

## Principles of Organisation

**These practice questions can be used by students and teachers and is suitable for GCSE AQA Biology topic Questions 8641**

**Level: GCSE AQA Biology 8641**

**Subject: Biology**

**Exam board: GCSE AQA**

**Topic: Principles of Organisation**

**Q1.**

Plants are made up of cells, tissues and organs.

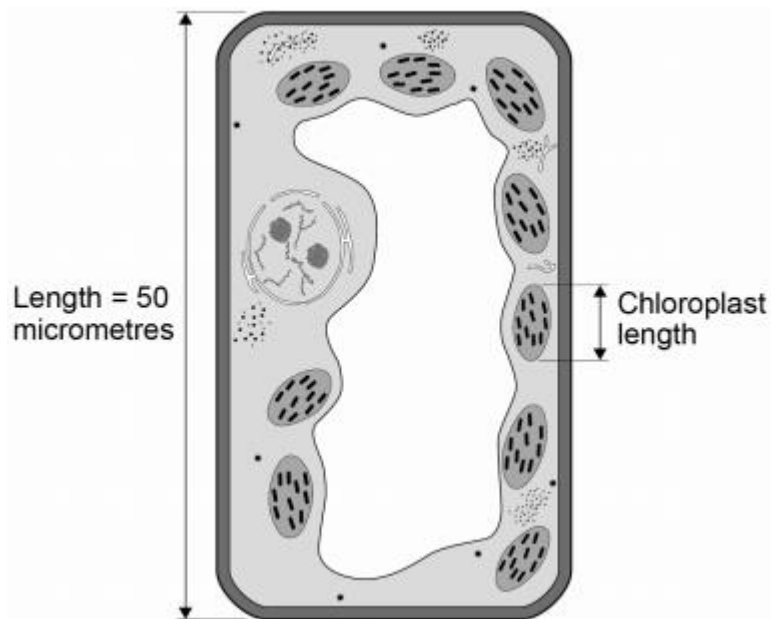
(a) Draw **one** line from each level of organisation to the correct plant part.

Level of organisation	Plant part
Organ	Leaf
Tissue	Root hair
	Spongy mesophyll
	Vacuole
	Xylem

(2)

**Figure 1** shows a plant cell drawn to scale.

**Figure 1**



(b) Where in a plant would the cell in **Figure 1** be found?

Tick **one** box.

Epidermis

Palisade mesophyll



Phloem

Xylem

(1)

(c) Calculate the length of the chloroplast labelled in **Figure 1**.

---

---

---

---

Length = \_\_\_\_\_ micrometres

(2)

(d) Cells in plant roots do **not** photosynthesise.

Give **one** reason why.

---

---

(1)

(e) As a plant grows, new root hair cells are formed from unspecialised cells.

How does an unspecialised cell become a new root hair cell?

Tick **one** box.

Differentiation

Metabolism

Transpiration

Transport

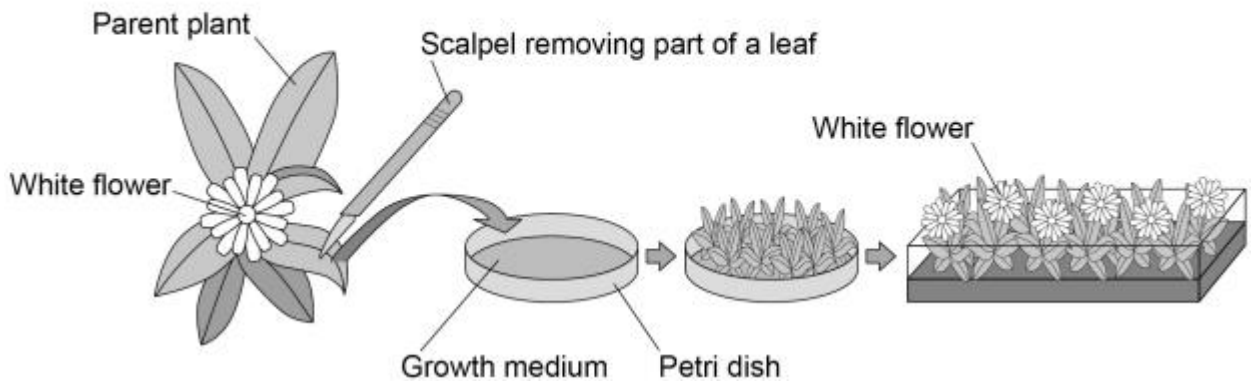
(1)

Scientists can clone plants using tissue culture.

