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**Level: IGCSE Oxford AQA Biology (9201)**
**Subject: Biology**
**Topic: IGCSE AQA Biology**
**Type: Topic Question**


To be used by all students preparing for IGCSE Oxford AQA Biology (9201)
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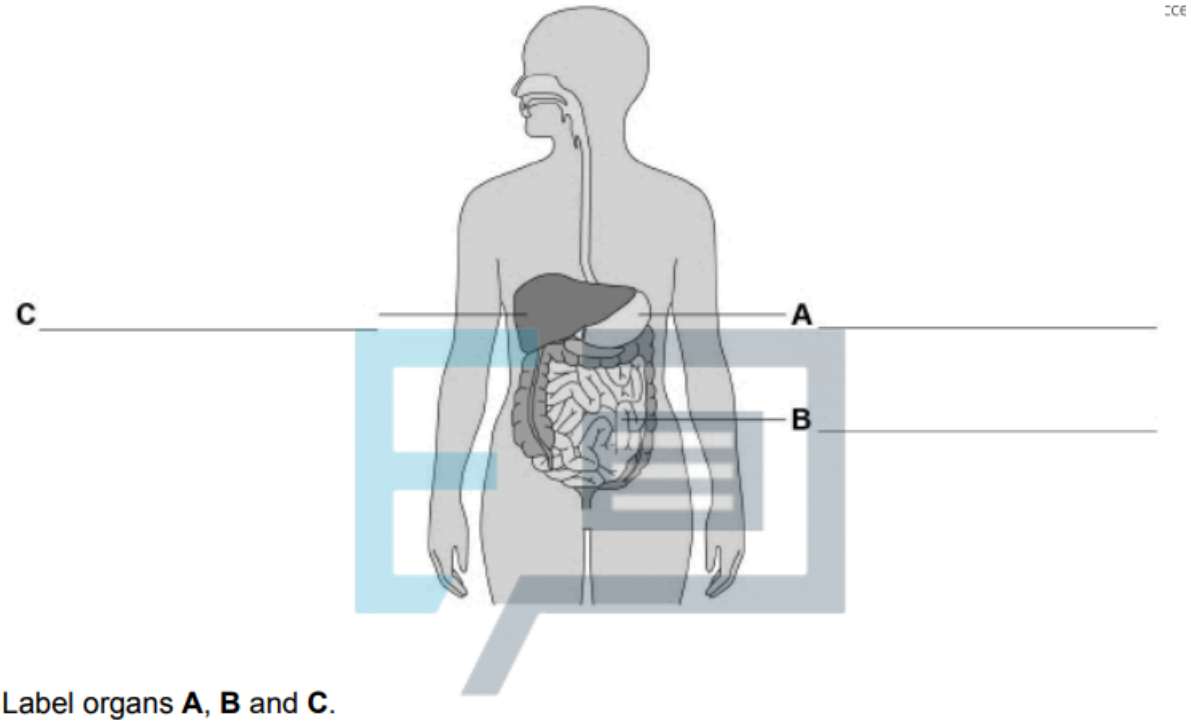
**Biology** **IGCSE AQA**

## Key skills

**1.** The diagram below shows the human digestive system.




(a) Label organs **A**, **B** and **C**. **(3)**



(b) Complete the sentences.

Choose the answers from the box.

| | | | |
|---|---|---|---|
| **catalyse** | **denatured** | **digest** | **energise** |
| **excreted** | **ingested** | **insoluble** | **soluble** |

Digestion is the process of breaking down large food molecules into smaller molecules that are _____ .

Enzymes help to break down food because they _____ chemical reactions.

If the temperature of an enzyme gets too high, the enzyme is _____ .

**(3)**

(c) Protease is an enzyme.

Protease breaks down protein.

What is protein broken down into?

Tick **one** box.

- Amino acids ☐
- Fatty acids ☐
- Glucose ☐
- Glycerol ☐



**(1)**

(d) Why is protein needed by the body?

_____

_____

**(1)**

(e) Which organ in the human digestive system produces protease?

Tick **one** box.

- Gall bladder ☐
- Large intestine ☐
- Liver ☐
- Stomach ☐

**(1)**

(f) Describe how you would test a sample of food to show it contains protein.

Give the reason for any safety precautions you would take.

**(4)**

(g) Complete the sentence.

Choose the answer from the box.

| fat | fibre | minerals | vitamins |
|---|---|---|---|

Obesity can be caused by a diet high in _____ .

