# Exampro GCSE Biology

## B2.1 Cells

Foundation tier

Name:

Class:

Author:

Date:

Time: 81

Marks: 81

Comments:

**Q1.** Diabetes is a disease in which the concentration of glucose in a person's blood may rise to fatally high levels.
Insulin controls the concentration of glucose in the blood.

(a) Where is insulin produced?

Draw a ring around **one** answer.

**gall bladder** **liver** **pancreas**

**(1)**

(b) People with diabetes may control their blood glucose by injecting insulin.

(i) If insulin is taken by mouth, it is digested in the stomach.

What type of substance is insulin?

Draw a ring around **one** answer.

**carbohydrate** **fat** **protein**

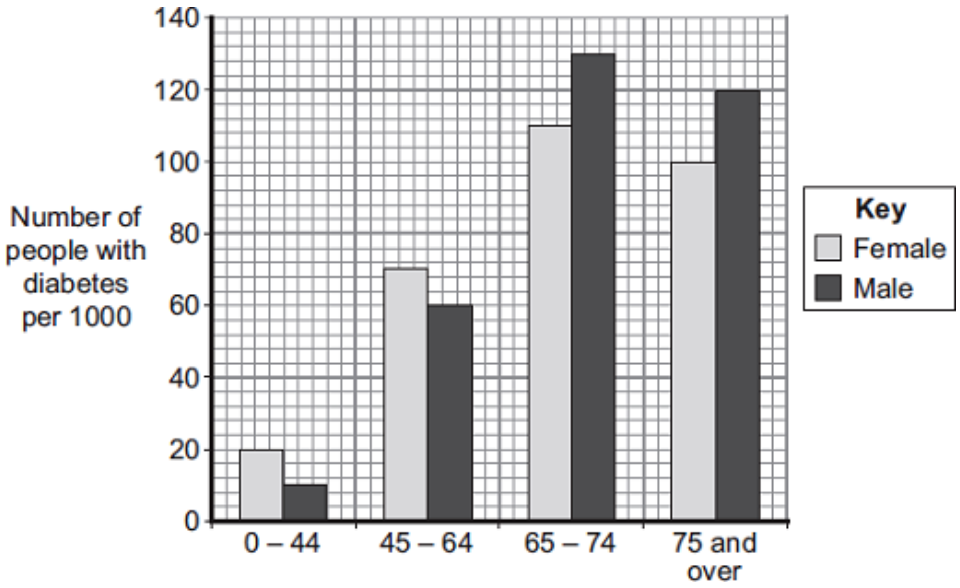
**(1)**

(ii) Apart from using insulin, give **one** other way people with diabetes may reduce their blood glucose.

.....

**(1)**

(c) The bar chart shows the number of people with diabetes in different age groups in the UK.




(i) Describe how the number of males with diabetes changes between the ages of 0 – 44 years and 75 years and over.

.....

.....

.....

.....

.....

.....

.....

.....

**(3)**

(ii) Compare the number of males and females with diabetes:

between the ages of 0 and 64 years

.....

.....

.....

over the age of 65 years.

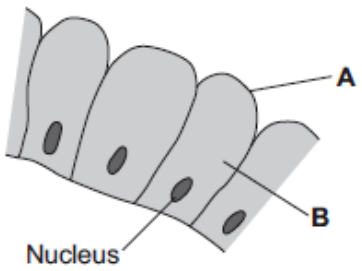
.....

.....

.....

**(2)**
**(Total 8 marks)**

**Q2.** The image below shows some cells in the lining of the stomach.




(a) (i) Use words from the box to name structures **A** and **B**.

| | | | |
|---|---|---|---|
| **cell membrane** | **chloroplast** | **cytoplasm** | **vacuole** |

**A** .....

**B** .....

**(2)**

(ii) What is the function of the nucleus?

Tick (✓) **one** box.

