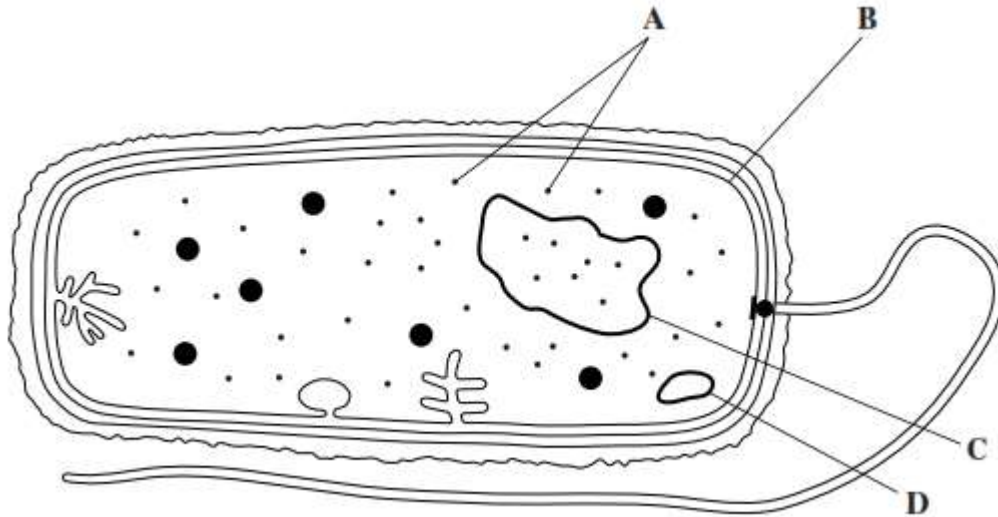


Y12 Summer work 2019 – AS short answer questions

Q1.

The diagram shows a bacterium.



(a) Name

(i) organelle **A** _____ (1)

(ii) structure **B** _____ (1)

(b) Give **two** ways in which the structure of this bacterium is different from the structure of cells lining the alveoli of a human lung.

1. _____

2. _____

(2)

(c) Structures **C** and **D** are made of the same type of biological molecule. They have a similar function.

What is the function of **C** and **D**?

(1)

(Total 5 marks)

Q2.

- (a) The table shows the transpiration rate of a group of plants exposed to different humidities at a temperature of 25°C.

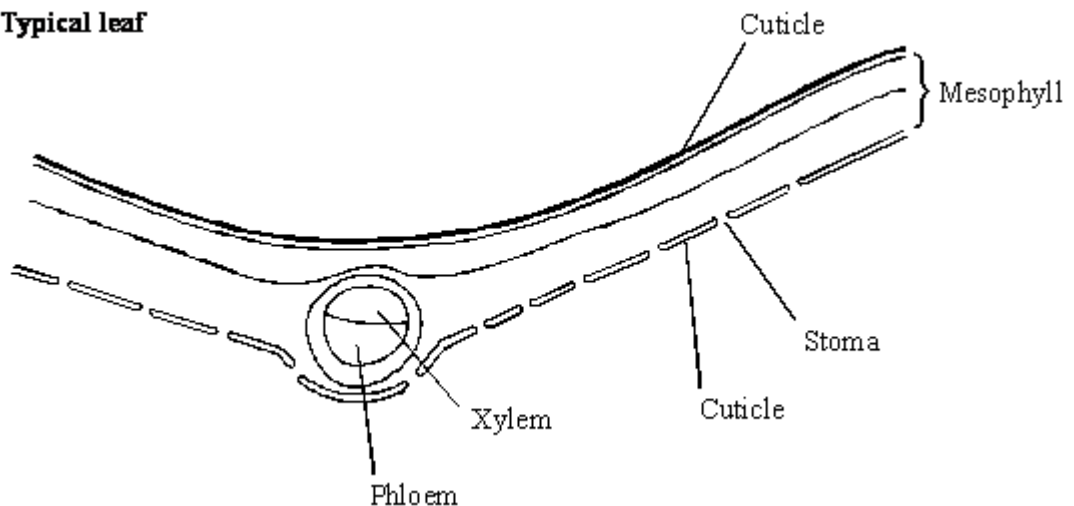
Humidity / %	Transpiration rate / arbitrary units
20	26.0
40	21.0
50	16.5
60	11.0
70	9.5

Describe and explain the relationship between humidity and transpiration rate.

