PEARSON EDEXCEL GCSE COMBINED SCIENCE (HIGHER) · 1SC0

BIOLOGY



EXAM QUESTION PACK

TOPIC 1: KEY CONCEPTS IN BIOLOGY (PAPER 2, PACK 3)

SCORE	PERCENTAGE
/56	%

STEMUP

These questions belong to Pearson Edexcel, not to us.

The examination questions, mark schemes and examiner comments in this pack were written and published by Pearson Edexcel. They are past assessment materials, reproduced here so that students can revise from them.

What we do not own

STEMUP is not affiliated with Pearson Edexcel and does not own, and makes no claim to own, any of the question, mark scheme or examiner report material in this pack. Pearson Edexcel has not endorsed, approved or been involved in the production of it. Pearson Edexcel and the qualification titles used here belong to their respective owners and appear for identification only.

Where to find the originals

Pearson Edexcel publishes its past papers, mark schemes and examiner reports. Always check the current specification at qualifications.pearson.com before you revise, because content and wording can change between series.

If you hold the rights to any material in this pack and would like it amended or removed, contact admin@stemup.co.uk and we will act on it.

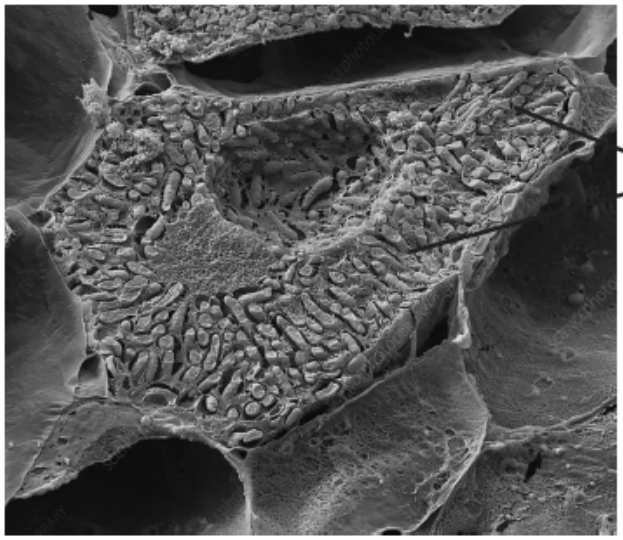
Q1.

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 4 shows a cross-section of a root nodule on a leguminous plant.

Bacteria in the root nodule provide the leguminous plant with nitrogen compounds.

The leguminous plant provides the bacteria with sugars.



(Source: © Nigel Downer / Science Photo Library)

Figure 4

(i) Which term describes the relationship between this leguminous plant and the bacteria?

(1)

☒ **A** parasitism

☒ **B** indigenous

☒ **C** biodiversity

☒ **D** mutualism

(ii) The width of this root nodule is 7.5 mm.

Give the width in µm.

(1)

..... µm

(Total for question = 2 marks)

Q2.

Potato cells contain the enzyme catalase.

This enzyme catalyses the breakdown of hydrogen peroxide into oxygen and water.

Figure 15 shows what happened when a student placed a potato disc in a 5% hydrogen peroxide solution.

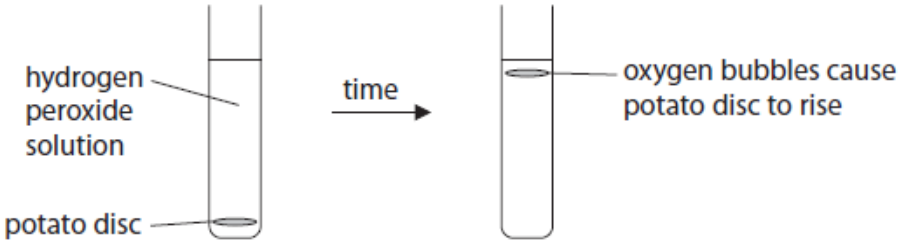


Figure 15

The student measured the time taken for the potato disc to rise.

The student repeated the investigation using 10%, 15% and 20% concentrations of hydrogen peroxide solution.

(i) Which term describes the hydrogen peroxide in this reaction?

(1)

☒ **A** product

☒ **B** substrate

☒ **C** active site

☒ **D** control

(ii) The potato discs all had the same mass.

Explain why the student used potato discs with the same mass.

(2)

.....

.....

.....

.....

(iii) State **two** other factors that need to be kept the same to improve this investigation.

(2)

.....

.....

.....

