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9693/01

May/June 2013

1 hour 30 minutes

No Additional Materials are required.

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 a pencil for any diagrams, graphs or rough work.
Do not use staples, paper clips, highlighters, glue or correction fluid.
DO NOT WRITE IN ANY BARCODES.

Answer **all** questions.

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.

This document consists of **14** printed pages and **2** blank pages.

1 (a) Explain what is meant by each of the following terms used in ecology.

(i) habitat
..... [1]

(ii) community
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..... [2]

(b) Table 1.1 shows the range of particle sizes found on two different types of shore.

Table 1.1

type of shore	particle diameter / mm
sandy	0.02 to 2.0
muddy	0.002 to 0.2

(i) Compare the particle sizes of the sandy shore and the muddy shore.

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..... [3]

(ii) Explain how the process of sedimentation gives rise to a muddy shore.

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- (iii) Using the information in Table 1.1 and your own knowledge, explain why a rocky shore tends to have a higher biodiversity than a sandy shore.

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[Total: 13]

- 2 (a) Fig. 2.1 shows the oxygen concentration at different temperatures in fresh water.

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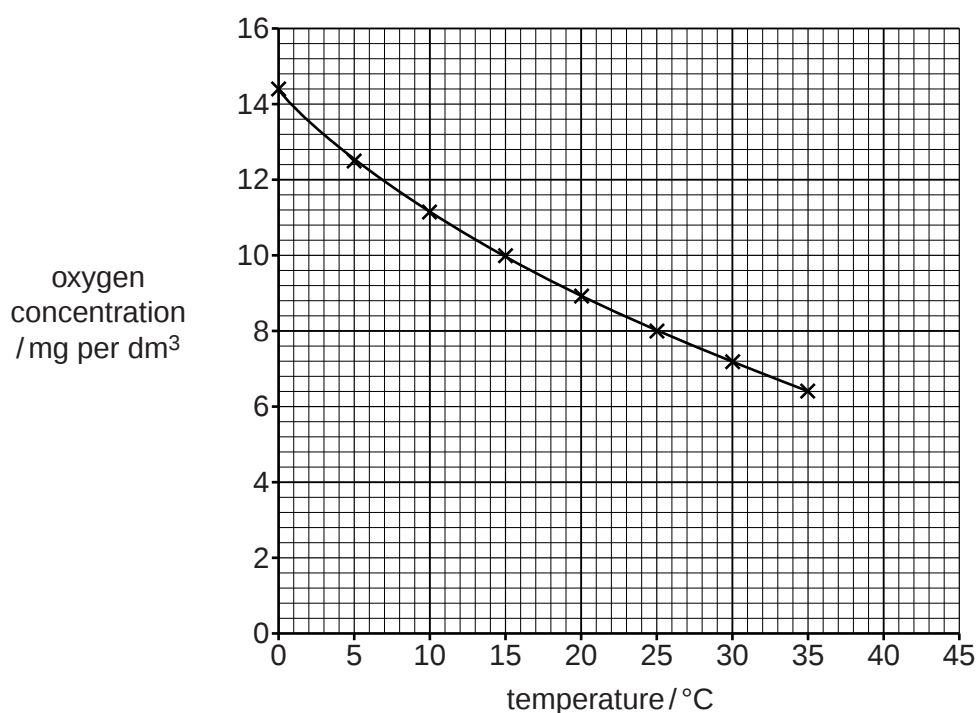


Fig. 2.1

- (i) State the change in oxygen concentration between 5 °C and 15 °C.

.....[2]

- (ii) Use Fig. 2.1 to estimate the oxygen concentration at a temperature of 45 °C.

.....[1]

- (iii) Table 2.1 shows the oxygen concentration in sea water at different temperatures.

Table 2.1

temperature / °C	0	5	10	15	20	25	30	35
oxygen concentration / mg per dm ³	11.4	10.0	8.6	8.0	7.4	6.4	6.0	5.4

Plot these data on Fig. 2.1.

[4]

- (iv) Describe the differences between the oxygen concentrations in fresh water and in sea water.

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A line graph showing the relationship between depth (metres) and oxygen concentration. The vertical axis (depth) ranges from 0 to 1000 metres, with major grid lines every 100 metres and minor grid lines every 20 metres. The horizontal axis represents oxygen concentration, with an arrow pointing to the right. A smooth curve starts at a depth of 1000 metres and rises steeply, then gradually levels off as it approaches the surface (0 metres), indicating that oxygen concentration increases with depth and approaches a saturation point near the surface.