To control the activities of the cell ☐

To control movement of substances into and out of the cell ☐

To release energy in respiration ☐

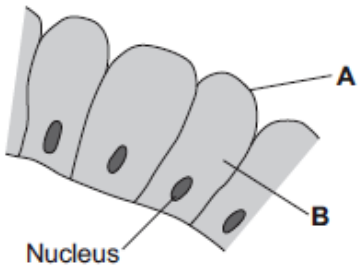
**(1)**

(b) Draw **one** line from each part of the human body to its correct scientific name.

| Part of human body | Scientific name |
|---|---|
| Layer of cells lining the stomach | An organ |
| Stomach | An organism |
| Mouth, stomach, intestines, liver and pancreas | An organ system |
| | A tissue |

**(3)**
**(Total 6 marks)**

**Q3.** The image below shows some cells in the lining of the stomach.




(a) (i) Use words from the box to name structures **A** and **B**.

| | | | |
|---|---|---|---|
| **cell membrane** | **chloroplast** | **cytoplasm** | **vacuole** |

**A** .....

**B** .....

**(2)**

(ii) What is the function of the nucleus?

Tick (✓) **one** box.

To control the activities of the cell ☐

To control movement of substances into and out of the cell ☐

To release energy in respiration ☐

**(1)**

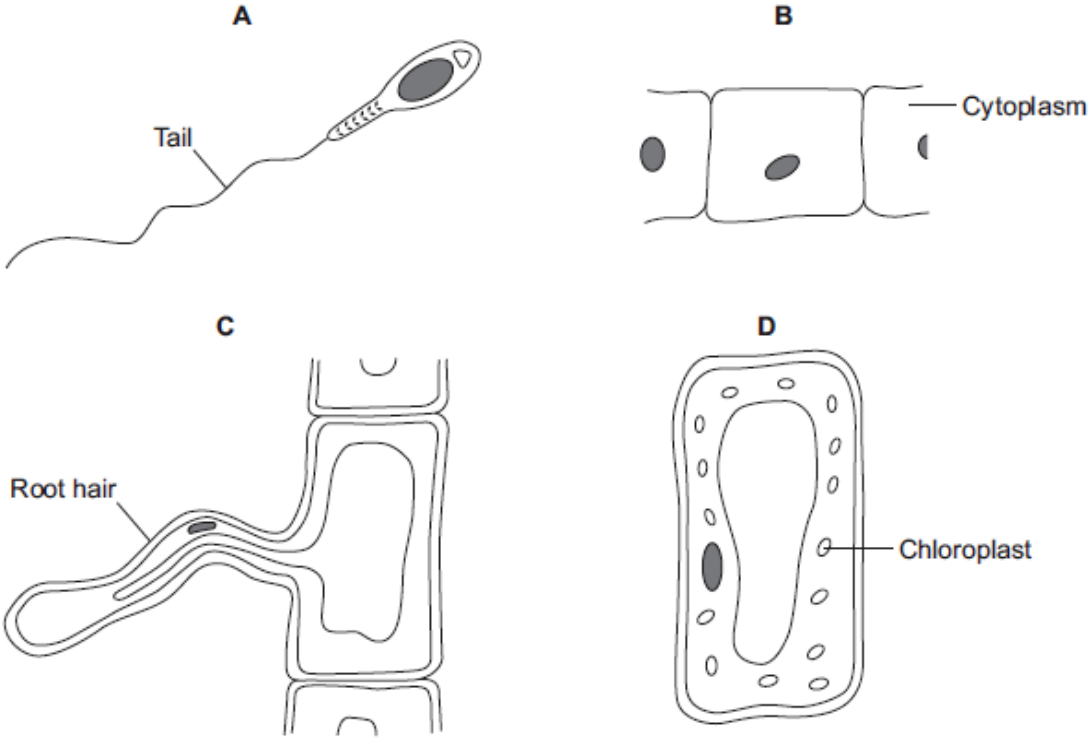
(b) Draw **one** line from each part of the human body to its correct scientific name.

| **Part of human body** | **Scientific name** |
|---|---|
| Layer of cells lining the stomach | An organ |
| Stomach | An organism |
| Mouth, stomach, intestines, liver and pancreas | An organ system |
| | A tissue |

**(3)**

**(Total 6 marks)**

**Q4.** The diagrams show four types of cell, **A**, **B**, **C** and **D**.
Two of the cells are plant cells and two are animal cells.




(a) (i) Which **two** of the cells are plant cells?

Tick (✓) **one** box.

**A** and **B** ☐

**A** and **D** ☐

**C** and **D** ☐

**(1)**

(ii) Give **one** reason for your answer.

.....

.....

**(1)**

(b) (i) Which cell, **A**, **B**, **C** or **D**, is adapted for swimming? ☐

**(1)**

(ii) Which cell, **A**, **B**, **C** or **D**, can produce glucose by photosynthesis? ☐

**(1)**

(c) Cells **A**, **B**, **C** and **D** all use oxygen.