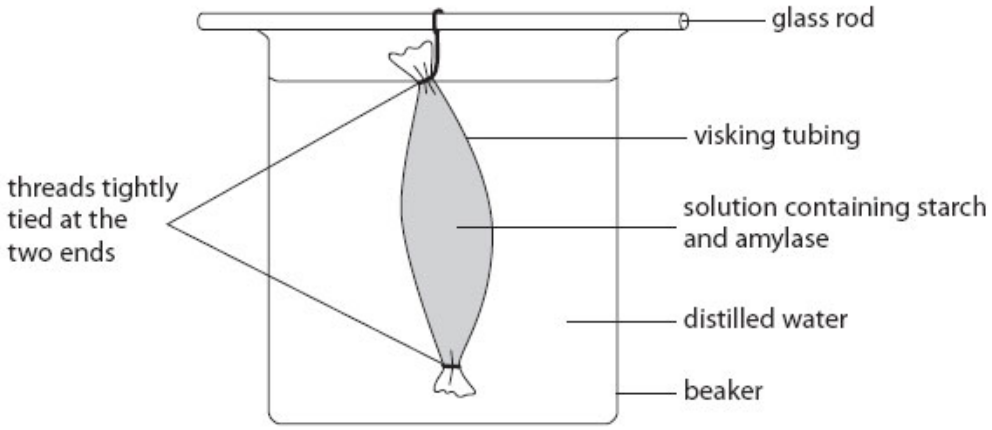
.....

(Total for question = 5 marks)

Q3.

Visking tubing is made of a plastic material through which small molecules can pass.

The diagram shows how the equipment for an investigation using visking tubing was set up.



In this investigation, the concentration of glucose in the distilled water was measured at the start and then every five minutes.

The results are shown in the table.

time of measuring the glucose concentration in the distilled water / mins	concentration of glucose in the distilled water / g cm^{-3}
0	0.00
5	0.07
10	0.39
15	0.52
20	0.79
25	0.79

(i) Describe the results of this investigation.

(2)

.....

.....

.....

.....

(ii) Explain the results of this investigation

(3)

.....

.....

.....

.....

.....

.....

*(iii) The diagram shows how visking tubing can be used to model the small intestine.

This model does not fully represent the structure and functions of the small intestine.

Evaluate the strengths and weaknesses of this model.

(6)

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

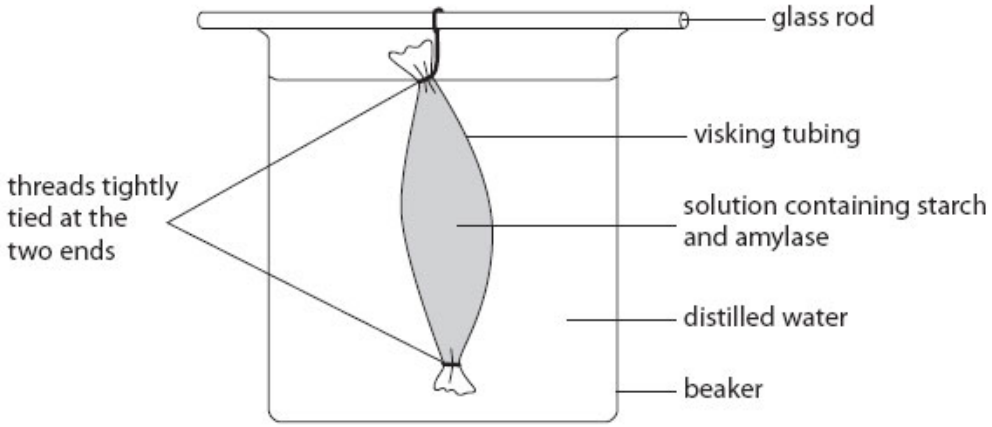
.....

.....

Q4.

Visking tubing is made of a plastic material through which small molecules can pass.

The diagram shows how the equipment for an investigation using visking tubing was set up.



In this investigation, the concentration of glucose in the distilled water was measured at the start and then every five minutes.

The results are shown in the table.

time of measuring the glucose concentration in the distilled water / mins	concentration of glucose in the distilled water / g cm^{-3}
0	0.00
5	0.07
10	0.39
15	0.52
20	0.79
25	0.79

(i) Describe the results of this investigation.

(2)

.....

.....

.....

.....

(ii) Explain the results of this investigation

(3)

.....

.....

.....

.....

.....

.....

*(iii) The diagram shows how visking tubing can be used to model the small intestine.

This model does not fully represent the structure and functions of the small intestine.

Evaluate the strengths and weaknesses of this model.

(6)

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

Q5.

