Write your name, centre number and candidate number in the boxes below.

Surname	Other names

Centre number | | | | | |

Candidate number | | | | |

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Cells

Time allowed: 40 minutes

Subject code **0610**

Biology

Questions from Paper 1, Paper 2, Paper 3 and Paper 4

You must have: a ruler marked in centimetres and millimetres, a protractor, compasses, a pen, an HB pencil and an eraser.

Total marks

/ 40

Instructions

- Answer every question in the space provided on this paper.
- Write in black or dark blue ink. Pencil may be used for diagrams and graphs.
- Fill in your name, centre number and candidate number above.
- Show your working: a correct method can earn marks even if the answer is wrong.

Information

- This paper has 10 questions worth 40 marks in total.
- The marks for each question or part are shown in brackets, for example [3].

Advice

- Read every question through once before you write anything.
- Use the marks in brackets to judge how long to spend on each part.
- If you finish early, go back and check your working.

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Print at 100% (Actual size) so diagrams keep their real measurements.

1 What is the function of ciliated cells in the bronchi?

A to absorb oxygen

B to digest pathogens

C to move mucus

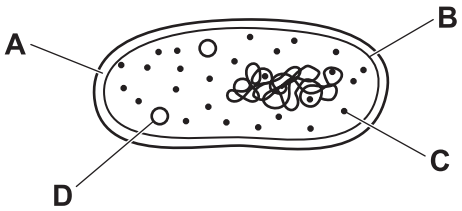
D to produce antibodies

Specialised cells, tissues and organs Click for more variations

Answer C

2 The diagram shows a bacterial cell.

Which cell structure is useful in genetic modification?

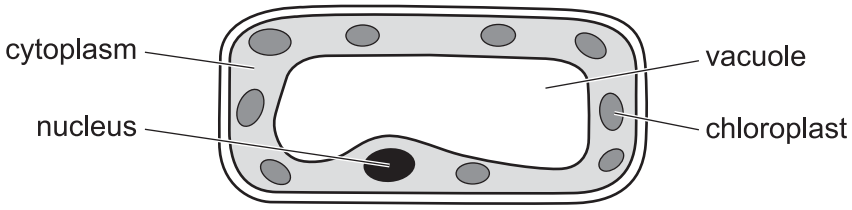


Biotechnology: bacteria, yeast, enzymes and fermenters Click for more variations

Answer D

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3 The diagram shows a type of plant cell.



In which tissue is this cell found?

A leaf epidermis

B palisade mesophyll

C root epidermis

D xylem

Cell structure: plant, animal and bacterial cells Click for more variations

Answer B

4 The image shows a single-celled organism called a *Paramecium*.



The length of the *Paramecium* in the image is 6 cm. The magnification is ×400.

Which calculation will give the correct actual length of the *Paramecium*, in mm?

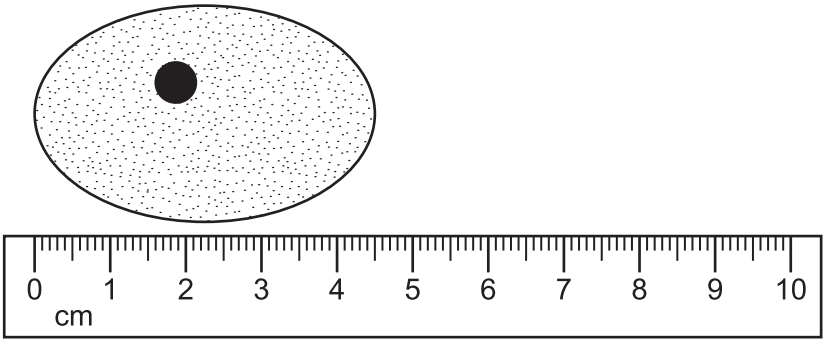
A $\frac{6 \times 10}{400}$ **B** $\frac{6 \times 1000}{400}$ **C** $\frac{400 \times 10}{6}$ **D** $\frac{400}{6 \times 1000}$

Magnification and size of specimens Click for more variations

Answer A

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5 The diagram shows a cell at ×1500 magnification.