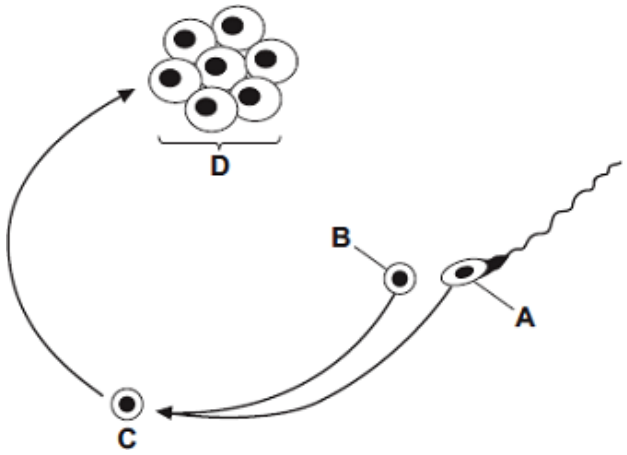
For what process do cells use oxygen?

Draw a ring around **one** answer.

**osmosis** **photosynthesis** **respiration**

**(1)**
**(Total 5 marks)**

**Q5.** The diagram shows some of the stages in IVF (in vitro fertilisation).




(a) Use words from the box to name structures **A**, **B**, **C** and **D**.

| | | | | |
|---|---|---|---|---|
| **egg** | **embryo** | **fertilised egg** | **ovary** | **sperm** |

Structure **A** .....

Structure **B** .....

Structure **C** .....

Structure **D** .....

**(4)**

(b) What do doctors do next with structure **D**?

.....

.....

.....

.....

**(2)**

(c) The table gives statistics for an IVF clinic.

| | Age of women treated | | | |
|---|---|---|---|---|
| | **Below 35 years** | **35 – 37 years** | **38 – 39 years** | **40 – 42 years** |
| Number of women treated | 414 | 207 | 106 | 53 |
| Number of women who produced one baby | 90 | 43 | 17 | 1 |
| Number of women who produced twins | 24 | 8 | 4 | 1 |
| Number of women who produced triplets | 1 | 0 | 0 | 0 |

(i) About what proportion of the treated women aged 35 – 37 years produced one or more babies?

Draw a ring around your answer.

**one quarter** **one third** **half**

**(1)**

(ii) This clinic does **not** give IVF treatment to women over 42 years of age.

Use data from the table to explain why.

.....

.....

.....

.....

**(2)**

(iii) The committee which regulates IVF treatment now advises that only one embryo is used in each treatment.

Suggest **one** reason for this.

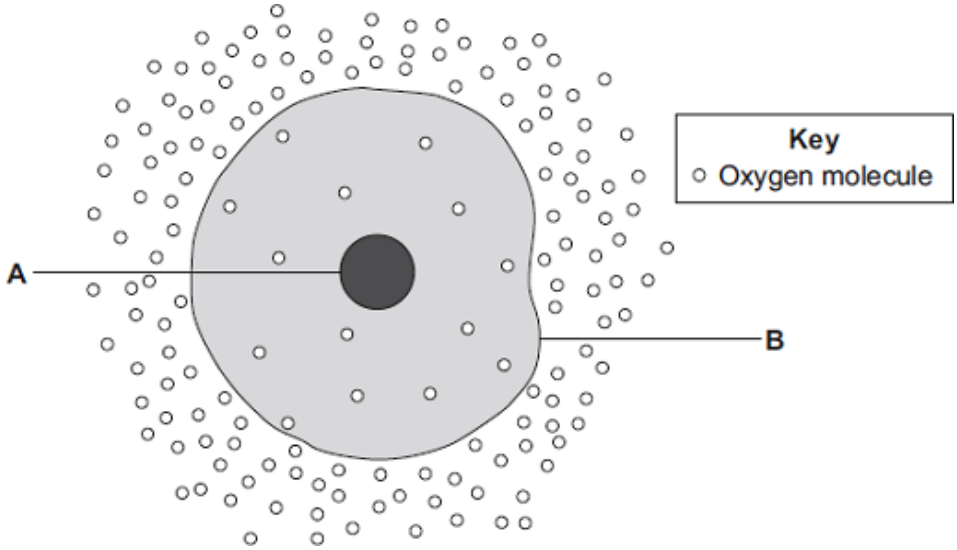
.....