Figure 3 is a drawing of a eukaryotic cell.

Structure **Z** is found in plant leaf cells.

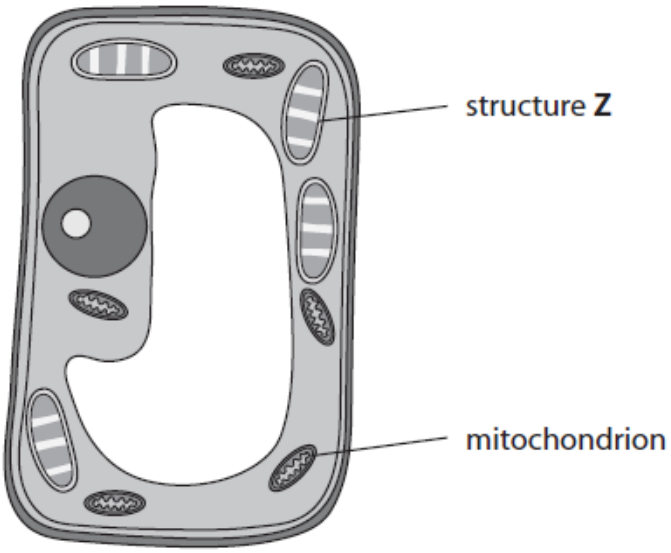


Figure 3

(i) Name structure **Z**.

(1)

.....

(ii) Give **one** function of the mitochondrion.

(1)

.....

.....

.....

(iii) Describe how a prokaryotic cell is different from the cell in Figure 3.

(2)

.....

.....

.....

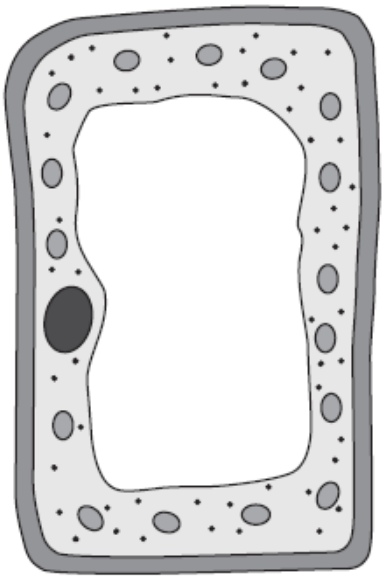
.....

(Total for question = 4 marks)

Q6.

Photosynthesis

The diagram shows a plant cell.



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

This plant cell is a

(1)

☒ **A** xylem vessel

☒ **B** phloem vessel

☒ **C** root hair cell

☒ **D** leaf palisade cell

(b) Explain how water moves from cell to cell in a leaf.

(2)

.....

.....

.....

.....

(c) Some small plants can grow on the bark of trees.

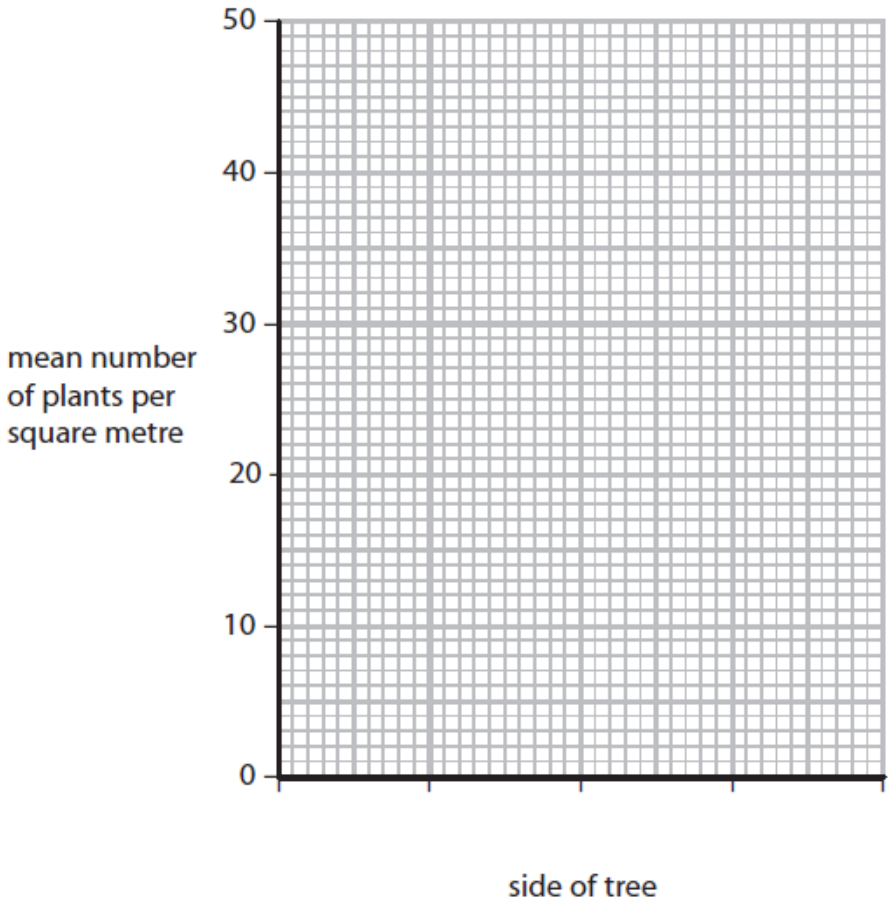
The distribution of two plant species, species A and species B, growing on the north and south side of a tree was investigated.