What is the actual size of the cell?

A 0.003 mm **B** 0.03 mm **C** 33 mm **D** 333 mm

Magnification and size of specimens Click for more variations

Answer B

6 The table shows the percentage of sperm with different abnormalities in samples from a person with normal fertility and two people with low fertility.

	person with normal fertility	person P with low fertility	person Q with low fertility
percentage of sperm with no acrosome	2	25	2
percentage of sperm with deformed flagellum	11	11	35
percentage of sperm with few mitochondria	4	4	30

What are the causes of low fertility in person P and person Q?

	person P	person Q
A	too many sperm cannot digest jelly coat of egg cell	too many sperm cannot digest jelly coat of egg cell
B	too many sperm cannot digest jelly coat of egg cell	too many sperm cannot move to oviduct
C	too many sperm cannot move to oviduct	too many sperm cannot digest jelly coat of egg cell
D	too many sperm cannot move to oviduct	too many sperm cannot move to oviduct

Specialised cells, tissues and organs Click for more variations

Answer B

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7 **(a)** Fig. 4.1 is a diagram of a plant cell.

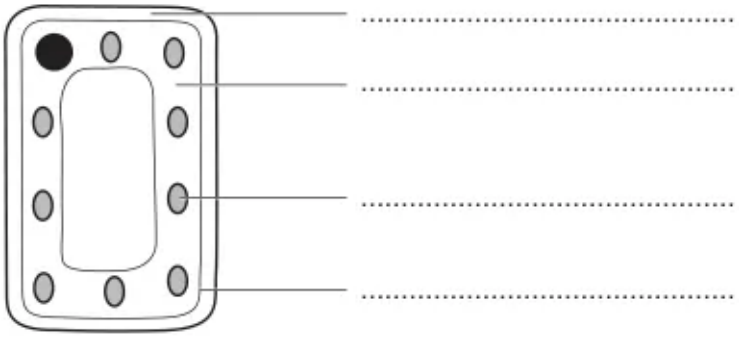


Fig. 4.1

Identify the parts of the plant cell in Fig. 4.1 by labelling them in the spaces provided, using words from the list.

cell membrane	**cell wall**	**chloroplast**
cytoplasm	**nucleus**	**vacuole**

[4]

(b) The boxes on the left show parts of a plant cell.

The boxes on the right show the functions of the parts.

Draw lines to link each part with its function. Draw **four** lines.

part	function
	contains the genetic material
cell wall	
	filled with sap and supports the plant cell
chloroplast	
	made of cellulose and strengthens the plant cell
nucleus	
	site of photosynthesis
vacuole	
	site of respiration

[4]

(c) Xylem is a specialised plant tissue.

State **two** functions of xylem tissue.

1 .....

2 .....

[2]

(d) Plant shoots and roots respond to stimuli.

Fig. 4.2 is a photograph of a plant that has been grown in the dark.

The plant has been grown with the pot in this position and is showing a tropic response to this stimulus.



Fig. 4.2

(i) State the name of the tropic response shown in Fig. 4.2.

..... [1]

(ii) Describe how the roots would respond to the same stimulus.

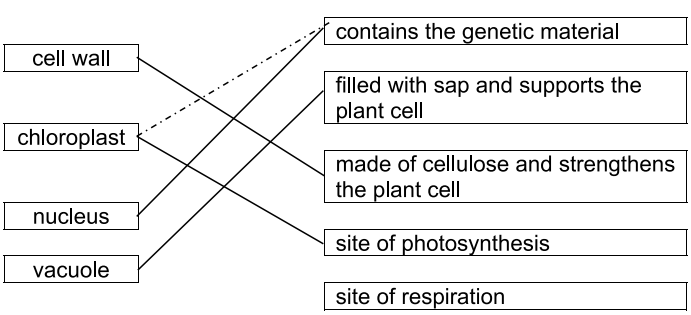
.....

