PEARSON EDEXCEL GCSE BIOLOGY (HIGHER) · 1BI0

BIOLOGY



EXAM QUESTION PACK

TOPIC 9: ECOSYSTEMS AND MATERIAL CYCLES (PACK 2)

SCORE	PERCENTAGE
/58	%

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Q1.

One method of preserving strawberries is by using them to make jam.

Figure 7 shows a method for making strawberry jam.

Procedure:

Measure 2 kg of crushed strawberries. Place in a bowl.
Add sugar, mix well, and allow to stand for 10 minutes.
Transfer to a saucepan and heat until boiling.
Stir apple pectin into fruit and continue stirring over a high temperature until the gel point is reached and there is a reduction in the water content.
Pour jam into sterilised jars, leaving 1 cm of space at the top and cover.

Figure 7

(i) Explain why reducing the water content of the strawberries will help to preserve them.

(2)

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(ii) Give a reason for sterilising the jars before adding the jam.

(1)

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(Total for question = 3 marks)

Q2.

This pond is affected by eutrophication.

Explain **one** possible cause of eutrophication.

(2)

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(Total for question = 2 marks)

Q3.

* (Reforestation has a beneficial effect on air composition and biodiversity.

Animal conservation projects can also have a beneficial effect on biodiversity.

Explain the beneficial effects of reforestation and animal conservation projects.

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(Total for question = 6 marks)

Q4.

Figure 2 shows an area of woodland with some small plants growing in the ground between the trees.



(Source: © Maksym Holovinov/Shutterstock)

Figure 2

A scientist recorded the mean light intensity and the mean number of small plants per m^2 for six 25 m^2 areas of the woodland.

Figure 3 shows the results.

area of woodland	mean light intensity in lux	mean number of small plants per m^2
A	1500	2.7
B	1300	1.6
C	1000	1.1
D	800	0.6
E	550	0.3
F	350	0.1

Figure 3

(i) Explain the effect of light intensity on the number of small plants per m^2.

(2)

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(ii) State **one** variable the scientist should have controlled to make sure the light intensity measurements could be compared.

(1)

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(Total for question = 3 marks)

Q5.

Figure 15 shows the results of this investigation.

seedling in test tube	length at the start in mm	length after 7 days in mm
1	4	11
2	6	17
3	5	26

Figure 15

(i) Explain why there are differences in the change in the lengths of the seedlings.

(2)

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(ii) Explain how nitrate ions were absorbed by the seedling in test tube 3.

(3)

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(Total for question = 5 marks)

Q6.

Figure 1 shows part of a diseased rose plant from a garden.



(Source: © Manfred Ruckszio/Shutterstock)

Figure 1

Explain what Figure 1 indicates about the air quality in the garden.

(2)

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(Total for question = 2 marks)

Q7.

Farmers use crop rotation to reduce the need to add nitrate fertilisers to the soil.

Plants such as peas and beans have a mutualistic relationship with nitrogen-fixing bacteria.

Explain why farmers use these plants in their crop rotation cycle.

(3)

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(Total for question = 3 marks)

Q8.

Answer the questions with a cross in the boxes you think are correct ☒. If you change your mind about an answer, put a line through the box ☒ and then mark your new answer with a cross ☒.

The population of native white-clawed crayfish in English rivers is decreasing due to an increasing population of American imported signal crayfish.

Figure 1 shows a white-clawed crayfish.

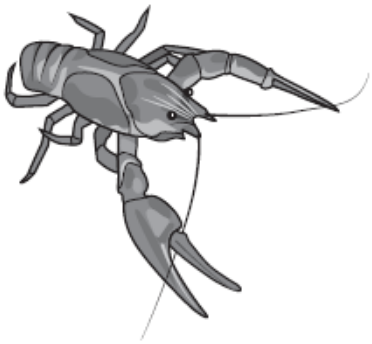


Figure 1

(i) Which term is used to describe the American imported signal crayfish now that it is living in English rivers?

(1)

☒ **A** indigenous species

☒ **B** non-indigenous species

☒ **C** non-invasive species

☒ **D** pathogenic species

(ii) American imported signal crayfish may eat white-clawed crayfish.