.....

**(1)**

**(Total 10 marks)**

**Q6.** The diagram shows a cell.




(a) (i) Use words from the box to name the structures labelled **A** and **B** .

| | | | |
|---|---|---|---|
| cell membrane | chloroplast | cytoplasm | nucleus |

**A** .....

**B** .....

**(2)**

(ii) The cell in the diagram is an animal cell.

How can you tell it is an animal cell and **not** a plant cell?

Give **two** reasons.

1 .....

.....

2 .....

.....

**(2)**

(b) Oxygen will diffuse into the cell in the diagram.

Why?

Use information from the diagram.

.....

.....

**(1)**

(c) The cell shown in the diagram is usually found with similar cells.

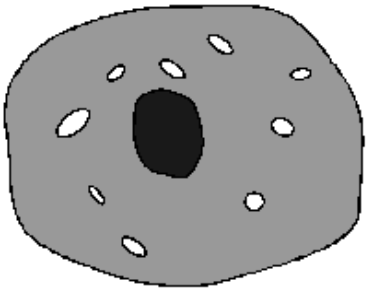
Draw a ring around the correct answer to complete the sentence.

Scientists call a group of similar cells

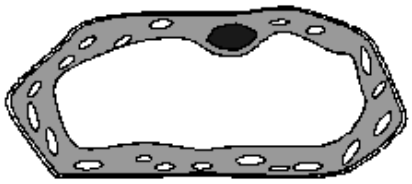
| |
|---|
| an organ. |
| a system. |
| a tissue. |

**(1)**
**(Total 6 marks)**

**Q7.** The diagrams show a cheek cell from a human and a leaf cell from a plant.



Cheek cell



Leaf cell

(a) The two cells have a number of parts in common.

(i) On the cheek cell, label **three** of these parts which both cells have.

**(3)**

(ii) In the table, write the names of the **three** parts you have labelled above and describe the main function of each part.

| Part | Function |
|---|---|
| ..... | |
| ..... | |
| ..... | |

**(3)**

(b) Blood contains white cells and red cells. State the function of each type of cell in the blood.

White cells .....

.....

Red cells .....

.....

**(2)**

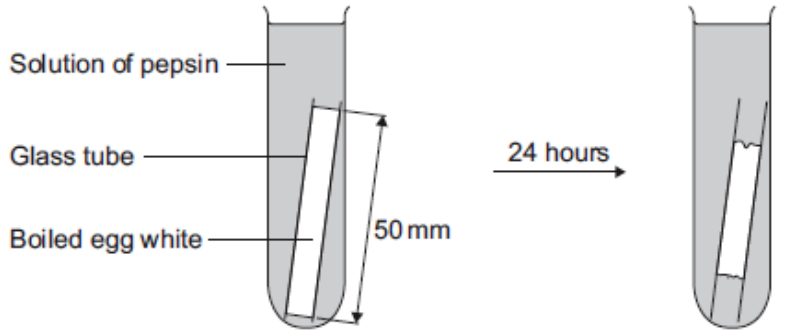
**(Total 8 marks)**

**Q8.** Some students investigated the effect of pH on the digestion of boiled egg white by an enzyme called pepsin. Egg white contains protein.

The students:

- put a glass tube containing boiled egg white into a test tube
- added a solution containing pepsin at pH 7
- set up six more tubes with solutions of pepsin at different pH values
- left the test tubes for 24 hours at room temperature.

The image below shows one of the test tubes, at the start and at the end of the 24 hours.




(a) (i) Name the product of protein digestion.

.....

**(1)**

(ii) What type of enzyme digests protein?

Tick (✓) **one** box.

amylase ☐

lipase ☐

protease ☐

**(1)**

(b) The egg white in each tube was 50 mm long at the start of the investigation.
The table below shows the students' results.

| pH | Length in mm of boiled egg white after 24 hours |
|---|---|
| 1 | 38 |
| 2 | 20 |
| 3 | 34 |
| 4 | 45 |
| 5 | 50 |
| 6 | 50 |
| 7 | 50 |

(i) At which pH did the pepsin work best?

pH .....

**(1)**

(ii) The answer you gave in part **(b)(i)** may not be the exact pH at which pepsin works best.

What could the students do to find a more accurate value for this pH?

.....