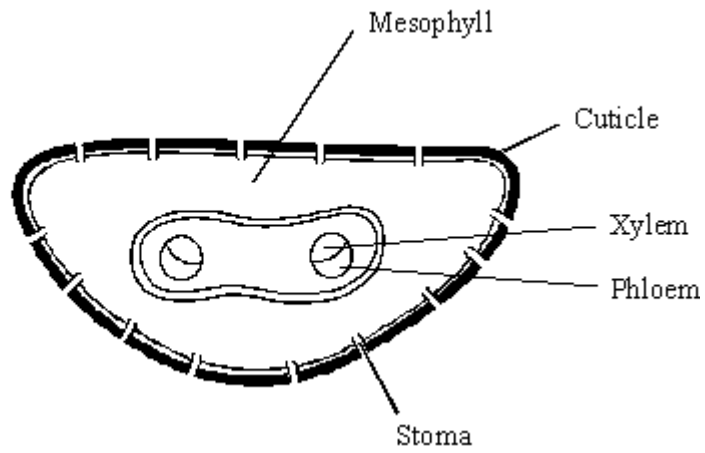
(3)

- (b) The diagrams show a section through a typical leaf and a section through a leaf from a xerophytic plant. The xerophytic leaf has a lower transpiration rate than the typical leaf.

Typical leaf



Xerophytic leaf



Describe **two** features shown in the diagram of the xerophytic leaf which reduce transpiration rate. Explain how each of these features contributes to a lower transpiration rate.

Feature 1 _____

Explanation _____

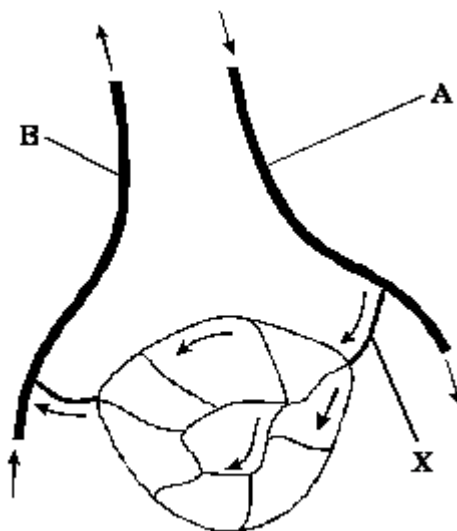
Feature 2 _____

Explanation _____

(4)
(Total 7 marks)

Q3.

The diagram shows some blood vessels in muscle tissue.



Not drawn to scale

(a) (i) Which type of blood vessel is **X**?

(1)

(ii) Name **two** substances which are at a higher concentration in the blood at **A** than in the blood at **B**.

1. _____

2. _____

(1)

(b) The table shows the mean diameter of the lumen and the rate of blood flow in some types of human blood vessel.

Type of blood vessel	Mean diameter of lumen / μm	Rate of blood flow / cm s^{-1}
Artery	400	10 – 40
Arteriole	30	0.1 – 10
Capillary	8	less than 0.1

Using information in the table, explain what causes the rate of blood flow to be slower in capillaries than in other vessels.

(2)

(c) (i) Which type of blood vessel has most elastic tissue in its wall?

(1)

(ii) How does this elastic tissue help to smooth out the flow of blood in the blood vessel?

(2)

(Total 7 marks)

Q4.

(a) Describe **two** differences between active transport and facilitated diffusion.

1. _____

2. _____

(2)

- (b) Explain why molecules of oxygen and carbon dioxide are able to diffuse across membranes.

(2)

- (c) Explain why ventilation of the lungs increases the efficiency of gas exchange.

(2)

(Total 6 marks)

Q5.

- (a) The structure of a plasma membrane is described as a fluid mosaic. Explain why.