Explain **one** other reason why the increasing population of American imported signal crayfish may have caused the decrease in white-clawed crayfish.

(2)

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(iii) The Environment Agency is developing methods of increasing the population of white-clawed crayfish in English rivers.

Which term describes these methods?

(1)

☒ **A** mutation

☒ **B** conservation

☒ **C** predation

☒ **D** mutualism

(iv) White-clawed crayfish cannot survive in rivers with a low concentration of oxygen.

Explain how eutrophication can cause the population of white-clawed crayfish to decrease.

(3)

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(Total for question = 7 marks)

Q9.

Figure 1 shows the sources of pollution and different levels of water pollution in a river.

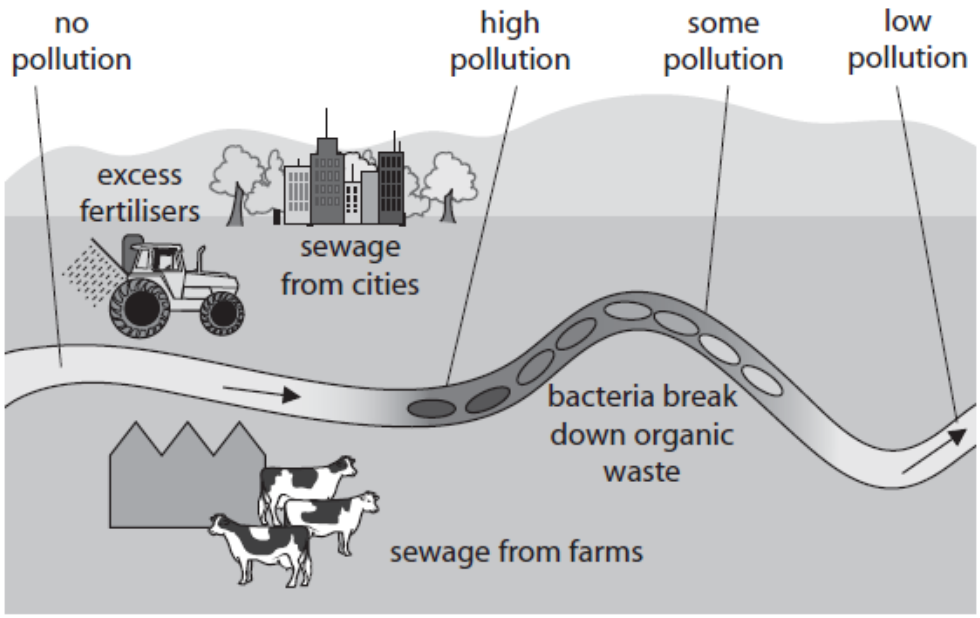


Figure 1

Explain why sewage pollution in the river can decrease the oxygen levels in the water.

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(Total for question = 2 marks)

Q10.

Figure 3 shows water lilies growing in a lake in Europe.



© lynn gladwell/123RF

Figure 3

One water lily plant was brought from America 10 years ago and planted in the lake shown in Figure 3.

Explain why this non-indigenous plant now covers the whole surface of the lake.

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(Total for question = 3 marks)

Q11.

Tuna are carnivorous fish.

In the wild, tuna eat smaller fish called mackerel.

Some young tuna are kept in fish farms.

(i) Explain why fish farmers keep the fish confined in netted areas.

(2)

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(ii) Give **one** reason why there is an increase in the number of fish farms in the world today.

(1)

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(Total for question = 3 marks)

Q12.

Maize plants can be used in the production of biofuel.

Discuss the advantages and disadvantages of the use of biofuel.

(4)

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Q13.

(i) Excess fertilisers can cause a build-up of nitrates in the rivers and lakes.

State the name given to a build-up of nitrates in the lake.

(1)

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(ii) State why the build-up of nitrates is less likely to affect a river than a lake.

(1)

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(Total for question = 2 marks)

Q14.

Genetic engineering can be used to produce plants that are resistant to herbicide.

One herbicide works by preventing the activity of an enzyme.

Some bacteria have a form of this enzyme that is not affected by the herbicide.

(a) Suggest how genetic engineering can be used to produce plants resistant to this herbicide.