**(1)**

(h) Complete the sentence.

Choose the answer from the box.

| skin cancer | type 1 diabetes | type 2 diabetes |
|---|---|---|

Obesity is a risk factor for _____ .

**(1)**

**(Total 15 marks)**



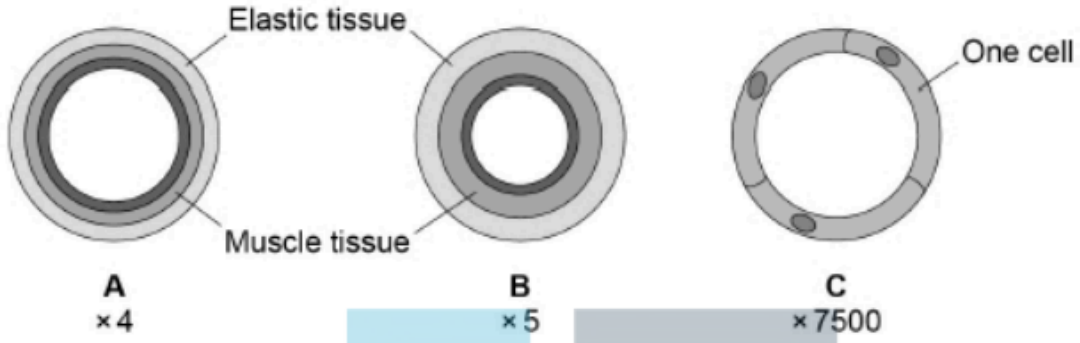
**2.** This question is about the circulatory system.

(a) Draw **one** line from each blood component to its function.

| Blood Component | Function |
| --- | --- |
| | Destroys microorganisms |
| Platelet | Helps the blood to clot |
| Red blood cell | Transports glucose around the body |
| White blood cell | Transports oxygen around the body |
| | Transports urea |

**(3)**

(b) The diagram below shows cross sections of the three main types of blood vessel found in the human body. Each blood vessel is drawn to the scale shown.




Which blood vessel has the smallest diameter?

Tick **one** box.

A ☐ B ☐ C ☐

**(1)**



(c) Which blood vessel in the figure above is an artery?

Give **one** reason for your answer.

Blood vessel: _____

Reason: _____

_____

**(2)**

**Table 1** gives information about the blood flow in two people.

**Table 1**

| **Person** | **Blood flow through the coronary arteries in $cm^3$ / minute** |
|---|---|
| **A** – does **not** have coronary heart disease | 250 |
| **B** – has coronary heart disease | 155 |

(d) Calculate the difference in blood flow between person **A** and person **B**.

_____

_____

Difference = _____ $cm^3$ / minute

**(1)**

(e) Suggest why blood flow through the coronary arteries is lower in people with coronary heart disease.

_____

_____

(f) Calculate the volume of blood flowing through the coronary arteries of person **A** in 1 hour.

Give your answer in $dm^3$.

_____

_____

_____

_____

_____

Volume of blood in 1 hour = _____ $dm^3$

**(2)**

Coronary heart disease can be treated by:

- inserting a stent
- using a Coronary Artery Bypass Graft (CABG).

**Table 2** gives information about each method.

**Table 2**

| | Stent | CABG |
|---|---|---|
| **Procedure** | The patient is awake during the procedure.<br>A small cut is made in the skin.<br>A wire mesh is inserted into the coronary artery via a blood vessel in the arm or leg. | The patient is not awake during the procedure.<br>The chest is cut open.<br>A section of blood vessel from the arm or leg is removed. It is used to create a new channel for blood to bypass the blockage in the coronary artery. |
| **When procedure is recommended** | When only one blockage is present | When multiple blockages are present |
| **Time spent in hospital after procedure** | 2-3 hours | at least 7 days |
| **Recovery time after procedure** | 7 days | 12 weeks |
| **Risk of heart attack during procedure** | 1% | 2% |
| **Chance of failure within one year** | 40% | 5% |

(g) Give **two** advantages of using a stent instead of CABG.

1. _____

_____

2. _____

_____

**(2)**

(h) Give **two** advantages of using CABG instead of a stent.

1. _____

_____

2. _____

_____

**(2)**

**(Total 14 marks)**

**3.** The heart pumps blood to the lungs and to the cells of the body.

(a) Name the blood vessel that transports blood from the body to the right atrium.

_____

**(1)**

(b) The aorta transports blood from the heart to the body.