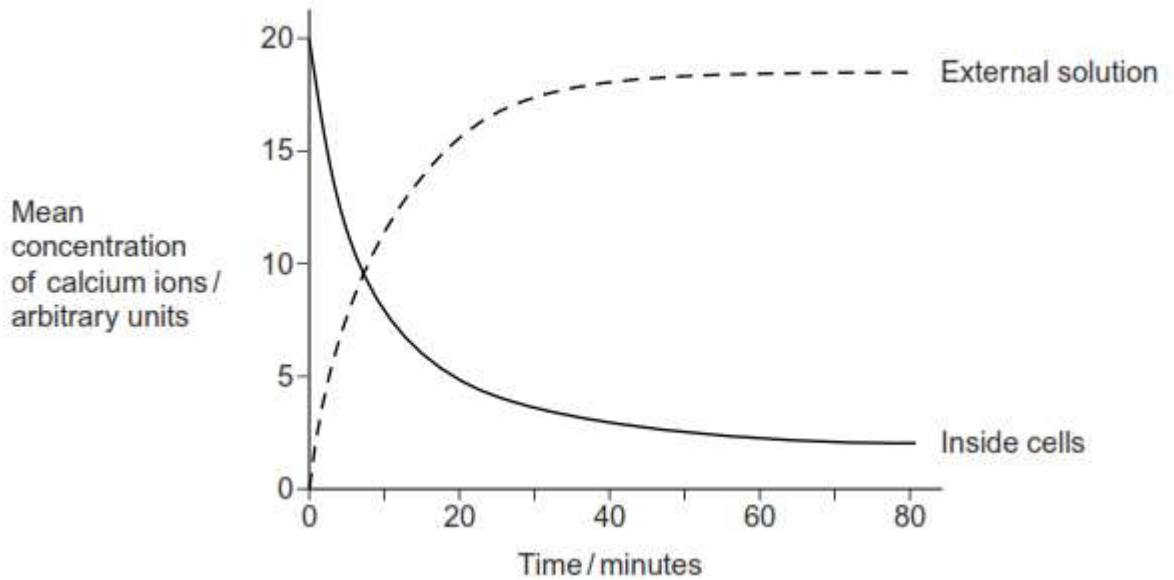
(2)

- (b) Give **two** functions of proteins in plasma membranes.

1. _____
2. _____

(2)

Scientists investigated the movement of calcium ions across the plasma membrane of human cells. They placed human cells in a solution of calcium ions. At regular intervals, they measured the concentration of calcium ions in the external solution and the concentration of calcium ions inside the cells. Their results are shown in the graph.



- (c) By what process did the calcium ions leave the cells after 10 minutes? Use evidence from the graph to support your answer.

(2)
(Total 6 marks)

Q6.

- (a) Complete the table to give **two** differences between DNA and RNA.

Difference	DNA	RNA
1		
2		

(2)

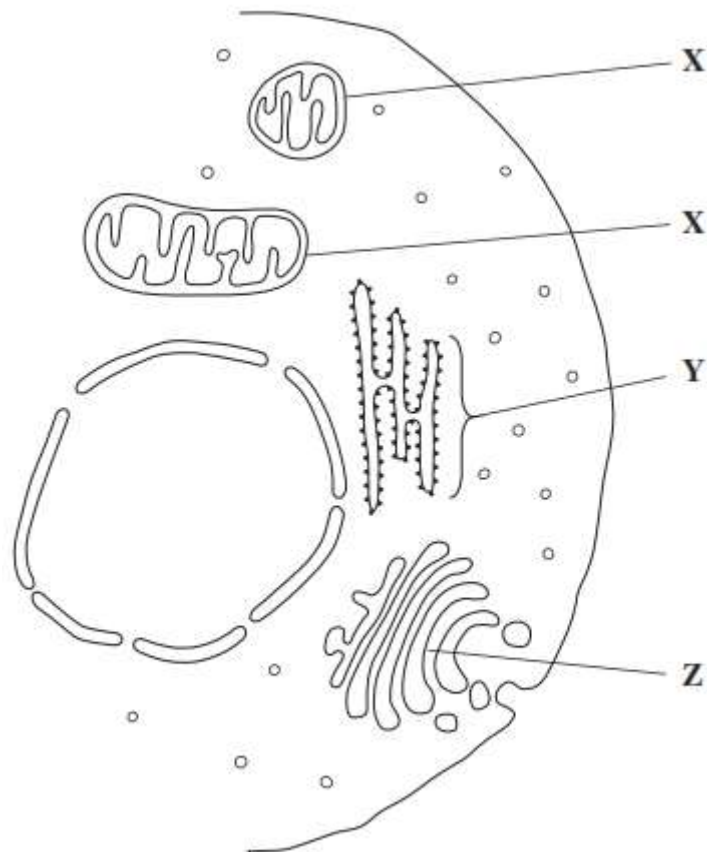
- (b) Describe the part played by RNA in protein synthesis.