The results are shown in the table.

	mean number of plants per square metre	
side of tree	**species A**	**species B**
North	48	12
South	0	36

(i) Draw a bar chart to illustrate the data in this table.

(2)



(ii) Which piece of equipment would be used to measure the distribution of plants on the bark of the tree?

Place a cross (☒) in the box next to your answer.

(1)

☒ **A** a pooter

☒ **B** a sweep net

☒ **C** a pitfall trap

☒ **D** a quadrat

(iii) Suggest reasons for the distribution of species B on the north and south sides of the tree.

(2)

.....

.....

.....

.....

.....

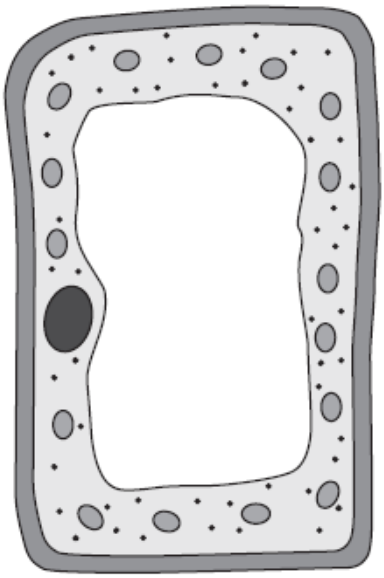
.....

(Total for question = 8 marks)

Q7.

Photosynthesis

The diagram shows a plant cell.



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

This plant cell is a

(1)

☒ **A** xylem vessel

☒ **B** phloem vessel

☒ **C** root hair cell

☒ **D** leaf palisade cell

(b) Explain how water moves from cell to cell in a leaf.

(2)

.....

.....

.....

.....

(c) Some small plants can grow on the bark of trees.

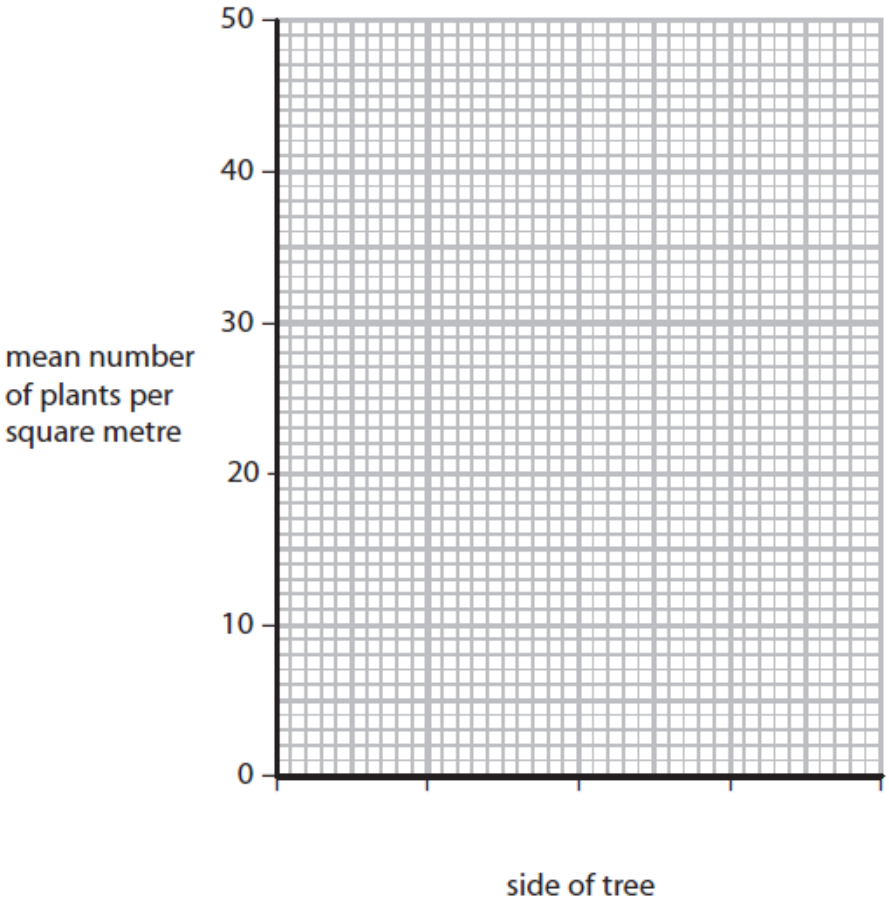
The distribution of two plant species, species A and species B, growing on the north and south side of a tree was investigated.