In a person at rest:

- blood travels at a mean speed of 10 cm/s in the aorta
- blood travels at a mean speed of 0.5 mm/s in the capillaries
- the speed of blood decreases at a rate of 0.4 $cm/s^2$ as blood travels from the aorta to the capillaries.

Calculate the time it takes for blood to travel from the aorta to the capillaries.

Assume that the speed of blood decreases at a constant rate.

Use the equation:

$$\text{rate of decrease in speed} = \frac{\text{change in speed}}{\text{time}}$$

Give your answer to 2 significant figures.



Time = _____ s

**(4)**

(c) Describe the route taken by oxygenated blood from the lungs to the body cells.

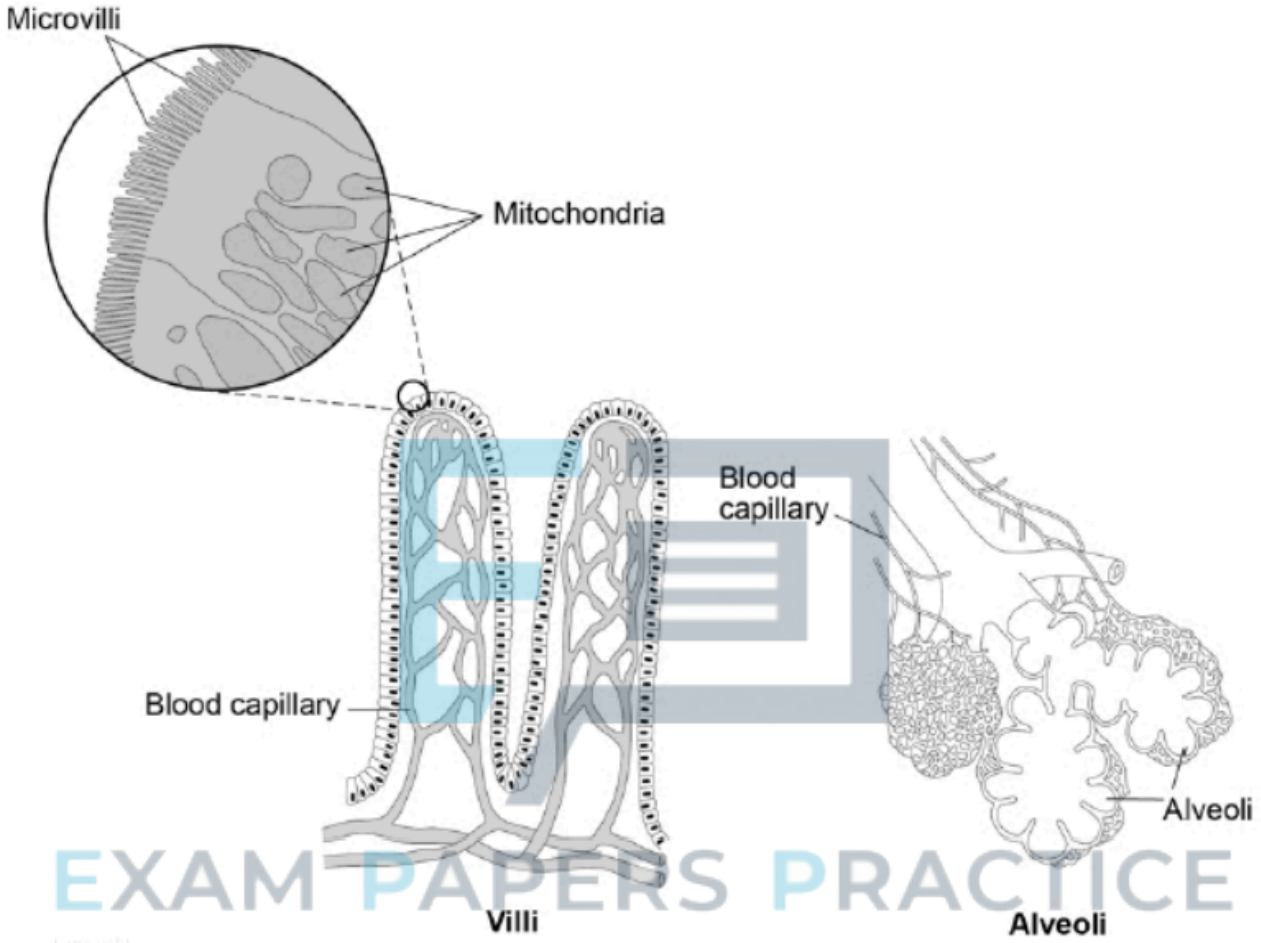
**(4)**



(d) The digestive system and the breathing system both contain specialised exchange surfaces.