Explain the relationship between oxygen concentration and depth as shown in Fig. 2.2.

..... [5]

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Turn over for question 3.

3 Fig. 3.1 shows part of a food web in a kelp forest.

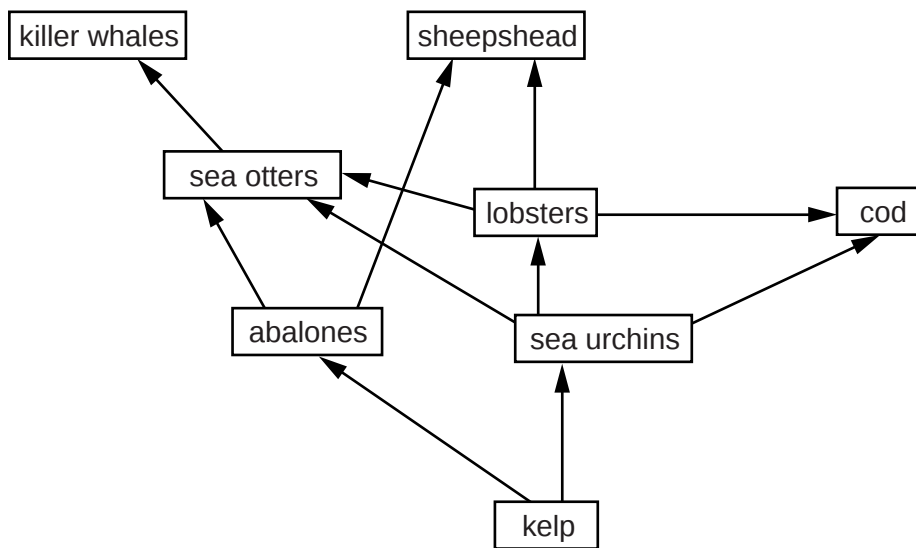


Fig. 3.1

(a) With reference to Fig. 3.1, explain what is meant by a *producer*.

[4]

(b) With reference to Fig. 3.1, explain what is meant by a *predator-prey relationship*.

[3]

- (c) Commercial fishing in this area targets cod and sheepshead.

Using the information in Fig. 3.1, suggest and explain **one** possible effect of commercial fishing on the population of sea otters.

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[Total: 11]

- 4 (a) Describe **three** pieces of evidence supporting the theory of plate tectonics.

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- (b) Fig. 4.1 shows one type of tectonic plate boundary.

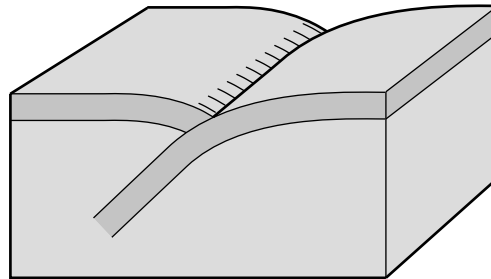


Fig. 4.1

With reference to Fig. 4.1, explain how movements at a plate tectonic boundary can lead to the formation of an ocean trench.

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- (c) Explain how movements at a plate tectonic boundary can lead to the formation of a tsunami.

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[Total: 13]

[3]

- 1
- 2
- 3 [3]

A line graph showing productivity (mg of fixed carbon per m³ per day) on the x-axis (0 to 40) versus depth (m) on the y-axis (0 to 60). Three curves are plotted: 'winter' (solid line), 'summer' (dashed line), and 'spring' (dotted line). The 'winter' curve peaks at ~10 mg/m³ at 10m depth. The 'summer' curve peaks at ~15 mg/m³ at 15m depth. The 'spring' curve peaks at ~40 mg/m³ at 40m depth. Arrows indicate the progression from winter to summer to spring.

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- (i) State the depth at which the difference in productivity between winter and spring is greatest.

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..... [1]

- (ii) Suggest explanations for the differences between the productivity in the Northeast Pacific Ocean in the winter and the spring.

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[Total: 11]

6 (a) Runoff is important in replenishing the reservoir of dissolved nutrients in the sea.

(i) Describe what is meant by the term *runoff*.

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(ii) Suggest how runoff can be harmful to marine organisms.

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(iii) Suggest how runoff can be beneficial to marine organisms.

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- (b) The mean concentration of calcium in sea water is 0.41 parts per thousand.

Suggest why this concentration remains approximately constant.

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[Total: 12]

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