The results are shown in the table.

	mean number of plants per square metre	
side of tree	species A	species B
North	48	12
South	0	36

(i) Draw a bar chart to illustrate the data in this table.

(2)



(ii) Which piece of equipment would be used to measure the distribution of plants on the bark of the tree?

Place a cross (☒) in the box next to your answer.

(1)

☒ **A** a pooter

☒ **B** a sweep net

☒ **C** a pitfall trap

☒ **D** a quadrat

(iii) Suggest reasons for the distribution of species B on the north and south sides of the tree.

(2)

.....

.....

.....

.....

.....

.....

(Total for question = 8 marks)

Q8.

Trypsin is a protease enzyme used in the manufacture of food for babies.

A manufacturer of baby food wanted to find out the optimum pH for trypsin.

Equal volumes of different pH solutions were placed in six separate test tubes.

5 cm^3 of 1% trypsin solution was added to each test tube.

1.5g of mashed food was placed in each test tube.

The time taken to digest the food was recorded.

(i) State **one** other variable that should be controlled in this investigation.

(1)

.....

.....

(ii) State how this variable could be controlled.

(1)

.....

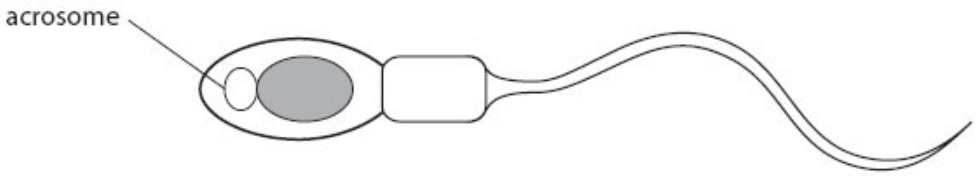
.....

.....

(Total for question = 2 marks)

Q9.

The diagram shows a sperm cell.



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

The acrosome contains

(1)

☒ **A** enzymes to help get through the membrane of the egg cell

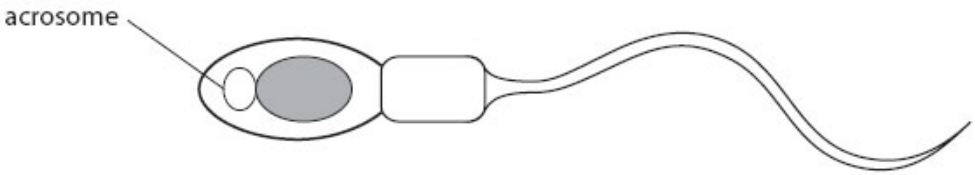
☒ **B** mitochondria to supply energy to swim

☒ **C** muscle fibres to swim

☒ **D** 23 chromosomes

Q10.

The diagram shows a sperm cell.



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

The acrosome contains

(1)

☒ **A** enzymes to help get through the membrane of the egg cell

☒ **B** mitochondria to supply energy to swim

☒ **C** muscle fibres to swim

☒ **D** 23 chromosomes

Q11.

State **two** roles of bile in digestion.

(2)

1 .....

.....

2 .....

.....

Q12.

State **two** roles of bile in digestion.

(2)

1 .....

.....

2 .....

.....

Q13.

* Describe the roles of the enzymes involved in digestion.

(6)

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

Q14.

* Describe the roles of the enzymes involved in digestion.

(6)

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

Q15.

Transport and exchange of materials

Some students investigated water movement in plant cells.

They measured the mass of five pieces of potato.

Each piece of potato was put into a different concentration of salt solution.

After one hour the pieces of potato were dried and the mass of each was recorded.