- In the digestive system, digested food is absorbed into the blood stream in structures called villi.
- In the breathing system, gases are absorbed into the blood stream in the alveoli.

The diagram below shows the structure of villi and alveoli.






Explain how the villi and the alveoli are adapted to absorb molecules into the bloodstream.

**(6)**

**(Total 15 marks)**

**4.** Amylase is an enzyme found in the human body.

Amylase breaks down starch into sugars.

(a) Where is amylase produced in the human body?

Tick **one** box.

- Liver and pancreas ☐
- Liver and stomach ☐
- Salivary glands and pancreas ☐
- Salivary glands and stomach ☐

**(1)**

(b) Enzymes speed up chemical reactions.

Explain how amylase breaks down starch.

_____

_____

_____

_____

_____

_____

**(3)**

(c) One sugar in the body is glucose.

Glucose is used for respiration.

Give **one** other use for glucose in the body.

_____

**(1)**



(d) A student investigated the effect of temperature on the activity of human amylase.

This is the method used.

1. Put 2 $cm^3$ of 1% starch solution into a boiling tube.
2. Put 2 $cm^3$ of amylase solution into a second boiling tube.
3. Put both boiling tubes into a water bath at 20 °C.
4. After 5 minutes, mix the amylase and the starch together in one boiling tube.
5. After 30 seconds, add a drop of the starch and amylase mixture to a drop of iodine solution in one well of a spotting tile.
6. Repeat step 5 until the iodine solution no longer changes colour.
7. Repeat steps 1 – 6 at 40 °C and at 60 °C and at 80 °C

Why did the student leave the starch and amylase solutions in the water bath for 5 minutes in step **3**?

_____

_____

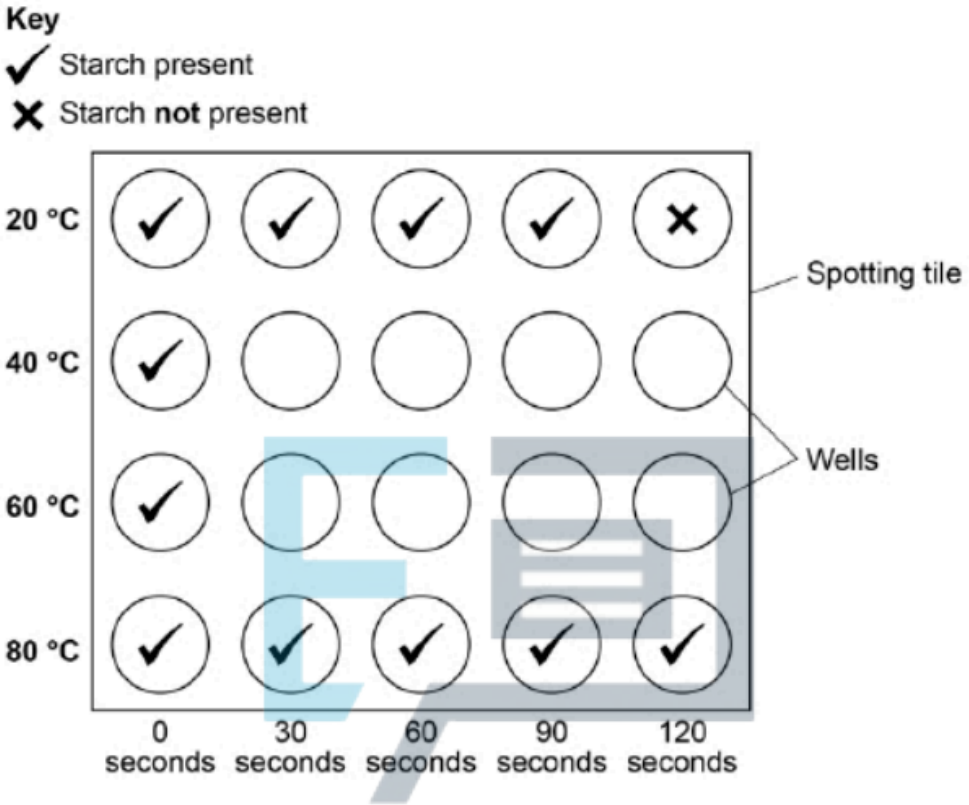
**(1)**

(e) The temperature of the human body is 37 °C

The diagram below shows the results of the investigation at 20 °C and at 80 °C

Complete the diagram to show the results you would expect at 40 °C and at 60 °C

You should write a tick or a cross in each well of the spotting tile.