(Extra space) _____

(3)
(Total 5 marks)

Q7.

The drawing shows part of a human cell.



(a) Name organelles

X _____

Y _____

(2)

(b) (i) The organelles labelled **X** all have very similar shapes in this cell. Explain why they appear to have different shapes in this drawing.

(Extra space) _____

(1)

(ii) Large numbers of organelles **X** and **Z** are found in mucus-secreting cells.

Explain why.

(Extra space) _____

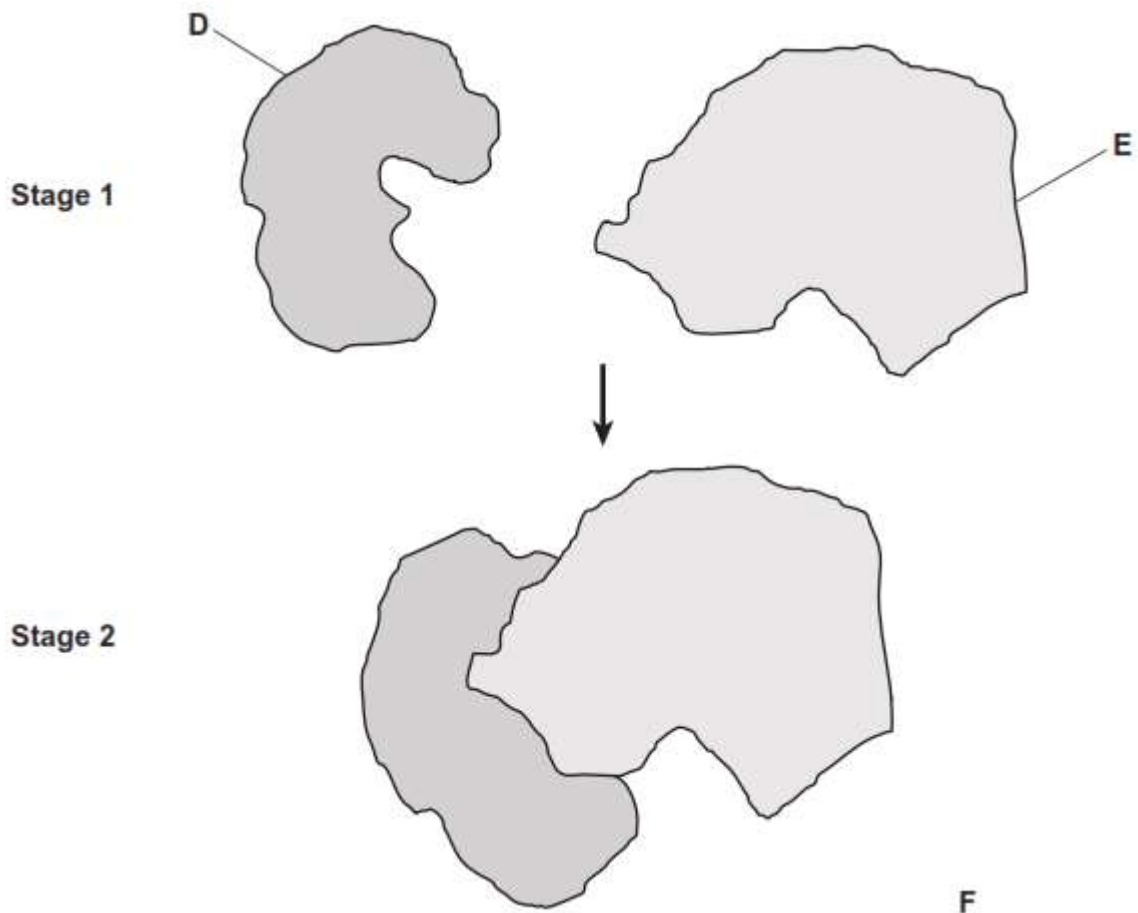
(2)
(Total 5 marks)