**Figure 2** shows the process of tissue culture.



Figure 2



(f) Why might scientists want to clone plants?

Tick **one** box.

To create new species of plants.

To introduce variation into plants.

To protect endangered plants from extinction.

To reduce disease resistance in plants.

(1)

(g) What is the advantage of cloning plants using tissue culture?

Tick **one** box.

No special equipment is needed.

Plants can be produced quickly.

The flowers are all different colours.

The offspring are all genetically different.

(1)

(h) The growth medium in **Figure 2** helps the plants to grow.

Name **one** substance in the growth medium.

(1)  
(Total 10 marks)

**Q2.**

The circulatory system is composed of the blood, blood vessels and the heart.

- (a) Urea is transported in the blood plasma.

Name **two** other substances transported in the blood plasma.

1. \_\_\_\_\_

2. \_\_\_\_\_

(2)

- (b) Some athletes train at high altitude.

Training at high altitude increases the number of red blood cells per cm<sup>3</sup> of blood.

Explain why having more red blood cells per cm<sup>3</sup> of blood is an advantage to an athlete.

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

(3)

- (c) Which **two** blood vessels carry deoxygenated blood?

Tick **two** boxes.

Aorta

Coronary artery

Pulmonary artery

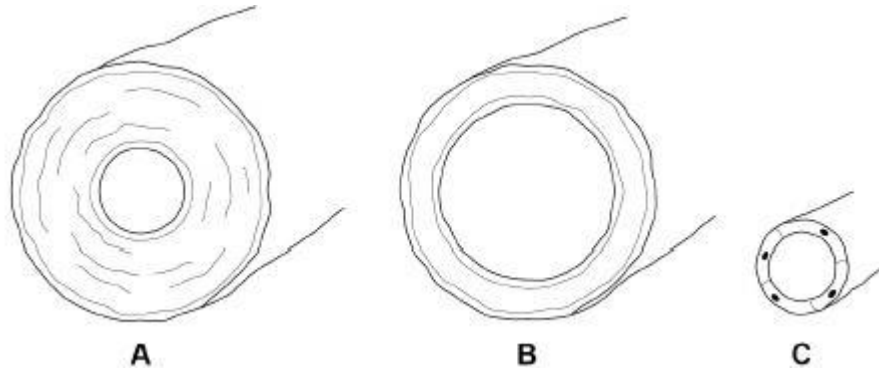
Pulmonary vein

Vena cava

(2)

**Figure 1** shows the three types of blood vessel.

**Figure 1**



(d) Which type of blood vessel carries blood into the right atrium?

Tick **one** box.

A		B		C	
---	--	---	--	---	--

(1)

(e) Compare the structure of an artery with the structure of a vein.

---

---

---

---

---

---

---

---

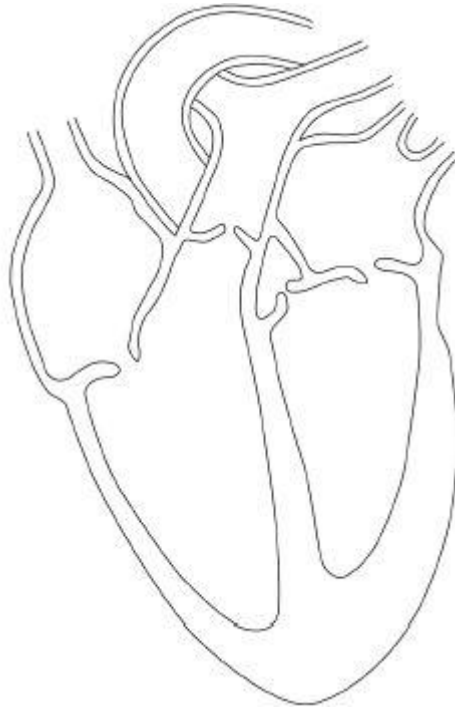
(3)

(f) Heart rate is controlled by a group of cells. This group of cells act as a pacemaker.

**Figure 2** shows a section through the heart.

Draw an **X** on **Figure 2** to show the position of the pacemaker.

**Figure 2**



(1)

(g) A patient may be fitted with an artificial pacemaker.

What condition may be treated using an artificial pacemaker?