(3)

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(b) This herbicide is sprayed onto the leaves of plants.

Suggest which vessel could transport the herbicide from the leaf to other parts of the plant.

(1)

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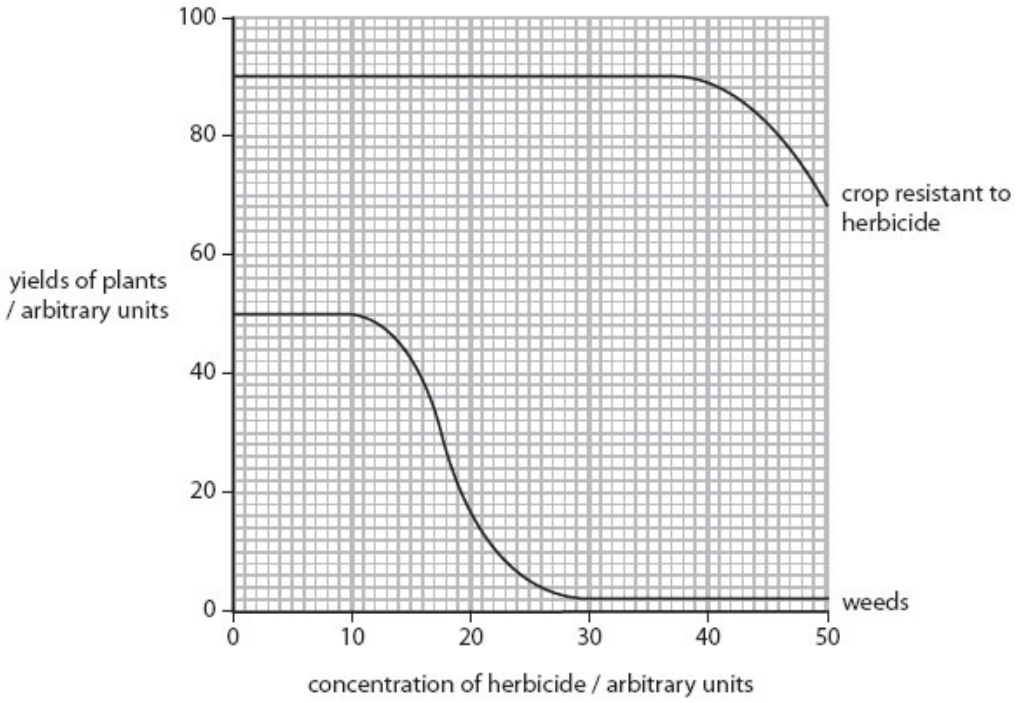
(c) Fields of crops have weeds growing in them.

In an investigation, crops resistant to a herbicide were grown in different fields.

The crops were sprayed with different concentrations of the herbicide.

The mass of the crops and weeds were recorded.

The graph shows the results of this investigation.



(i) Describe the effects of the herbicide on the yield of weeds.

(2)

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(ii) Complete the sentence by putting a cross (☒) in the box next to your answer.

The most appropriate concentration of herbicide to use is

(1)

- ☒ **A** 10 arbitrary units
- ☒ **B** 30 arbitrary units
- ☒ **C** 40 arbitrary units
- ☒ **D** 50 arbitrary units

(d) The table shows the number of species of weeds resistant to this herbicide from 1996 to 2004.

	Year				
	1996	**1998**	**2000**	**2002**	**2004**
Number of species of weeds resistant to this herbicide	1	2	3	5	8

(i) Describe the trend shown in the data.

(1)

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(ii) Suggest reasons for this trend.

(2)

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(Total for Question is 10 marks)

Q15.

Climacteric fruits are fruits that can ripen after they have been removed from the plant.

A student investigated how temperature affects the decomposition of climacteric fruit.

The student placed a plastic box containing a banana in a water bath at 20 °C.

The student recorded the time taken for the banana to turn completely black.

This investigation was repeated at 30 °C and 40 °C.

(i) State **two** factors the student would need to control to ensure only the temperature affected the rate of decomposition of the banana.

(2)

1 .....

.....

2 .....

.....