.....

.....

.....

**(2)**

(iii) There was no change in the length of the egg white from pH 5 to pH 7.

Explain why.

.....

.....

.....

.....

**(2)**

(c) Pepsin is made by the stomach.

Name the acid made by the stomach which allows pepsin to work well.

.....

**(1)**

**(Total 8 marks)**

**Q9.** (a) Balance the following equation for photosynthesis.

..... $CO_2$ + ..... $H_2O$ → $C_6H_{12}O_6$ + ..... $O_2$

**(1)**

(b) Give **two** conditions necessary for photosynthesis apart from a suitable temperature range and the availability of water and carbon dioxide.

1. .....

2. .....

**(2)**

(a) Plants have leaves which contain guard cells and palisade cells. Explain how **each** of these kinds of cell assists photosynthesis.

**Guard** cells .....

.....

.....

.....

**(2)**

**Palisade** cells .....

.....

.....

.....

**(2)**

(d) Glucose is a product of photosynthesis. Give **three** uses which green plants make of glucose.

1. .....

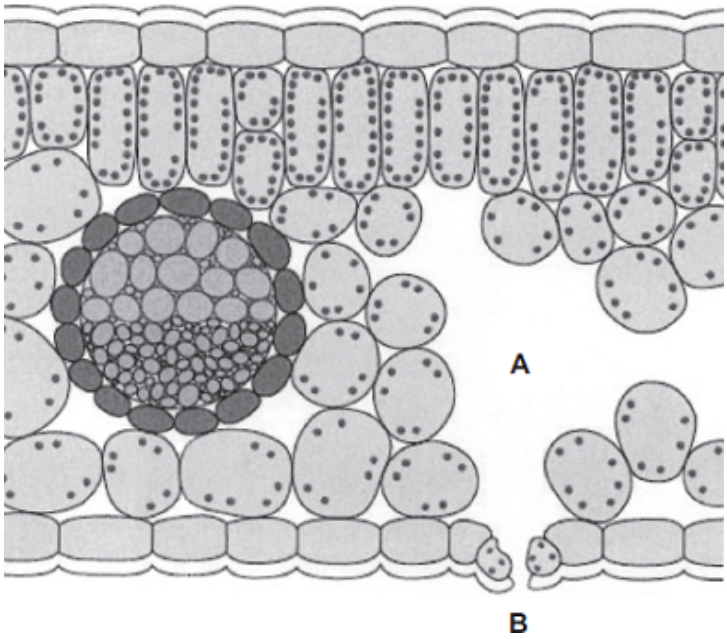
2. .....

3. .....

**(3)**

**(Total 10 marks)**

**Q10.** The diagram shows a section through a plant leaf.




(a) Use words from the box to name **two** tissues in the leaf that transport substances around the plant.

| | | | |
|---|---|---|---|
| **epidermis** | **mesophyll** | **phloem** | **xylem** |

..... and .....

**(1)**

(b) Gases *diffuse* between the leaf and the surrounding air.

(i) What is *diffusion*?

.....

.....

.....

.....

**(2)**

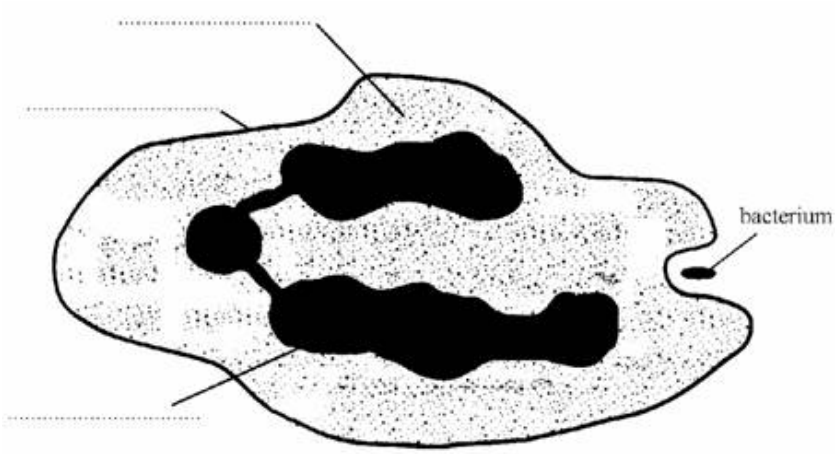
(ii) Name **one** gas that will diffuse from point **A** to point **B** on the diagram on a sunny day.