---

---

(1)

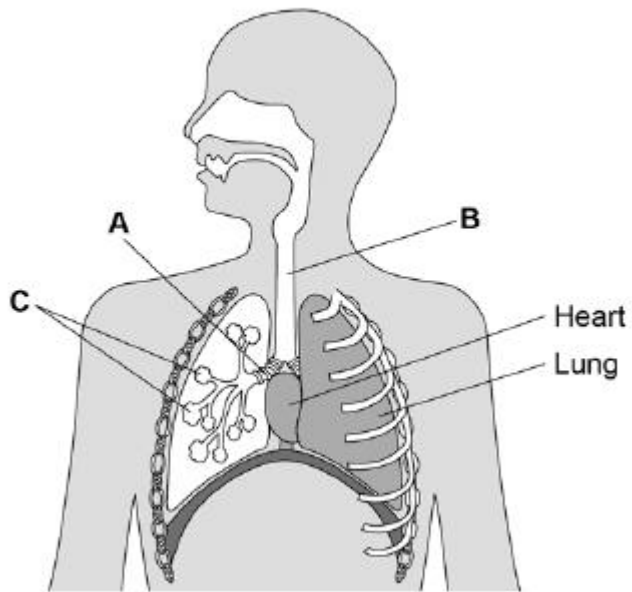
(Total 13 marks)

**Q3.**

Animals and plants contain organs and tissues.

**Figure 1** shows some organs in the human thorax.

Figure 1



(a) Name parts **A**, **B** and **C**.

**A** \_\_\_\_\_

**B** \_\_\_\_\_

**C** \_\_\_\_\_

(3)

(b) Which organ system is the heart part of?

Tick **one** box.

Breathing system

Circulatory system

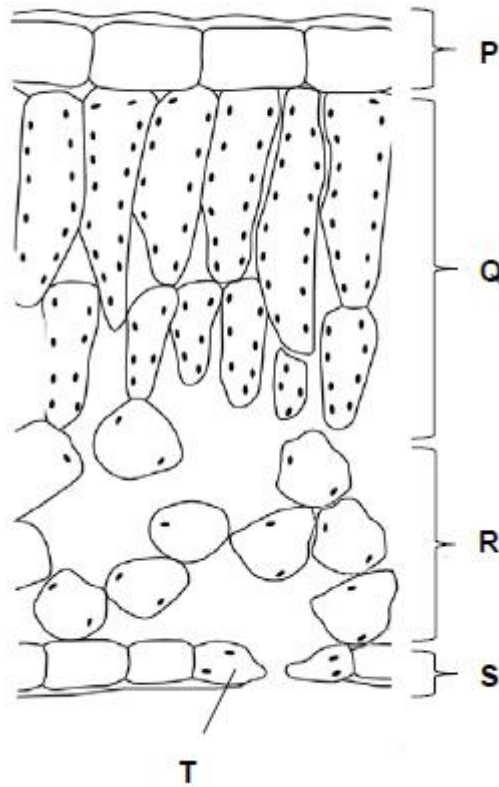
Digestive system

Excretory system

(1)

Figure 2 shows a cross section of a leaf.

**Figure 2**



(c) In which part of the leaf does most photosynthesis take place?

Tick **one** box.

P       Q       R       S

(1)

(d) What is part T?

Tick **one** box.

Guard cell   
 Phloem   
 Stoma   
 Xylem

(1)

(e) A leaf is an organ made of tissues.

What is a tissue?

---

---

(1)

(f) Draw **one** line from each tissue to its function.

Tissue	Function
Epidermis	Allows diffusion of gases through the leaf
Phloem	Allows light through to the photosynthesising parts of the leaf
Spongy mesophyll	Allows water into the leaf
	Transport sugars around the plant
	Transports water around the plant

(3)

(Total 10 marks)

**Q4.**

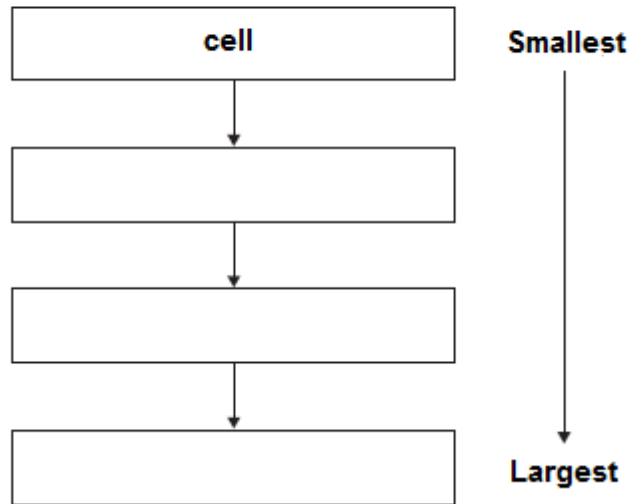
The human body is organised to carry out many different functions.