The results are shown in the table.

concentration of salt solution / %	mass / g			percentage change / %
	start	after 1 hour	change	
0	10.2	13.1	+2.9	+28.4
10	9.8	11.4	+1.6	+16.3
20	10.3	9.8	–0.5	
30	10.1	8.9	–1.2	–11.9
40	9.7	7.7	–2.0	–20.6

(a) (i) Calculate the percentage change in the mass of the potato in the 20% salt solution.

(2)

..... %

(ii) Suggest why calculating a percentage change is more useful than calculating the change in mass in this investigation.

(1)

.....

.....

(b) Mitosis occurs in plant cells during growth.

Describe the division of a cell by mitosis.

(3)

.....

.....

.....

.....

.....

.....

.....

.....

*(c) Explain how active transport and diffusion provide a plant with named substances it needs for growth.

(6)

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

(Total for question = 12 marks)

Q16.

Transport and exchange of materials

Some students investigated water movement in plant cells.

They measured the mass of five pieces of potato.

Each piece of potato was put into a different concentration of salt solution.

After one hour the pieces of potato were dried and the mass of each was recorded.

The results are shown in the table.

concentration of salt solution / %	mass / g			percentage change / %
	start	after 1 hour	change	
0	10.2	13.1	+2.9	+28.4
10	9.8	11.4	+1.6	+16.3
20	10.3	9.8	–0.5	
30	10.1	8.9	–1.2	–11.9
40	9.7	7.7	–2.0	–20.6

(a) (i) Calculate the percentage change in the mass of the potato in the 20% salt solution.

(2)

..... %

(ii) Suggest why calculating a percentage change is more useful than calculating the change in mass in this investigation.

(1)

.....

.....

(b) Mitosis occurs in plant cells during growth.

Describe the division of a cell by mitosis.

(3)

.....

.....

.....

.....

.....

.....

.....

.....

*(c) Explain how active transport and diffusion provide a plant with named substances it needs for growth.

(6)

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

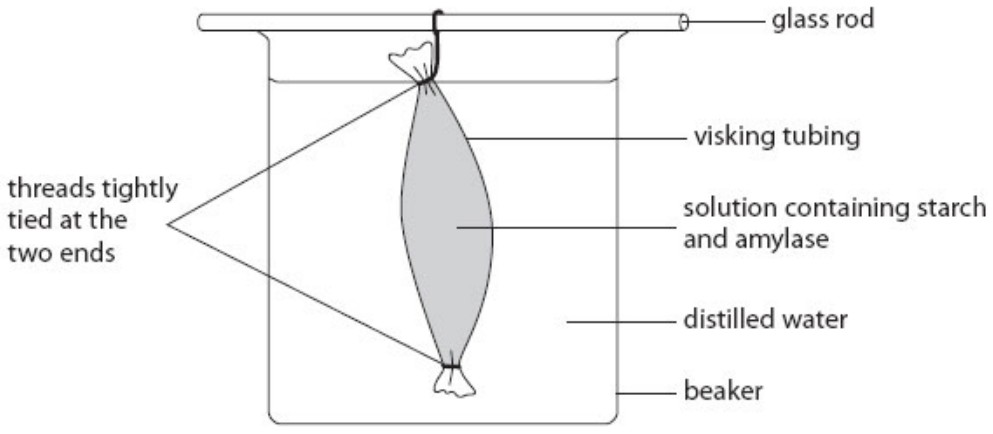
.....

(Total for question = 12 marks)

Q17.

Visking tubing is made of a plastic material through which small molecules can pass.

The diagram shows how the equipment for an investigation using visking tubing was set up.



(a) In this investigation, the concentration of glucose in the distilled water was measured at the start and then every five minutes.

The results are shown in the table.

time of measuring the glucose concentration in the distilled water / mins	concentration of glucose in the distilled water / g cm^{-3}
0	0.00
5	0.07
10	0.39
15	0.52
20	0.79
25	0.79

(i) Describe the results of this investigation.

(2)

.....

.....

.....

.....

(ii) Explain the results of this investigation

(3)

.....

.....

.....

.....

.....

.....

*(iii) The diagram shows how visking tubing can be used to model the small intestine.

This model does not fully represent the structure and functions of the small intestine.

Evaluate the strengths and weaknesses of this model.