.....

..... [1]

[Total: 12]

Cell structure: plant, animal and bacterial cells Click for more variations

7(a)	*plant cell labelled from top to bottom:* cell wall ; cytoplasm ; chloroplast ; cell membrane ;	**4**	
7(b)	**part** **funtion**  ;;;;	**4**	one mark per part **A** line between chloroplast and contains the genetic material **R** other additional lines
7(c)	conduction / transport / transfer of, water / mineral ions ; support ;	**2**	
7(d)(i)	gravitropism ;	**1**	
7(d)(ii)	roots would grow downwards / **AW** ;	**1**	

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8 Fig. 5.1 is a photomicrograph of a structure found in animal and plant cells.



Fig. 5.1

(a) State the name and function of the cell structure labelled **A** in Fig. 5.1.

name .....

function .....

.....

[2]

(b) State the **two** pieces of information needed to calculate the actual length of cell structure **A** in Fig. 5.1.

1 .....

2 .....

[1]

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(c) The actual length of cell structure **A** is 0.000 75 mm.

Convert this value to micrometres (μm).

.....μm [1]

[Total: 4]

Cell structure: plant, animal and bacterial cells Click for more variations

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8(a)	mitochondrion ; (aerobic) respiration ;	**2**	**A** release energy **A** cytoplasm for MP1 with correct function for MP2 i.e. allows / location of, (biochemical / metabolic) reactions / cell processes **ecf** MP2 from incorrect structure in MP1
8(b)	length of the (cell structure), in image / picture / photomicrograph / diagram and magnification ;	**1**	
8(c)	0.75 (μm) ;	**1**	**A** 7.5×10^{-1}

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9 **(a)** Fig. 6.1 is a diagram of a spongy mesophyll cell.

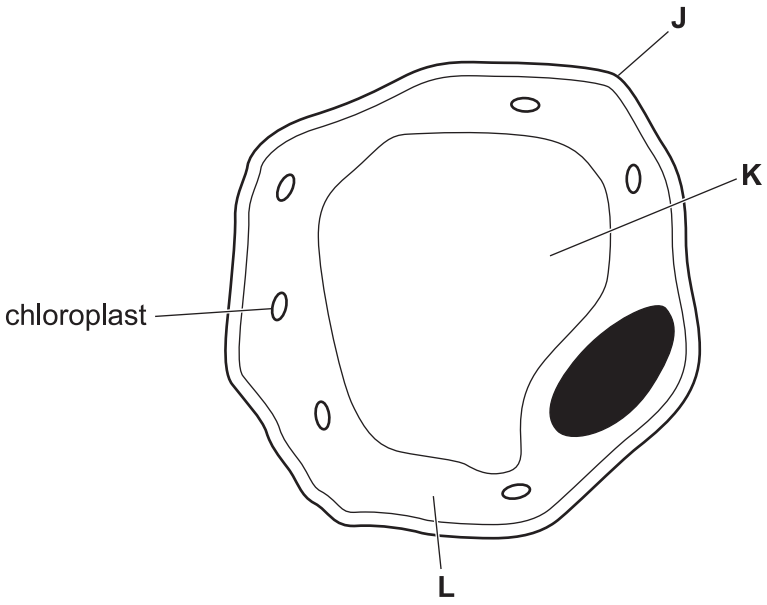


Fig. 6.1

(i) State the name of the organ that contains spongy mesophyll cells.

..... [1]

(ii) State the names of structures **J**, **K** and **L** in Fig. 6.1.

J .....

K .....

L .....

[3]

(iii) Describe **one** function of the nucleus.

.....

.....