(a) Use words from the box to complete **Figure 1** by putting the parts of the body in order of size from smallest to largest.

The smallest one has been done for you.



**Figure 1**



(2)

(b) The stomach is made of different types of tissue.

Draw **one** line from each type of stomach tissue to the correct description.

<div style="border: 1px solid black; padding: 5px; margin-bottom: 10px; text-align: center;">Epithelial tissue</div> <div style="border: 1px solid black; padding: 5px; margin-bottom: 10px; text-align: center;">Glandular tissue</div> <div style="border: 1px solid black; padding: 5px; text-align: center;">Muscular tissue</div>	<div style="border: 1px solid black; padding: 5px; margin-bottom: 10px; text-align: center;">Allows food to be churned around the stomach</div> <div style="border: 1px solid black; padding: 5px; margin-bottom: 10px; text-align: center;">Covers the outside and the inside of the stomach</div> <div style="border: 1px solid black; padding: 5px; margin-bottom: 10px; text-align: center;">Produces digestive juices</div> <div style="border: 1px solid black; padding: 5px; text-align: center;">Coordinates nerve impulses</div>
--	---

(3)

(c) Animals can react to their surroundings because they have nervous systems.

A student investigated the behaviour of small animals called woodlice.

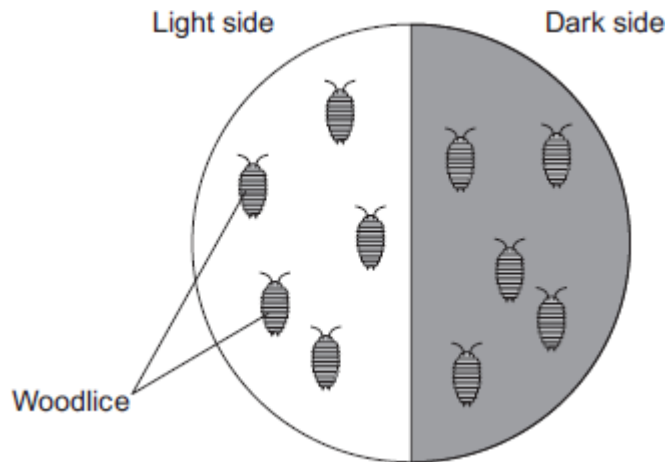
The student set up the investigation as shown in **Figure 2**.

- The student covered one half of a Petri dish with black paper to make that side of the Petri dish dark.
- The other side had no cover.



- The student put five woodlice into each side of the dish and then put the clear Petri dish lid back on the dish.

Figure 2



After 30 minutes, all the woodlice had moved to the dark side of the Petri dish.

- (i) In this investigation, what is the **stimulus** that the woodlice responded to?

\_\_\_\_\_ (1)

- (ii) In this investigation, what is the **response** that the woodlice made?

\_\_\_\_\_ (1)

- (iii) The student concluded that woodlice prefer dark conditions.

Give **two** ways in which the student could improve the investigation to be sure that his conclusion was correct.