(6)

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

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

The function of the gall bladder is to

(1)

☒ **A** make bile

☒ **B** make lipase

☒ **C** store bile

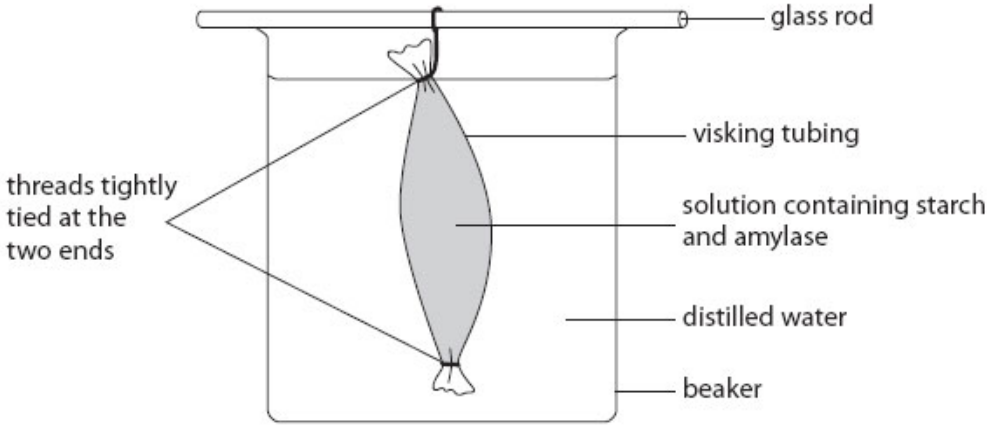
☒ **D** store lipase

(Total for Question = 12 marks)

Q18.

Visking tubing is made of a plastic material through which small molecules can pass.

The diagram shows how the equipment for an investigation using visking tubing was set up.



(a) In this investigation, the concentration of glucose in the distilled water was measured at the start and then every five minutes.

The results are shown in the table.

time of measuring the glucose concentration in the distilled water / mins	concentration of glucose in the distilled water / g cm^{-3}
0	0.00
5	0.07
10	0.39
15	0.52
20	0.79
25	0.79

(i) Describe the results of this investigation.

(2)

.....

.....

.....

.....

(ii) Explain the results of this investigation

(3)

.....

.....

.....

.....

.....

.....

*(iii) The diagram shows how visking tubing can be used to model the small intestine.

This model does not fully represent the structure and functions of the small intestine.

Evaluate the strengths and weaknesses of this model.

(6)

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

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

The function of the gall bladder is to

(1)

☒ **A** make bile

☒ **B** make lipase

☒ **C** store bile

☒ **D** store lipase

(Total for Question = 12 marks)

Q19.

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 1 shows xylem and phloem from the stem of a plant.

