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To do this, follow the relevant steps below.

Adobe Reader or Adobe Acrobat

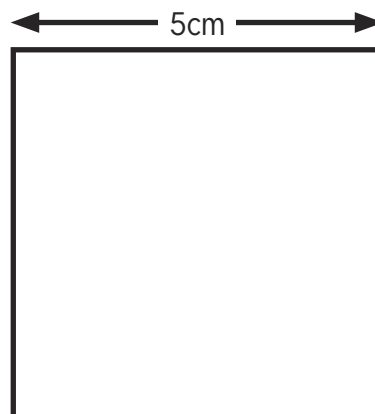
- Adobe Reader is a free PDF viewer, from Adobe. To install a copy of Adobe Reader, go to <https://get.adobe.com/uk/reader/>.
- Once Adobe Reader is installed, open your PDF.
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- Under 'Page Sizing & Handling', select 'Size'.
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Foxit Reader

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Web Browser

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Name:

Edexcel Style

Combined Science GCSE

Key Concepts in Biology

(Levels 4–9)

Date:

Time allowed: 50mins

Question	Links to Student Progress Sheet	Score	Total marks Available
1	1.1 a, c		3
2	1.2		4
3	1.3, 1.4, 1.5a, b		8
4	1.8, 1.7		5
5	1.8, 1.9, 1.10		12
6	1.11		4
7	1.12		4
8	1.15, 1.16, 1.17		10
Total			50

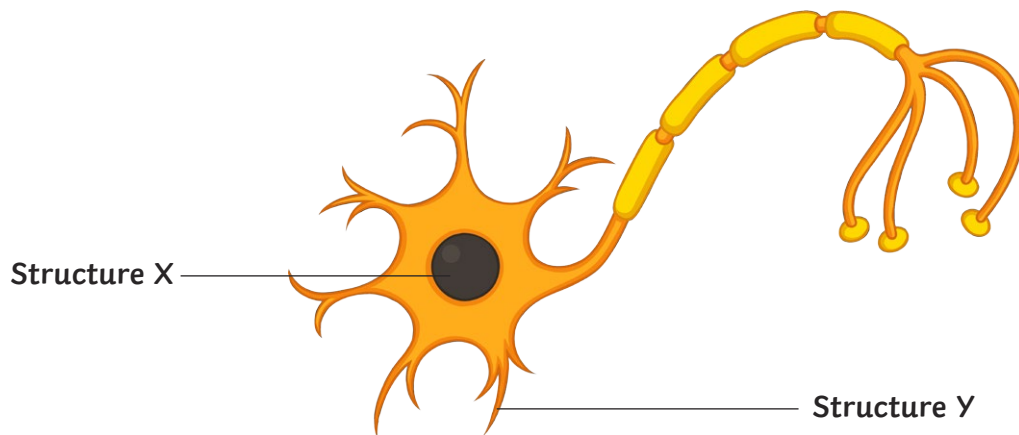
Score	Estimated Grade
47 – 50	9
40 – 46	8
33 – 39	7
28 – 32	6
24 – 27	5
20 – 23	4
0 – 19	U

Please be aware that these grade boundaries are Twinkl's own, and may not be in-line with Edexcel's own.

Area for Improvement:

Cell Structure and Function

1. (a) Neurones are specialised cells in the nervous system.



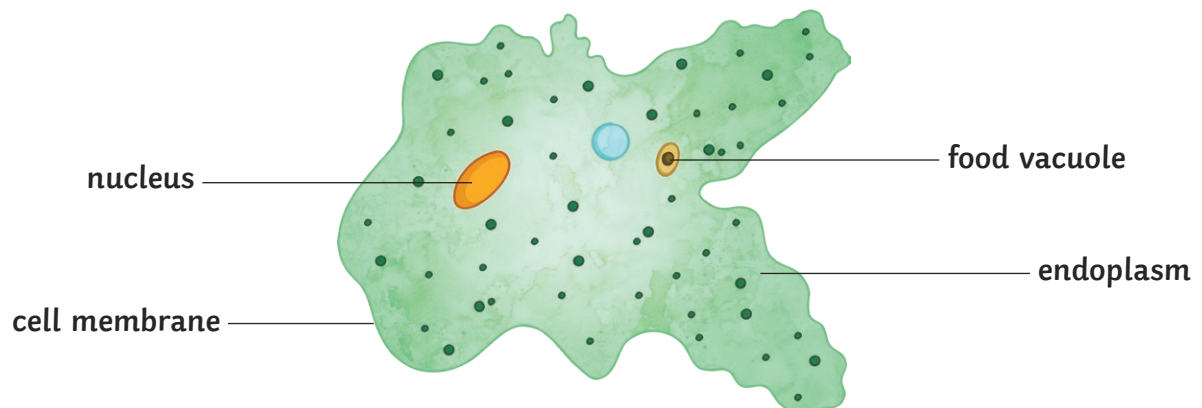
Name structures X and Y on the diagram.