.....

**(1)**

**(Total 4 marks)**

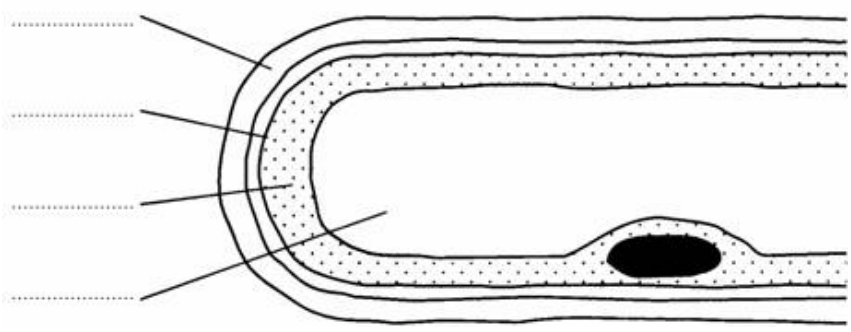
**Q11.** The drawing shows a white blood cell ingesting a bacterium.




Label the parts of the white blood cell.

**(Total 3 marks)**

**Q12.** The drawing shows part of a root hair cell.

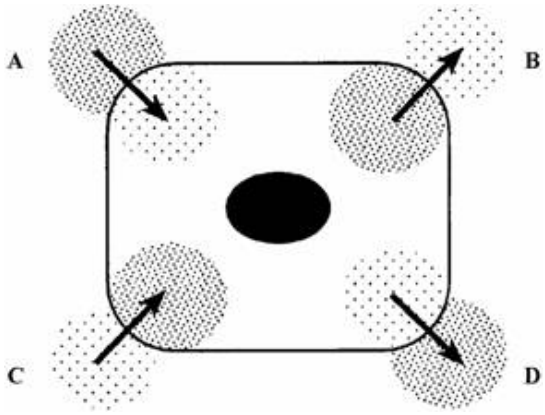


(a) Use words from the list to label the parts of the root hair cell.

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

**(4)**

(b) The diagram shows four ways in which molecules may move into and out of a cell. The dots show the concentration of molecules.




The cell is respiring aerobically.
Which arrow, **A**, **B**, **C** or **D** represents:

(i) movement of oxygen molecules; .....

(ii) movement of carbon dioxide molecules? .....

**(2)**

(c) Name the process by which these gases move into and out of the cell.

.....

**(1)**
**(Total 7 marks)**

**M1.** (a) pancreas

*apply list principle*

**1**

(b) (i) protein

*apply list principle*

**1**

(ii) any **one** from:

- (controlling / changing) diet
  *accept sugar(y foods) / named eg*
  *ignore references to starch / fat / protein / fibre*
- exercise
  *accept example, eg go for a run*
- pancreas transplant
  *accept named drug eg metformin*

**1**

(c) (i) increase

*ignore reference to women*

**1**

then fall

**1**

relevant data quote (for male)

*eg max at ages 65–74* ***or*** *starts at 10 (per thousand)* ***or*** *max at 130 (per thousand)* ***or*** *ends at 120 (per thousand)*

*accept a difference between any pairs of numbers in data set*

*accept quotes from scale eg '130' or '130 per thousand' but* ***not*** *'130 thousand'; to within accuracy of +/- 2 (per thousand)*

**1**

(ii) (between 0 and 64) more females (than males) **or** less males (than females)

*ignore numbers*

*allow eg females more diabetic than males*

**1**

(over 65) more males (than females) or less females (than males)