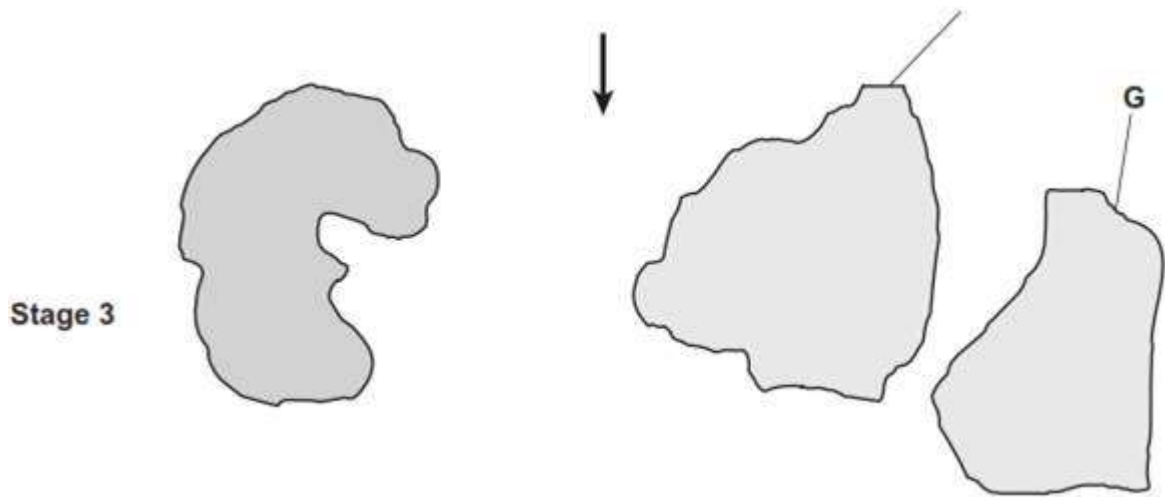
Q8.

(a) What is an enzyme?

(2)

The diagram shows stages during an enzyme-catalysed reaction.





(b) Using the letters in the diagram, describe what is happening in this reaction.

(Extra space) _____

(3)
(Total 5 marks)

Q9.

The bases in DNA nucleotides contain nitrogen.

Researchers grew bacteria on a medium containing ^{15}N ('heavy' nitrogen) for several generations. They then transferred the bacteria to a medium containing ^{14}N ('ordinary' nitrogen). They analysed DNA from the bacteria at three stages:

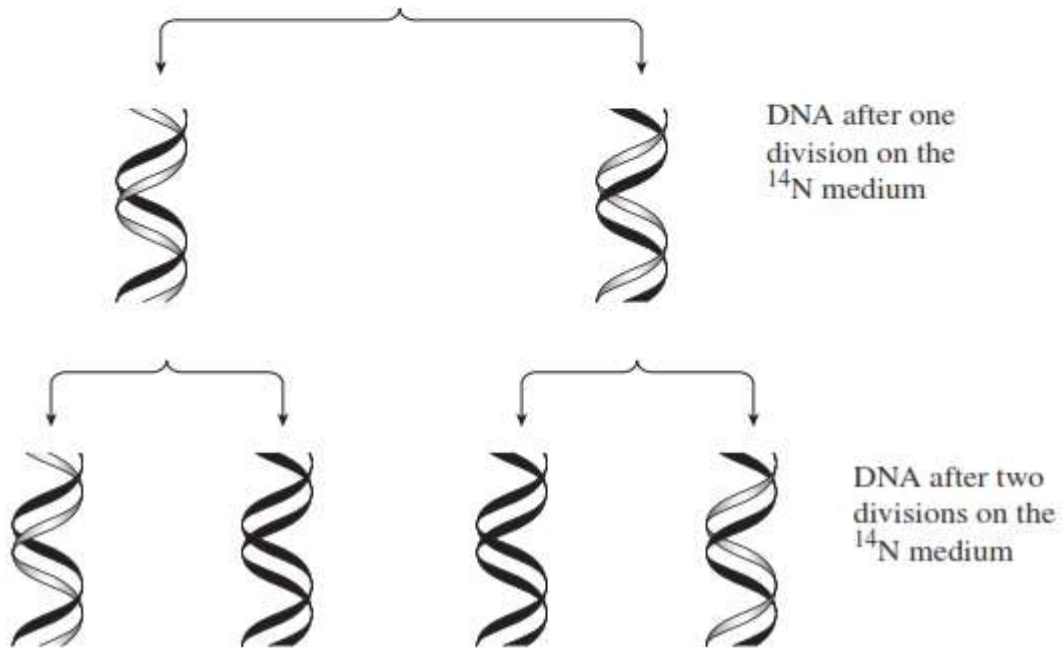
1. whilst the bacteria were growing on the ^{15}N medium
2. after one division of the bacteria on the ^{14}N medium
3. after two divisions of the bacteria on the ^{14}N medium