(2)

Structure X: _____

Structure Y: _____

- (b) The diagram below shows an Amoeba.



Which of the structures labelled on the diagram contains the chromosomes of this organism?

Place an X in the box to indicate your answer.

(1)

☐

A nucleus

☐

B cell membrane

☐

C food vacuole

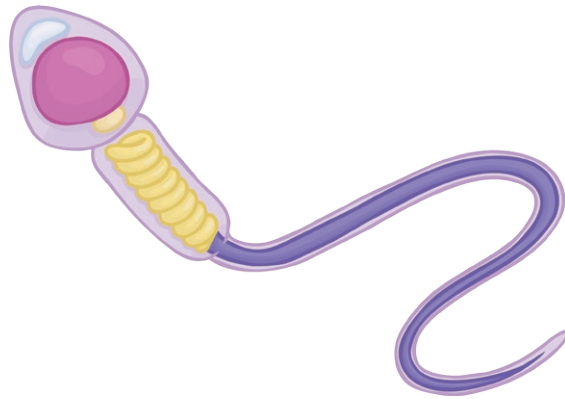
☐

D endoplasm

(Total for Question 1 = 3 marks)

Specialised Cells

2. The diagram below shows a sperm cell.



Name two structures of the sperm cell and explain how these structures adapt the cell to its function.

(4)

Structure: _____

Function: _____

Structure: _____

Function: _____

(Total for Question 2 = 4 marks)

Microscopy

3. (a) The photographs below show three types of microscope.



A



B



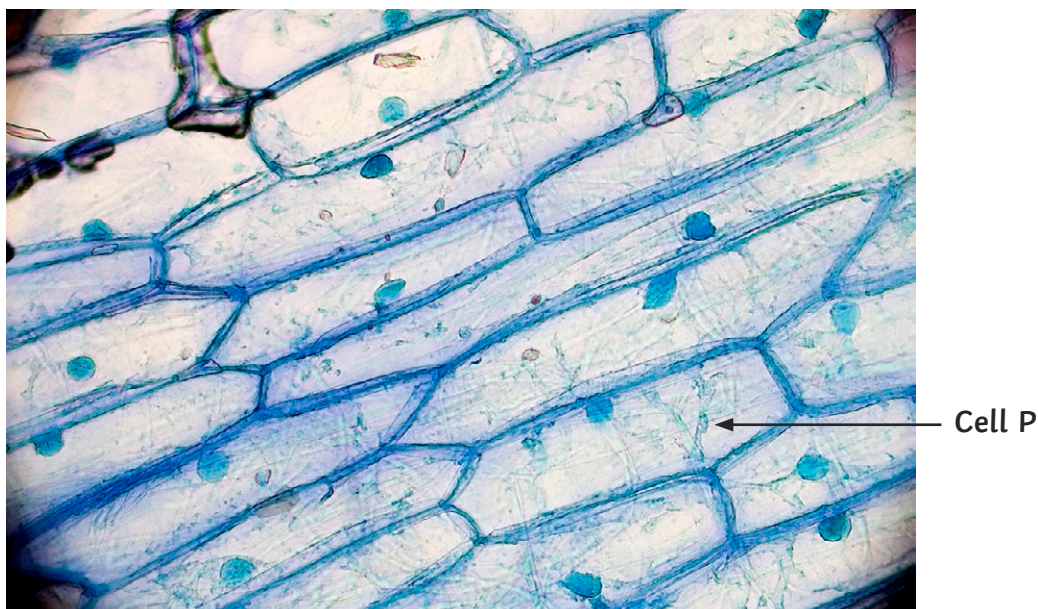
C

Write the letters corresponding to each microscope to place them in order of development, from the earliest to the most modern.

Write the letters into the boxes below:

(2)

early microscope → → modern microscope



(b) The image below shows onion cells as viewed under a light microscope.

The image is viewed at $\times 1200$ magnification.

Use the equation below to calculate the length of the cell labelled P.

Give your answer in μm .

(2)

$$\text{size of object} = \text{size of image} \div \text{magnification}$$

Cell length = _____ μm

(c) Explain how the development and advances in microscope technology have led to better understanding of cell structure and functions.