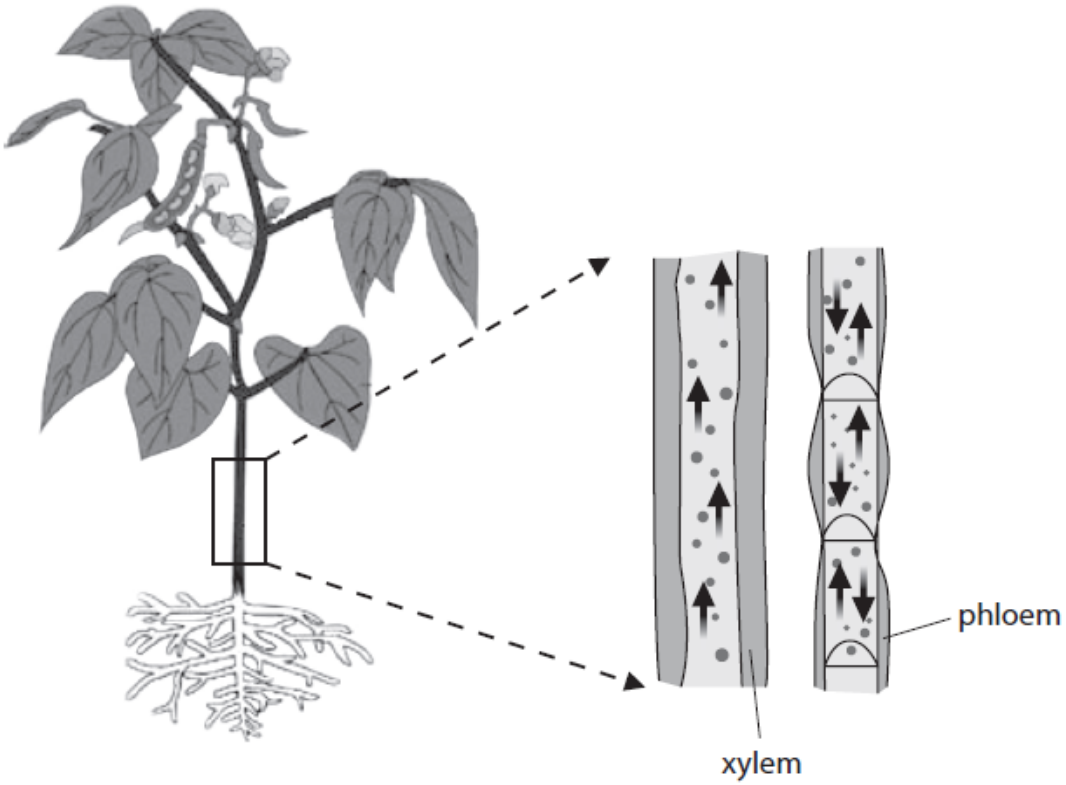


Figure 1

(i) Living cells in phloem use energy to transport sucrose.

Which organelles release energy in living cells?

(1)

☒ **A** vacuoles

☒ **B** mitochondria

☒ **C** nuclei

☒ **D** ribosomes

(ii) Describe **two** features of the structure of xylem vessels that can be seen in Figure 1.

(2)

1 .....

.....

2 .....

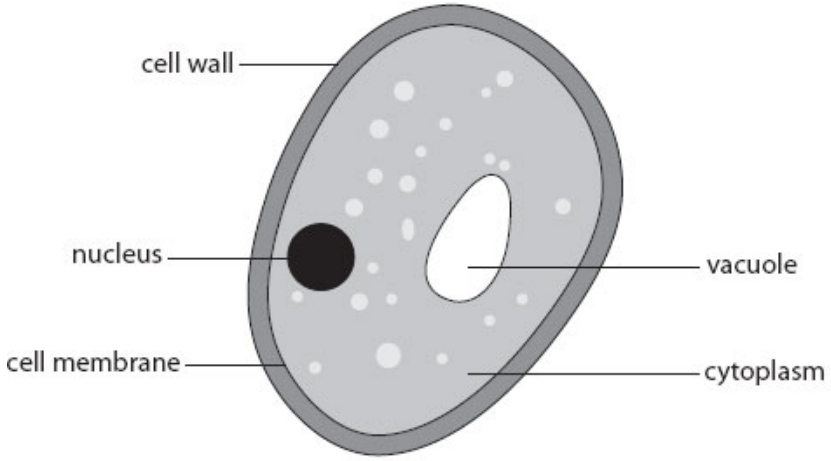
.....

(Total for question = 3 marks)

Q20.

Yeasts are microorganisms that are used in the brewing and baking industries.

The diagram shows a yeast cell.



(i) State **two** ways in which the structure of this yeast cell differs from the structure of a bacterial cell.

(2)

1 .....

.....

2 .....

.....

(ii) Plant cells can produce glucose.

Suggest why yeast cells cannot produce glucose.

(1)

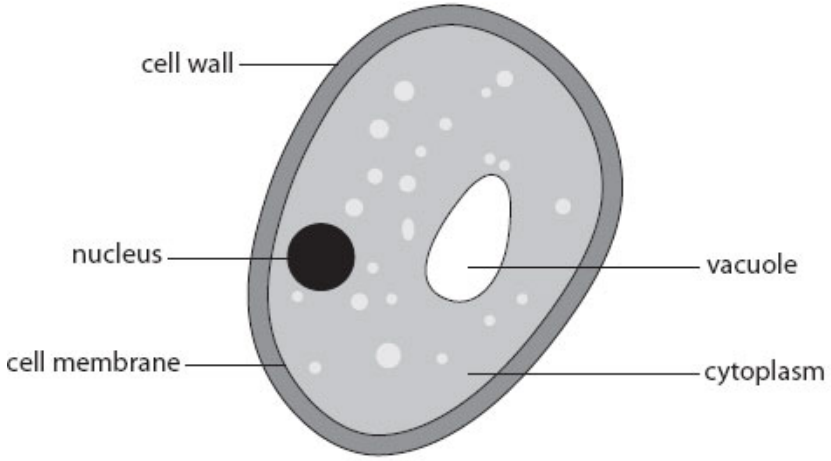
.....

.....

Q21.

Yeasts are microorganisms that are used in the brewing and baking industries.

The diagram shows a yeast cell.



(i) State **two** ways in which the structure of this yeast cell differs from the structure of a bacterial cell.

(2)

1 .....

.....

2 .....

.....

(ii) Plant cells can produce glucose.

Suggest why yeast cells cannot produce glucose.

(1)

.....

.....