1. \_\_\_\_\_

\_\_\_\_\_

2. \_\_\_\_\_

\_\_\_\_\_

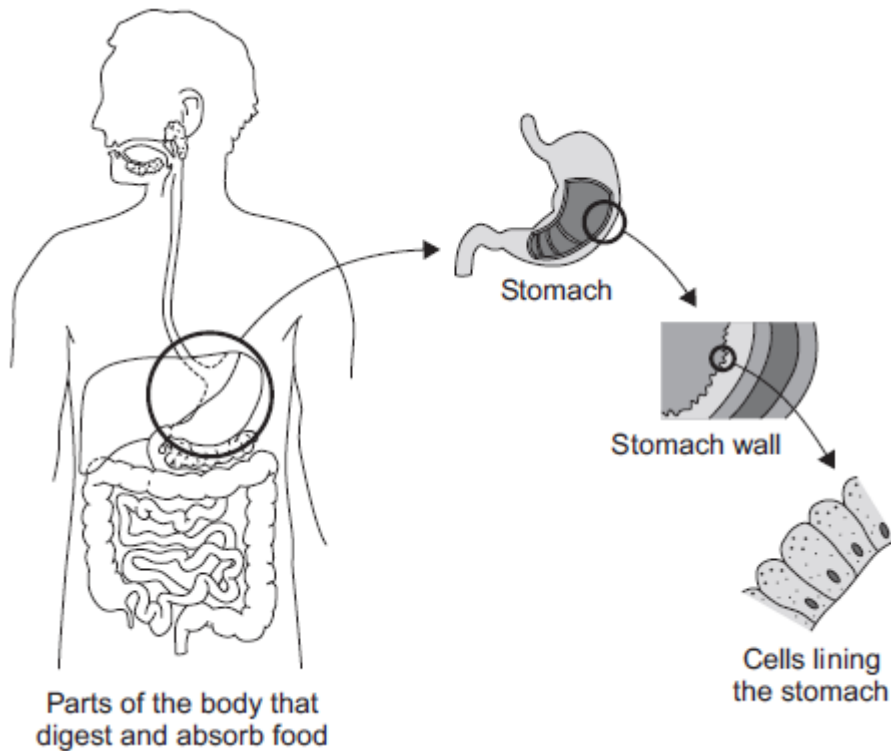
(2)

(Total 9 marks)

### Q5.

The diagram below shows the parts of the body that digest and absorb food.

It also shows some details about the structure of the stomach.



- (a) Complete the table to show whether each structure is an organ, an organ system or a tissue.

For each structure, tick (✓) **one** box.

Structure	Organ	Organ system	Tissue
Stomach			
Cells lining the stomach			
Mouth, oesophagus, stomach, liver, pancreas, small and large intestine			

(2)

- (b) (i) The blood going to the stomach has a high concentration of oxygen. The cells lining the stomach have a low concentration of oxygen.

Complete the following sentence.

Oxygen moves from the blood to the cells lining the stomach by

the process of \_\_\_\_\_.

(1)

- (ii) What other substance must move from the blood to the cells lining the stomach so that respiration can take place?

Draw a ring around the correct answer.

**glucose**      **protein**      **starch**

For more help, please our website [www.exampaperspractice.co.uk](http://www.exampaperspractice.co.uk)

(1)

(iii) In which part of a cell does aerobic respiration take place?

Draw a ring around the correct answer.

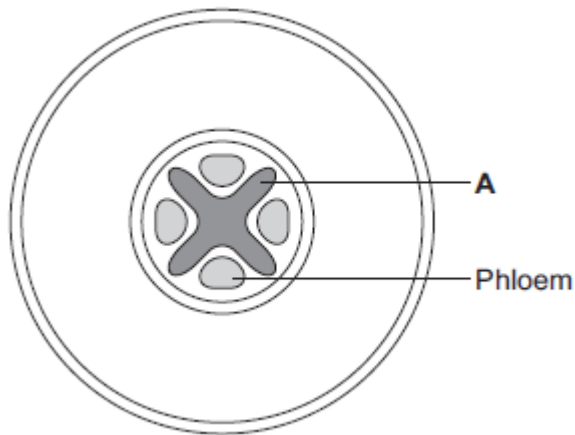
**cell membrane      mitochondria      nucleus**

(1)

(Total 5 marks)

**Q6.**

The diagram below shows a cross-section of a plant root. The transport tissues are labelled.



(a) (i) What is tissue **A**?

Draw a ring around the correct answer.

**cuticle      epidermis      xylem**

(1)

(ii) Name **two** substances transported by tissue **A**.

1. \_\_\_\_\_

2. \_\_\_\_\_

(2)

(b) Phloem is involved in a process called translocation.

(i) What is translocation?

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

(1)

(ii) Explain why translocation is important to plants.

---

---

---

---

(2)

(c) Plants must use active transport to move some substances from the soil into root hair cells.

(i) Active transport needs energy.

Which part of the cell releases most of this energy?

Tick (✓) **one** box.

mitochondria	<input type="checkbox"/>
nucleus	<input type="checkbox"/>
ribosome	<input type="checkbox"/>

(1)

(ii) Explain why active transport is necessary in root hair cells.

