. Explain your answers.
availability of stock
availability of clean water
availability of food

(c)	Describe two economic considerations of sustainable aquaculture.
	1
	2
	[2]
	[Total: 13]

6	(a)	The information	below i	s about	sewage	and	refuse	disposal	from	small	boats	by	tourists
		visiting marine si	ites.										

Sewage and refuse disposal from small boats has become a subject of concern for many within the tourism industry. Boats discharging raw or partially treated sewage and dumping refuse in coastal waters pose an increasing threat to both people and the environment.

Human waste contains nutrients that can contribute to harmful algal blooms in coastal marine environments. This waste also contains pathogens that can cause disease.

Refuse such as plastic objects, fishing lines, cigarette butts and expanded polystyrene debris are often consumed by turtles, seabirds, fish and marine mammals.

When refuse from tourist fishing boats becomes entangled on coral and rocky reefs, it can smother coral and pose a safety hazard to snorkelers, divers and young marine mammals.

(i)	Suggest how human waste in coastal waters can cause disease.
	[3]
(ii)	Explain why algal blooms can be harmful.

(b)	(i)	Explain two ways in which eating refuse is a danger to turtles, seabirds, fish or marine mammals.
		[4]
	(ii)	Suggest one type of fishing boat refuse that may be a safety hazard to snorkelers, divers and young marine mammals.
		Explain why this type of refuse may be a safety hazard.
		hazard
		explanation
		[3]
		[Total: 13]

7 (a) State what is meant by the term ecotouris	m.
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		[41

(b) Fig. 7.1 shows a coastal region that has some areas of outstanding natural beauty. The nearest local village is 2km away.

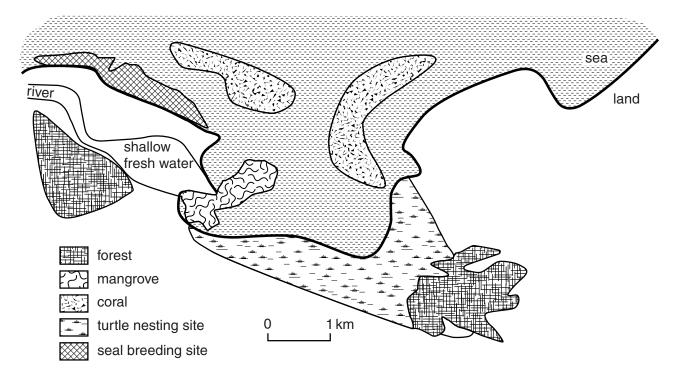


Fig. 7. 1

This area is under consideration to develop for ecotourism.

The proposals for development include:

- 1. building self-catering log cabins in the forested area next to the river, using wood from the trees that are cut down to make space
- 2. developing a camp site in the same area
- 3. piping water from the river to a small water treatment plant to supply drinking water
- 4. using solar cells to provide electricity
- 5. collecting rainwater and river water for washing
- 6. draining waste water into the sea
- 7. parking all vehicles in the nearby village and providing local horse-drawn carts to the development area.

	(i)	Identify, with reasons, three of these proposals that are examples of responsible practice in ecotourism.
		[3]
	(ii)	Identify with reasons, two of these proposals that could cause damage to the environment.
		[2]
(c)	Sug	gest two reasons why people in the local village may be in favour of this development.
		[2]
		[Total: 8]

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