

# Enzymes

## Question Paper 1

<b>Level</b>	IGCSE
<b>Subject</b>	Biology
<b>Exam Board</b>	CIE
<b>Topic</b>	Enzymes
<b>Paper Type</b>	(Extended) Theory Paper
<b>Booklet</b>	Question Paper 1

**Time Allowed:** 63 minutes

**Score:** /52

**Percentage:** /100





- (e) The effect of human lysozyme on two common species of bacteria, **A** and **B**, was investigated at two different values of pH.

The investigation was set up as shown in Fig. 2.1.

The test-tubes were kept at 37 °C for 24 hours.


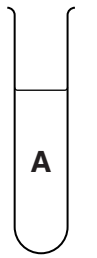
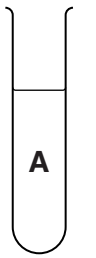
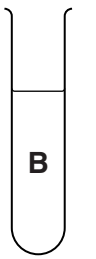
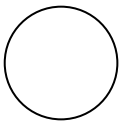
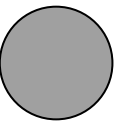
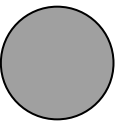
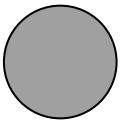
tube number	1	2	3	
species of bacteria				
pH of medium	4.0	4.0	9.0	4.0
fresh lysozyme	✓		✓	✓
boiled lysozyme		✓		

Fig. 2.1

After 24 hours, samples were taken from each test-tube. Each sample was placed onto nutrient agar in Petri dishes. The dishes were incubated at 28 °C for a further 24 hours to allow any bacteria to grow.

The results are shown in Fig. 2.2.

sample from test-tube	1	2	3	
result after incubation for 24 hours				

**Key:**



-  no growth of bacteria
-  growth of bacteria

Fig. 2.2

Explain the results shown in Fig. 2.2 by comparing the following pairs:

**1 and 3** .....  
.....  
.....  
.....[2]

**1 and 4** .....  
.....  
.....  
.....[2]

**1 and 2** .....  
.....  
.....  
.....[2]

**(f)** Human milk also contains antibodies. Explain the benefits of antibodies to a newborn child.  
.....  
.....  
.....  
.....  
.....[2]

**[Total: 20]**

2 Microorganisms in the soil release enzymes to digest dead leaves.

(a) Explain how enzymes catalyse chemical reactions.

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.....

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.....

.....

..... [3]

(b) Protease and cellulase are two enzymes secreted by soil microorganisms. Protease digests protein.

Suggest what part of the dead leaf cells are digested by the enzyme cellulase.

..... [1]



(d) Describe how nitrogen in proteins in dead leaves is recycled to be absorbed by plants.

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..... [4]

(e) Microorganisms also process and convert atmospheric nitrogen to form a nitrogen compound that can be absorbed by plants.

(i) Name this process of converting atmospheric nitrogen.

..... [1]

(ii) Explain how this process happens.

.....

.....

.....

.....

..... [2]

[Total: 17]



3 Enzymes are necessary for many biological processes, such as the digestion of fat.



(a) (i) Explain why enzymes are necessary for biological processes.

.....  
.....  
.....  
.....  
.....  
.....  
..... [3]

(ii) Lipase, protease and amylase are enzymes secreted into the alimentary canal.

Name **one** organ that secretes each enzyme. Choose your answers from this list.

- |          |              |                 |
|----------|--------------|-----------------|
| colon    | gall bladder | liver           |
| pancreas | rectum       | salivary glands |

You can use each organ **only once**.

lipase .....

protease .....

amylase ..... [3]

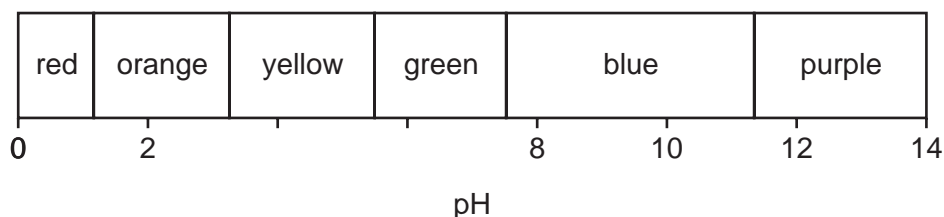
(b) A group of students investigated the digestion of fat in milk.

- They added an alkaline solution to the milk.
- They divided the milk into four test-tubes.
- They added lipase and bile salts to some of the test-tubes, as shown in Table 5.1. They did this at the same time for each test-tube.
- They kept all test-tubes at 40 °C.
- After 5 minutes, they added Universal Indicator solution to each test-tube.

**Table 5.1**

test-tube		colour of pH indicator after 5 minutes at 40 °C
<b>A</b>	milk, alkaline solution, lipase and bile salts	orange
<b>B</b>	milk, alkaline solution, bile salts and water	blue
<b>C</b>	milk, alkaline solution, lipase and water	yellow
<b>D</b>	milk, alkaline solution and water	blue

Fig. 5.1 shows the colour of the indicator at different pH values.



**Fig. 5.1**

(i) Explain why test-tube **D** was included in the investigation.

.....

.....

.....

..... [2]

(ii) Explain why the colour in test-tube **A** was orange.

.....  
.....  
.....  
.....  
.....  
.....  
..... [3]

(iii) Explain the results for test-tubes **B** and **C**.

test-tube **B** .....  
.....  
.....  
.....  
test-tube **C** .....  
.....  
..... [4]

[Total: 15]