---

---

---

---

---

---

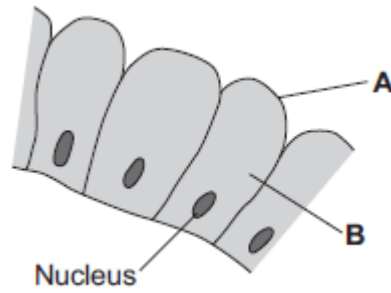
---

(2)

(Total 9 marks)

**Q7.**

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

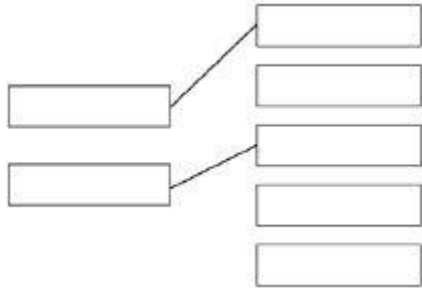
A tissue

(3)  
(Total 6 marks)

Mark schemes

**Q1.**

(a)



*additional line from a level of organisation  
negates the mark for that level of organisation*

2

(b) palisade mesophyll

1

(c)  $\frac{50}{8}$

1

6 / 6.25 / 6.3 (micrometres)

1

*an answer of 6 / 6.25 / 6.3 scores 2 marks*

(d) they have no chloroplasts / chlorophyll

*allow they are underground*

*allow they don't get (access to) light*

*allow (because) photosynthesis needs light*

*allow they can't absorb light*

*ignore 'sun'*

*ignore 'it is dark'*

1

(e) differentiation

1

(f) to protect endangered plants from extinction

1

(g) plants can be produced quickly

1

(h) any **one** from:

- glucose / sugars / starch
- amino acids / protein
- hormones

*allow named hormones e.g. auxin*

- ions / minerals

For more help, please our website [www.exampaperspractice.co.uk](http://www.exampaperspractice.co.uk)



- *allow magnesium / nitrate*
- vitamins
- *allow named vitamins e.g. vitamin B*
- water
- *allow H<sub>2</sub>O / H2O*
- *ignore oxygen / carbon dioxide / agar / nutrients / fertiliser*

1

[10]

**Q2.**

(a) any **two** from:

- *allow proteins / hormones / antibodies / vitamins / minerals / ions / fatty acids / glycerol*
- carbon dioxide
- water
- glucose
- amino acids
- *ignore sugar / enzymes / nutrients / waste*
- lactic acid

2

(b) more haemoglobin

*max 2 marks if 'more' is not given*

1

(therefore) more oxygen can be carried / transported

1

(for) more (aerobic) respiration of muscle (cells)

**or**

more energy released for muscle (cells)

*allow less anaerobic respiration / lactic acid / oxygen debt / fatigue in muscle (cells)  
i.e. addition of 'debt'  
do **not** accept energy produced*

1

(c) pulmonary artery

1

vena cava

1

(d) B

1

(e) any **three** from:

- arteries have a **thicker** layer of muscle (tissue) **or** veins have a thinner layer of muscle (tissue)\*
- arteries have a **thicker** layer of elastic tissue **or** veins have a thinner layer of elastic tissue\*

For more help, please our website [www.exampaperspractice.co.uk](http://www.exampaperspractice.co.uk)



*\*if neither marking points 1 or 2 awarded, allow arteries have a thick wall **and** veins have a thin wall*

**or**

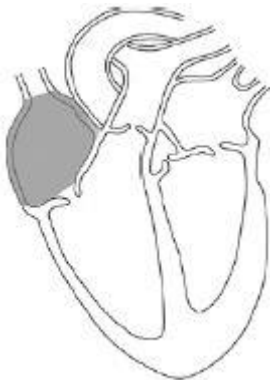
*arteries have a thicker wall or veins have a thinner wall for 1 mark*

*do **not** accept 'cell wall'*

- arteries have a narrower lumen **or** veins have a wider lumen  
*allow descriptions of 'lumen'*
- arteries do not have valves **and** veins have valves  
*allow **only** veins have valves*

3

(f) allow an X drawn anywhere in grey shaded area below:



*if a large X is drawn, award the mark if the intersection touches the grey area*

*if a label line is used, award marks if the end of the label line touches the grey area*

*allow label 'pacemaker'*

*ignore label 'right atrium'*

1

(g) an irregular heart beat

*allow arrhythmia*

*allow fibrillation*

*ignore heart failure*

*do **not** accept cardiovascular disease / heart murmur*

1

[13]