(4)

(Total for Question 3 = 8 marks)

Enzymes

4. (a) Enzymes can be affected by different factors and this can stop them from functioning correctly.

Which term below describes the change to an enzyme active site?

Place an X in the box to indicate your answer.

(1)

☐

A activation

☐

B catalyst

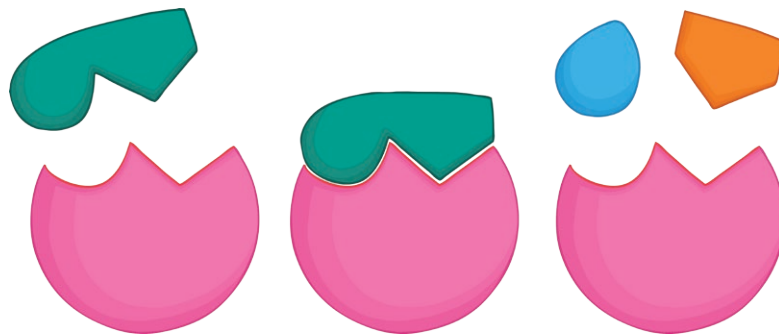
☐

C denature

☐

D evolution

- (b) The diagram below shows a theory of how enzymes work.



Use the diagram above to explain what is meant by 'enzyme specificity'.

(4)

(Total for Question 5 = 5 marks)

5. (a) Write a valid method which describes how to carry out an investigation to observe the effect of pH on enzyme activity.

(6)

- (b) Alice carried out an investigation to observe the effect of pH on enzyme activity.

Her results are shown in the table below.

pH	Change in mass
1	0.3
7	1.8
8	1.9

Give another way this information could be displayed.

(1)

(c) Alice concluded that the optimal pH of the enzyme was 8.

Hamish disagreed; he said that you could not draw a conclusion from Alice's data.

Suggest two ways that Alice could improve her data.

(2)