The diagram shows their results.

Bacteria are grown on ^{15}N medium



Bacteria are then transferred to ^{14}N medium



- (a) Describe how the proportion of DNA that contained ^{15}N changed at each division when bacteria were grown on the ^{14}N medium.

(2)

- (b) The change in the proportion of DNA containing ^{15}N is due to the way in which DNA replicates. Explain how.

(2)

(Total 4 marks)

Q10.

Scientists have developed a new technique that can identify whether people smoke tobacco. Tobacco contains nicotine, which is broken down to cotinine. Cotinine is found in fingerprints. The new technique uses antibodies against cotinine.

- (a) These scientists injected laboratory mice with cotinine. Describe how this injection stimulates mice to produce antibodies against cotinine.

(Extra space) _____

(4)

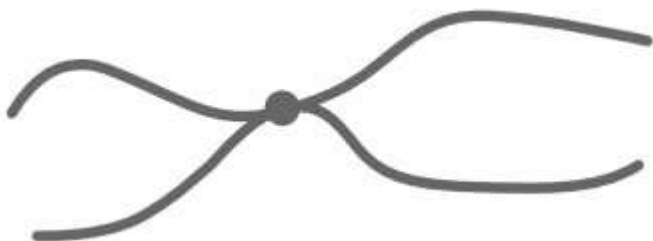
- (b) The antibodies bind only to cotinine, and not to any other substance in the fingerprint. Explain why.

(2)

(Total 6 marks)

Q11.

- (a) The diagram shows a chromosome at the start of mitosis.



Describe and explain the appearance of the chromosome.

(2)

(b) The photographs show two stages in mitosis.

Stage A

Stage B



By Dr. phil.nat Thomas Geier, Fachgebiet Botanik der Forschungsanstalt Geisenheim.
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Name stages **A** and **B**. Describe what is happening to the chromosomes in each stage.

(i) Stage A _____

(2)

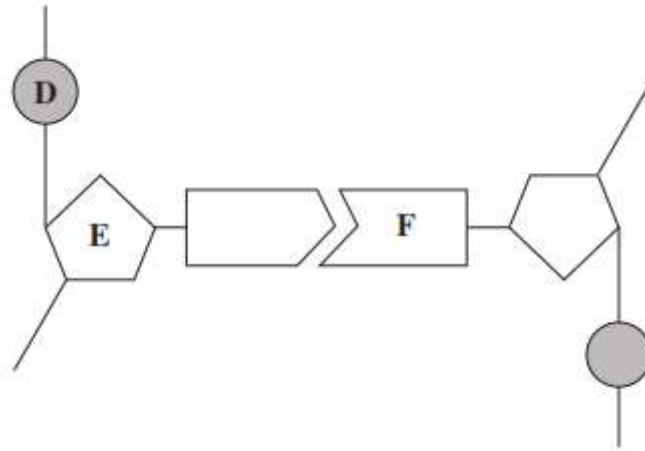
(ii) Stage B _____

(2)

(Total 6 marks)

Q12.

(a) The diagram shows one pair of nucleotides of a DNA molecule.



Name _____

D _____

E _____

F _____

(3)

(b) Complete the table to give **two** differences between the structure of DNA and the structure of RNA.

	DNA	RNA
1		
2		

(2)

(Total 5 mark)