### Q3.

(a) (A) bronchus

*allow bronchi*

*allow bronchiole*

1

(B) trachea  
*allow windpipe* 1

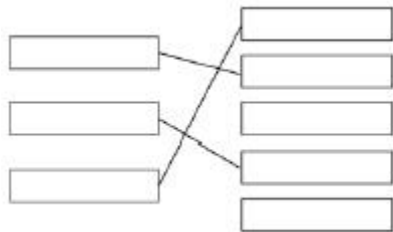
(C) alveolus  
*allow alveoli*  
*ignore air sac* 1

(b) circulatory system 1

(c) **Q** 1

(d) guard cell 1

(e) a group of cells with a similar structure / function 1



(f) *1 mark for each correct line*  
*extra line from a tissue negates the mark for that tissue* 3

[10]

**Q4.**

(a) tissue → organ → organ system  
*one right for 1 mark*  
*three right for 2 marks* 2

(b) **Epithelial tissue** → covers the outside and the inside of the stomach  
*more than one line from a tissue = no mark* 1

**Glandular tissue** → produces digestive juices 1

**Muscular tissue** → allows food to be churned around the stomach 1

(c) (i) light  
*ignore dark* 1



(ii) moving (to the dark)

1

(iii) any **two** from:

- use more woodlice
- repeat the experiment
- run for a longer time

2

[9]

**Q5.**

(a)

Structure	Organ	Organ system	Tissue
Stomach	✓		
Cells lining the stomach			✓
Mouth, oesophagus, stomach, liver, pancreas, small and large intestine		✓	

all 3 correct = 2 marks  
 2 correct = 1 mark  
 1 or 0 correct = 0 marks

2

(b) (i) diffusion  
*allow phonetic spelling*

1

(ii) glucose

1

(iii) mitochondria

1

[5]

**Q6.**

(a) (i) xylem

1

(ii) water

1

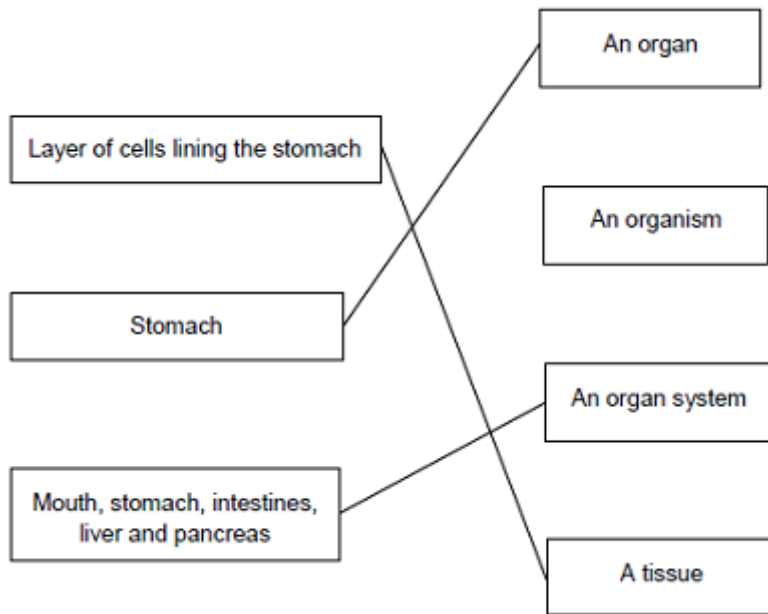
minerals / ions / named example(s)  
*ignore nutrients*

1

For more help, please our website [www.exampaperspractice.co.uk](http://www.exampaperspractice.co.uk)



- (b) (i) movement of (dissolved) sugar  
*allow additional substances, eg amino acids / correct named sugar (allow sucrose / glucose)*  
*allow nutrients / substances / food molecules if sufficiently qualified*  
*ignore food alone* 1
- (ii) sugars are made in the leaves 1
- so they need to be moved to other parts of the plant for respiration / growth / storage 1
- (c) (i) mitochondria 1
- (ii) for movement of minerals / ions  
*Do not accept 'water'* 1
- against their concentration gradient 1
- [9]
- Q7.**
- (a) (i) A = (cell) membrane 1
- B = cytoplasm  
*do not accept cytoplasm* 1
- (ii) To control the activities of the cell 1
- (b)



*extra lines cancel*