

9: Organisms and environment – Topic questions **Paper 4**

The questions in this document have been compiled from a number of past papers, as indicated in the table below.

Use these questions to formatively assess your learners' understanding of this topic.

Question	Year	Series	Paper number
6	2015	June	33
6	2014	June	32

The mark scheme for each question is provided at the end of the document.

You can find the complete question papers and the complete mark schemes (with additional notes where available) on the School Support Hub at www.cambridgeinternational.org/support

- 6 Some integrated farming systems involve making best use of all available resources without the use of large inputs of energy in the form of fossil fuels.

A study looked at what happened to the light energy that was the major energy input to farms in the Zhujiang delta in China. The farms are based on a dyke-pond system as shown in Fig. 6.1.

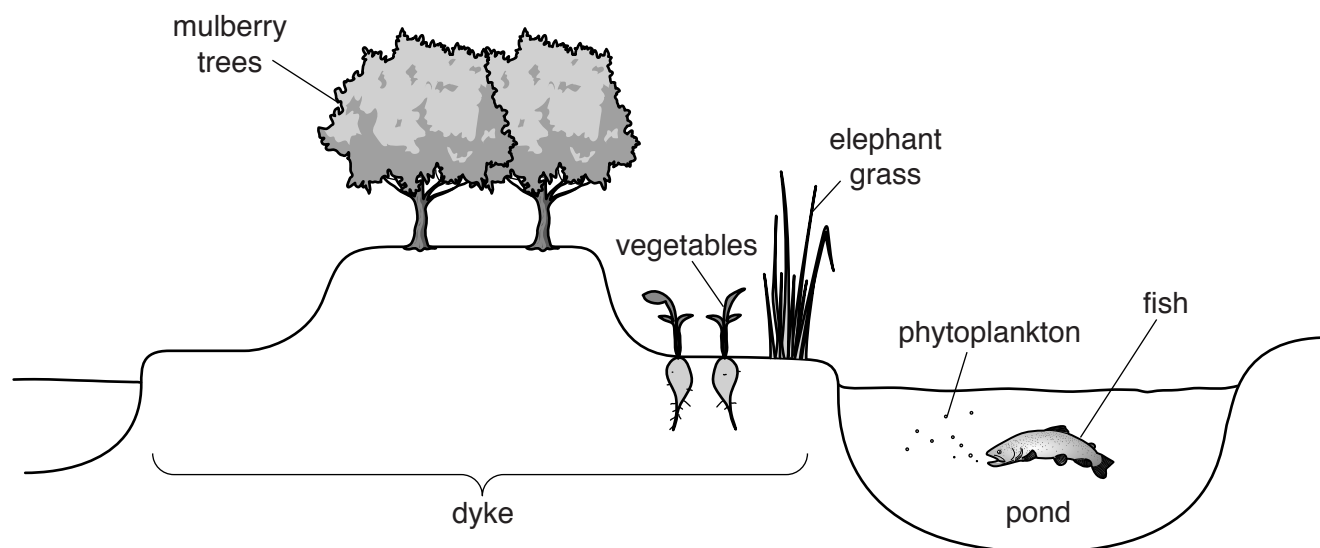


Fig. 6.1

Elephant grass, vegetables and mulberry trees are grown on the dykes in between the ponds. The elephant grass is grown and then cut to feed the fish. Vegetables and fish are used for human consumption. Silkworms feed on the mulberry trees. Phytoplankton are the main producers in the pond and are eaten by the fish.

- (a) (i) Explain the meaning of the term *producer*.

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.....[2]

- (ii) Use the information provided in the passage on page 18 and in Fig. 6.1 to **complete** a food web for the farm. Some of the producers have been drawn for you.

mulberry trees

vegetables

phytoplankton
in the pond

[5]

- (b) In the study the researchers discovered that the vegetables absorbed 1560 MJ m^{-2} per year of light energy. The energy which was transferred from the vegetables to humans was 3 MJ m^{-2} per year.

Explain what happens to the energy that is absorbed by the vegetables but is not transferred to humans.

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.....[3]

- (d) A student found the following information about the feeding relationships between some organisms in a soil habitat.

Dead organic matter, such as leaves, provides food for bacteria and soil fungi.

Earthworms eat dead leaves.

Many millipedes feed on dead plant matter and also on soil fungi.

Nematodes feed on bacteria and are eaten by springtails.

Centipedes are predators that feed on earthworms, millipedes and springtails.

- (i) Draw a food web to show the feeding relationships described above.

[4]

- (ii) Describe the roles of the soil organisms in the **carbon** cycle.

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..... [2]

[Total: 17]

Abbreviations used in the Mark Scheme:

;	separates marking points
/	alternatives
I	ignore
R	reject
A	accept (for answers correctly cued by the question, or guidance for examiners)
AW	alternative wording (where responses vary more than usual)
AVP	any valid point
ecf	credit a correct statement / calculation that follows a previous wrong response
ora	or reverse argument
()	the word / phrase in brackets is not required, but sets the context
<u>underline</u>	actual word given must be used by candidate (grammatical variants excepted)
max	indicates the maximum number of marks that can be given

Question	Answer	Marks
6 (a) (i)	autotrophic (organism) ; organism that makes its own organic nutrients / food ; (usually) using energy from the Sun / by photosynthesis ;	[2]
6 (a) (ii)	1 all arrows point from food to feeder ; 2 elephant grass added (at the producer level) ; 3 phytoplankton and elephant grass arrows go to fish ; 4 mulberry trees arrow goes to silkworms ; 5 vegetables and fish arrows go to humans ;	[5]
6 (b)	1 not all of the plants are edible / some not digested ; 2 faeces / egestion ; 3 eaten by, pests / AW ; 4 dead leaves / AW, to decomposers ; 5 plants lose energy as a result of respiration ; AVP ; e.g. some energy not used for growth	[max 3]
[Total: 10]		

Question	Answer	Marks
6 (d) (i)	1 all arrows point from food to feeder ; 2 millipedes eat dead leaves and fungi ; 3 food chain : bacteria _ nematodes _ springtails _ centipedes ; 4 centipedes eat millipedes, springtails and earthworms ;	[4]
6 (d) (ii)	1 ref to, respiration / decomposition ; 2 release carbon dioxide ; 3 carbon dioxide is taken in by, plants / photosynthesis ;	[max 2]
		[Total: 6]