..... [1]

(iv) Draw an **M** on Fig. 6.1 to show where mitochondria are found. [1]

(v) State the function of mitochondria.

.....

..... [1]

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(b) Explain how the spongy mesophyll **tissue** is adapted for photosynthesis.

.....

.....

.....

.....

.....

.....

..... [3]

[Total: 10]

Cell structure: plant, animal and bacterial cells Click for more variations

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9(a)(i)	leaf / leaves ;	1	
9(a)(ii)	**J** cell wall ; **K** vacuole ; **L** cytoplasm ;	3	
9(a)(iii)	*any one from:* contain the, genetic material / DNA / chromosomes / genes / alleles ; *idea of* controls (activities of) the cell ;	1	
9(a)(iv)	**M** drawn in cytoplasm ;	1	
9(a)(v)	(site of aerobic) respiration / release of energy ;	1	
9(b)	*any three from:* contains, chloroplasts / chlorophyll, which absorbs light (energy) / AW ; cells have an irregular shape ; large(r)surface area ; (spongy mesophyll) tissue / cells, loosely packed ; creates (air) spaces ; ref. to diffusion of carbon dioxide ; ref. to gas exchange ; ref. to vascular bundles ;	3	

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10 Fig. 1.1 shows some cells from the lining of the trachea.

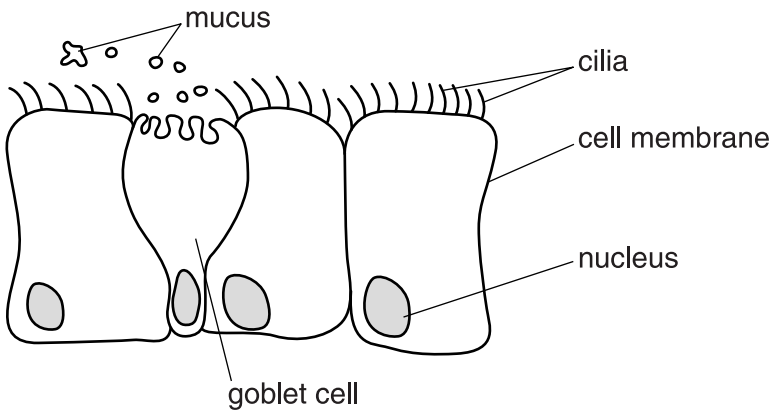


Fig. 1.1

(a) Describe the functions of the nucleus and cell membrane.

nucleus .....

.....

cell membrane .....

.....

.....

.....

[4]

(b) The cells in Fig. 1.1 form a tissue.

Define the term *tissue*.

.....

..... [1]

(c) The goblet cell secretes mucus.

Describe the role of mucus and cilia in the trachea.

.....

.....

.....

.....

.....

..... [3]

[Total: 8]

Cell structure: plant, animal and bacterial cells Click for more variations

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10 (a)	nucleus: **1** controls (activities in) the cell / AW; **2** contains, chromosomes / genes / alleles / genetic information / DNA; **3** controls how cells, develop / divide / reproduce / grow; **4** cell membrane: **5** forms a barrier / separates a cell from surroundings; **6** allows / controls, movement of (named) substance(s), across / in / out; keeps contents of cell inside / keeps cytoplasm intact / AW;	**max 4**	**I** 'brain' of cell / 'tells cell what to do' **MP1 A** ref to making proteins **A** makes ribosomes e.g. O_2 / CO_2 / nutrients **I** ref to shape / 'covers cell' / protects cell
(b)	a group of cells, same type / do the same function;	**1**	cells are in the same place = group
(c)	**1** mucus traps, particles / any example; **2** mucus protects lining; **3** (cilia) beat / create wave motion / wafting; **4** move, mucus / fluid away; **5** reduce risk of / stop, (named) pathogens entering lungs;	**max 3**	e.g. dust / bacteria / spores / virus **I** 'collects' particles
		[Total: 8]	

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