(ii) The results of this investigation are shown in Figure 1.

temperature of water bath in °C	time taken for the banana to turn completely black in days
20	16
30	7
40	4

Figure 1

State a conclusion that could be made from these results.

(1)

.....

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(Total for question = 3 marks)

Q16.

Answer the question with a cross in the box you think is correct ☒. If you change your mind about an answer, put a line through the box ☒ and then mark your new answer with a cross ☒.

A student investigated the decomposition of leaves from different types of tree.

Decomposers in the soil convert

(1)

☒ **A** nitrogen into nitrates

☒ **B** nitrates into nitrogen

☒ **C** urea into ammonia

☒ **D** ammonia into urea

(Total for question = 1 mark)

Q17.

Answer the question with a cross in the box you think is correct ☒. If you change your mind about an answer, put a line through the box ☒ and then mark your new answer with a cross ☒.

Figure 12 shows the mean rate of decomposition for this investigation.

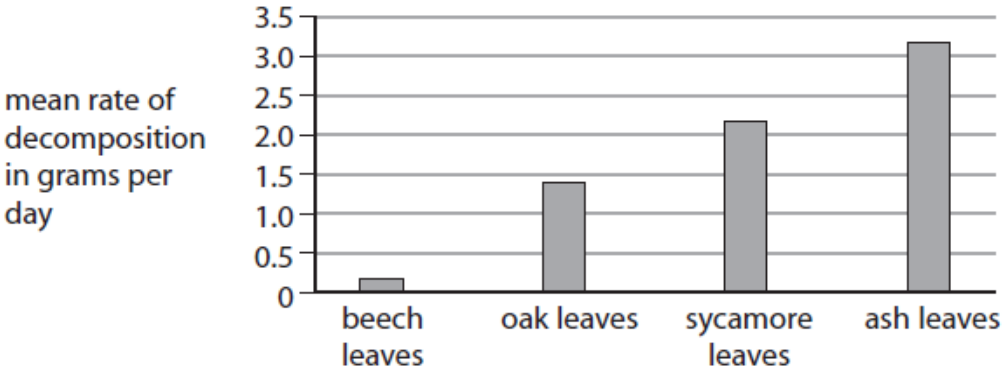


Figure 12

(i) Which leaves would produce compost in the least time?

(1)

☒ **A** beech leaves

☒ **B** oak leaves

☒ **C** sycamore leaves

☒ **D** ash leaves

(ii) The same investigation was extended to include the leaves of a silver birch tree.

The starting mass of the leaves was 28.2 grams.

After 40 days the mass of the leaves was 19.7 grams.

Calculate the rate of decomposition of the leaves of the silver birch tree.

Give your answer to three significant figures and include the units.

(3)

rate of decomposition .....

(Total for question = 4 marks)

Q18.

Complete the table by writing the name of an indicator species for clean water and an indicator species for polluted water.

(2)

condition	indicator species
clean air	lichen
clean water	.....
polluted water	.....

Q19.

Bloodworms in a pond indicate that the water is polluted.

(i) Which species also indicates that the water is polluted?

(1)

☒ **A** fertiliser

☒ **B** lichen

☒ **C** stonefly

☒ **D** sludgeworm

(ii) Bloodworms have a high level of haemoglobin in their blood.

Give a reason why this helps them survive in polluted water.

(1)

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(iii) Carbon dioxide diffuses from the body of the bloodworm into the water.

Give **two** factors that affect the rate of diffusion.

(2)

1 .....

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2 .....

.....

(Total for question = 4 marks)

Q20.

A gardener investigated the ability of four types of compost to hold water.

50cm^3 of water was added to each type of compost.

Figure 6 shows the volume of water retained by four different types of compost.

type of compost	A	B	C	D
mass of compost /g	500	500	1000	1000
volume of water retained / cm^3	15	29	45	34
total mass of compost after water was added /g cm^{-3}	515	529	1045	1034

Figure 6

(i) Calculate the percentage change in mass for compost B.

(2)

..... %

(ii) Explain which compost would be best to use for a pot containing strawberry plants to be grown during a hot summer.

(2)

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(iii) State **one** way to improve this investigation in order to compare the results without having to calculate the percentage change in mass.

(1)

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(Total for question = 5 marks)