*allow eg males more diabetic than females*

**1**

**[8]**

**M2.** (a) (i) A = (cell) membrane

**1**

B = cytoplasm

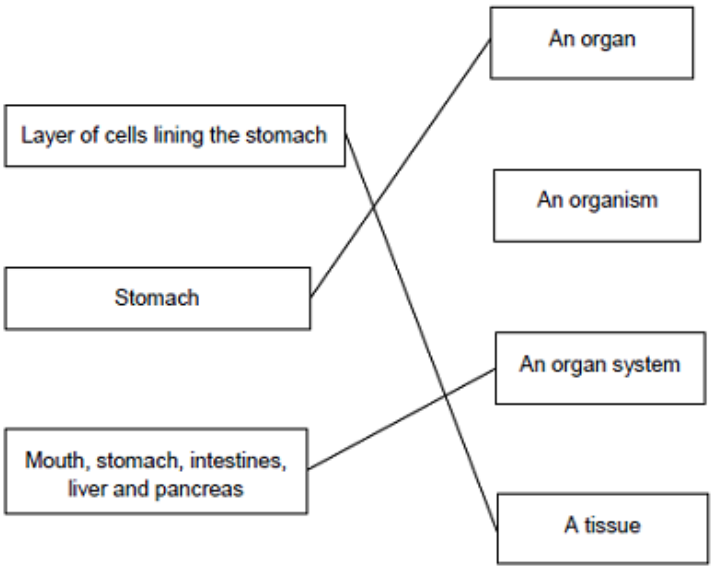
*do* ***not*** *accept cytoplast*

**1**

(ii) To control the activities of the cell

1

(b)




extra lines cancel

3

**[6]**

**M3.** (a) (i) A = (cell) membrane

1

B = cytoplasm

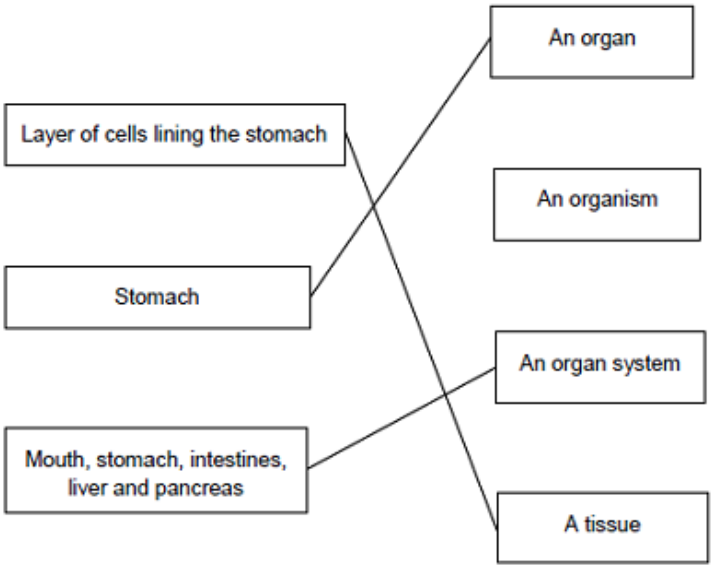
*do **not** accept cytoplast*

1

(ii) To control the activities of the cell

1

(b)




extra lines cancel

3

**[6]**

**M4.** (a) (i) **C** and **D**

*no mark if more than one box is ticked*

1

(ii) any **one** from:

*do **not** allow if other cell parts are given in a list*

- (have) cell wall(s)
- (have) vacuole(s)

1

(b) (i) **A**

*apply list principle*

1

(ii) **D**

*apply list principle*

1

(c) respiration

*apply list principle*

1

**[5]**

**M5.** (a) **A** sperm

1

**B** egg

1

**C** fertilised egg

1

**D** embryo

1

(b) insert into mother

*ignore fertilise / check fertilisation / check viability*

1

womb / uterus

1

(c) (i) one quarter

1

(ii) no / little chance of success over 42

1

reference to table of only two women in the age bracket 40-42 years became pregnant

*the statement 'only 2 out of 53 40-42 year old women became pregnant / had babies' gains **2** marks*

1

(iii) so fewer twins / multiple births
**or**
multiple births more dangerous

1

**[10]**

**M6.** (a) (i) A = nucleus

1

B = (cell) membrane

1

(ii) any **two** from:

*ignore shape*

- no (cell) wall
- no (large / permanent) vacuole
- no chloroplasts / chlorophyll

2

(b) because high to low oxygen / concentration **or** down gradient

*allow 'more / a lot of oxygen molecules <u>outside</u>'*

*ignore along / across gradient*

1

(c) a tissue

1

**[6]**

**M7.** (a) (i) the three features correctly labelled on cheek cell (which are referred to in part (ii)

*label lines should touch or end very close to part no marks if leaf cell labelled*

nucleus

cytoplasm

cell membrane

mitochondrion

*accept mitochondria or one of these could be labelled vacuole*

**3**

(ii) any **three** from

| **feature** | **function** |
|---|---|
| nucleus | controls cell |

*accept contains genetic material **or** genes **or** chromosomes **or** stores information*
*do not credit the brain of the cell*

| | |
|---|---|
| cytoplasm | where respiration occurs |

*accept contains food **or** mitochondria*

**or** reactions occurs

| | |
|---|---|
| membrane | less water **or** chemicals |

*accept surrounds the cell or lets some things in but not others*
*do not credit keeps things out **or** protection*

in and **or** out

| | |
|---|---|
| mitochondria | where energy released |

*ecf from leaf cell labelling*
*accept chloroplasts make sugar **or** glucose*
*accept vacuole contains sap*
*accept if cell wall mis labelled on cheek cell, support **or** hold together*