1. _____

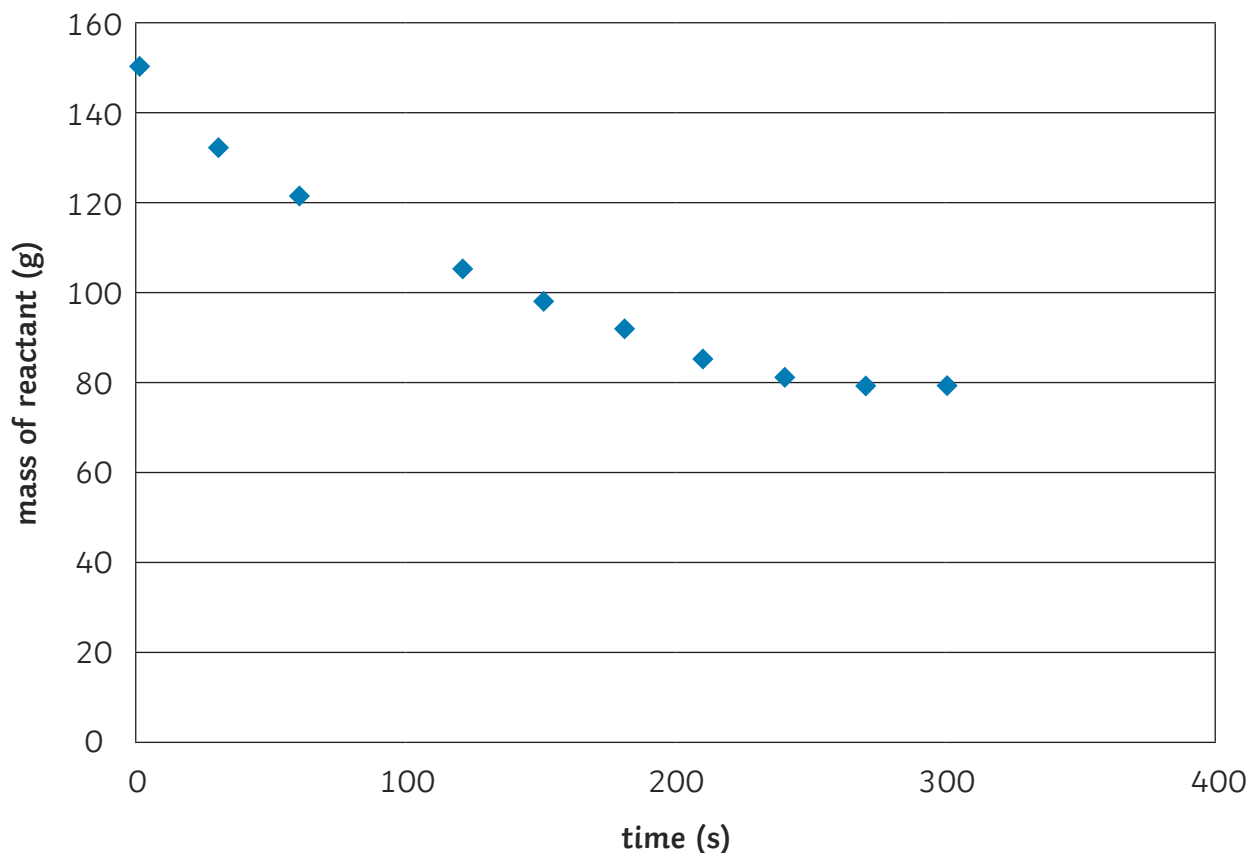
2. _____

(c) Explain how pH affects the rate of an enzyme controlled reaction.

(3)

(Total for Question 5 = 12 marks)

6. (a) The graph below shows the amount of reactant remaining in a reaction, against the time in seconds.



Looking at the graph, what is the mostly likely amount of reactant remaining at 90 seconds?

Place an X in the box to indicate your answer.

(1)

☐ **A** 120g

☐ **B** 110g

☐ **C** 100g

☐ **D** 90g

- (b) What does the graph tell you about the rate of reaction between 240 and 300 seconds?

(1)

(c) Use the graph to calculate the mean rate of reaction at 30 seconds.

Show your working.

(2)

Rate of reaction = _____ g/s

(Total for Question 6 = 5 marks)

7. (a) What name is given to a biological catalyst which works in the human body?

Place an X in the box to indicate your answer.

(1)

☐

A substrate

☐

B enzyme

☐

C metabolic

☐

D organism

(b) Complete the table below to show how these substances can be used to join smaller units into larger nutrients in the human body.

(3)

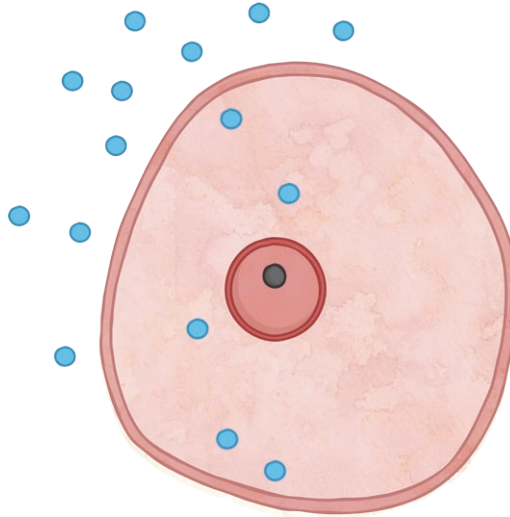
Small units	Nutrient
	Carbohydrate
Amino acids	
	Lipids

(Total for Question 7 = 4 marks)

8. (a) Below is a diagram of a simple cell. Substance X is shown by shaded circles.

Draw an arrow on the diagram to show whether the particles of substance X will move into or move out of the cell.

(1)



- (b) Explain why substance X moves in the direction you have shown in your answer to 8a.

(2)

- (c) What is osmosis?

Tick one box to select your answer.

(1)

- | | | |
|----------|---|--------------------------|
| A | The movement of sugar from a high concentration to a low concentration, through a partially permeable membrane. | ☐ |
| B | The movement of sugar from a low concentration to a high concentration, through a partially permeable membrane. | ☐ |
| C | The movement of water from a high concentration to a low concentration, through a partially permeable membrane. | ☐ |
| D | The movement of water from a low concentration to a high concentration, through a partially permeable membrane. | ☐ |

(d) The table below compares diffusion, osmosis and active transport.

Complete the table by drawing a tick (✓) or a cross (✗) into each box.

(4)

	Diffusion	Osmosis	Active Transport
Substances move down a concentration gradient			
Substance move against a concentration gradient			
Energy is required			
Dissolved solutes are moved			

- (e) Stephen and Kyra carried out an investigation to observe the effect of sucrose solution on the mass of potato cylinders.

Their results are shown in the table below.

% sucrose solution	Start mass (g)	Final mass (g)	% change in mass
20	55.3	68.4	23.69 %
40	60.9	56.1	-7.88 %
60	56.2	48.3	-14.06 %
80	59.1	45.6	-22.84%
100	61.3	47.2	

Complete the table by calculating the percentage change of mass in the potato cylinder placed in 100% sucrose solution.

You may use the space below for any working out.

(2)

(Total for Question 8 = 10 marks)

TOTAL FOR PAPER = 50 MARKS