**3**

(b) fight **or** ingest **or** kill bacteria **or**
germs **or** viruses **or** microbes

*accept produce antitoxins or antibodies fight disease (organisms)*
*do not credit fungus*

**1**

(transport) oxygen **or** carry
haemoglobin

*accept transport carbon dioxide **or** helps form scabs*

**1**

**[8]**

**M8.** (a) (i) amino acid(s)

*accept peptide(s)*
*do **not** allow polypeptide(s)*

**1**

(ii) protease

**1**

(b) (i) 2

**1**

(ii) repeat

*do not allow other enzyme / substrate*

**1**

using smaller pH intervals between pH1 and pH3

*allow smaller intervals on both sides of / around pH2*
*allow smaller intervals on both sides of / around answer to (b)(i)*

**1**

(iii) <u>enzyme / pepsin</u> denatured / shape changed

*do **not** allow enzyme killed*
*allow enzyme 'destroyed'*

**1**

<u>enzyme / pepsin</u> no longer fits (substrate)

*allow enzyme / pepsin does not work*

**1**

(c) hydrochloric (acid)

*allow phonetic spelling*
*accept HCl*
*allow HCL*
*ignore hcl*
*do **not** allow incorrect formula –e.g. $H_2Cl$ / $HCl_2$*

**1**

**[8]**

**M9.** (a) 6 6 6

*all required*

*accept a 'n 6 n n 6n' version of the balanced equation provided it is correct in every detail*

**1**

(b) any **two** of

- (presence of) chlorophyll **or** (amount of) chloroplasts

  *accept green leaves (or other green parts)*

- (sufficient) light (intensity)

- (light) of **a** suitable wavelength

  *any light other than green light*

  *do not credit Sun's energy or sunshine or Sun*

**2**

(c) **guard cells**

any **two** of

* control by osmosis
* the movement of gases

  *accept movement of carbon dioxide **or** oxygen **or** water vapour*
  *beware movement of $CO_2$ out*

  *accept a diagram or description*

* through the stoma

**2**

**palisade cells**

any **two** of

* near the upper surface
* contain (a great) many **or** more chloroplasts
* (so) contain the most chlorophyll

**2**

(d) any three of

* for respiration
* conversion to (insoluble) starch

**or** to food store **or** to (other)carbohydrates
* (conversion to) sucrose **or** to food store **or** to (other) carbohydrates

**or** polysaccharides

*do not credit just to grow **or** live*
***or** survive*
*accept conversion to food store*
***or** to (other) carbohydrates once only*

* (conversion to) lipids **or** fats **or** oils
* (conversion to) amino acids **or** (plant) proteins **or** auxins **or** (plant) hormones **or** enzymes

**3**

**[10]**

**M10.** (a) xylem **and** phloem

*either order*
*allow words ringed in box*
*allow mis-spelling if unambiguous*

**1**

(b) (i) movement / spreading out of particles / molecules / ions / atoms

*ignore names of substances / 'gases'*

**1**

from high to low concentration

*accept down concentration gradient*
*ignore 'along' / 'across' gradient*
*ignore 'with' gradient*

**1**

(ii) oxygen / water (vapour)

*allow $O_2$ / O2*

*ignore $O^2$/ O*
*allow $H_2O$ / H2O*

*ignore $H^2O$*

**1**

**[4]**

**M11.** cytoplasm reject protoplasm
(cell) membrane
nucleus

*all correctly labelled*
*each for 1 mark*

**[3]**

**M12.** (a) (cell) wall
(cell) membrane
cytoplasm
vacuole

*for 1 mark each*

**4**

(b) (i) A

(ii) B

*for 1 mark each*

**2**

(c) diffusion (*reject* osmosis)

*for 1 mark*

**1**

**[7]**