**(2)**

(f) There are different ways to investigate the breakdown of starch by amylase.

One other method is to measure the **concentration** of starch present in the solution every 30 seconds.

Why is this method better than the method the student used?

_____

_____

_____

_____

**(2)**

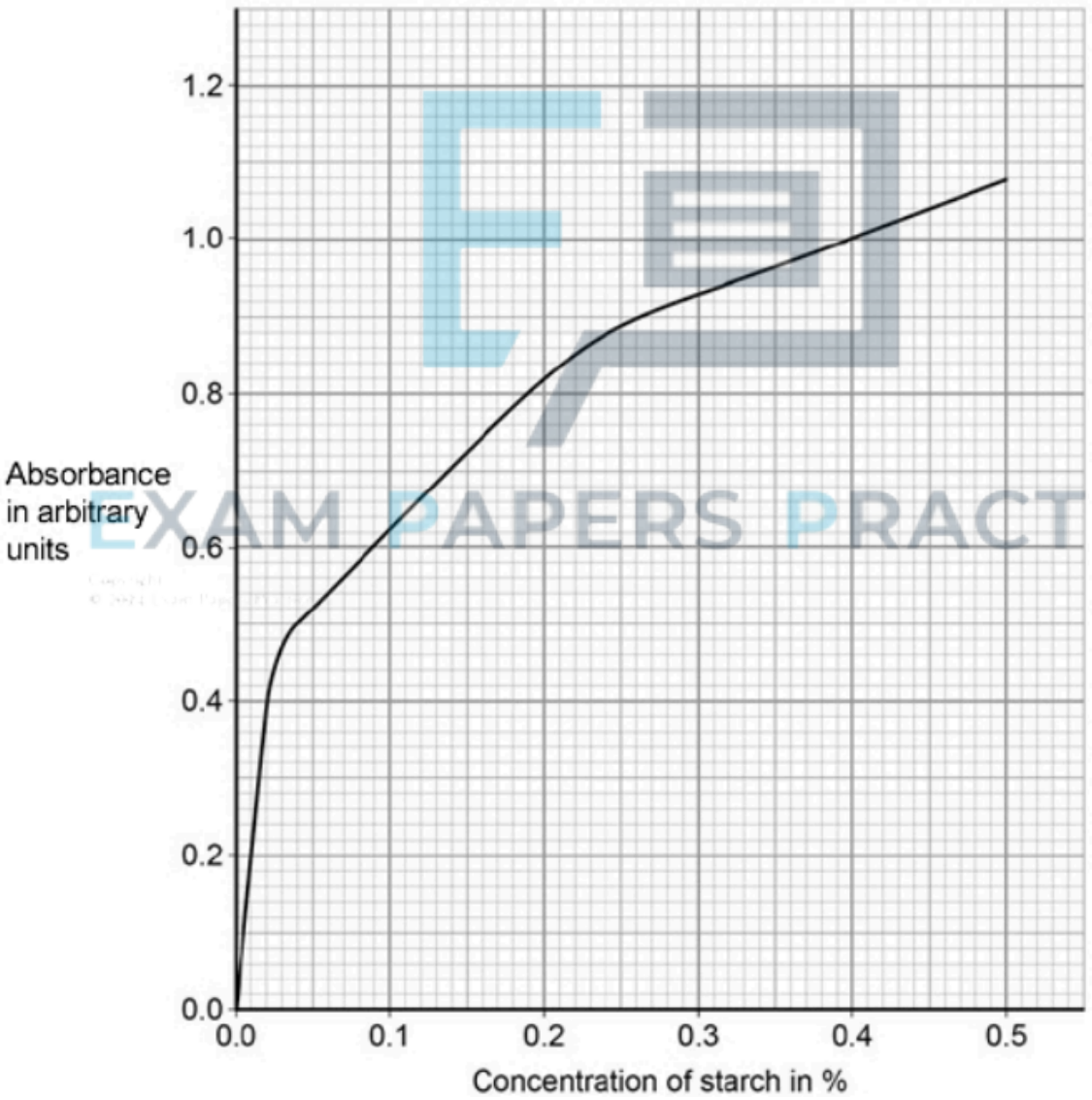
A colorimeter can be used to measure the concentration of starch present in

the solution every 30 seconds.

A colorimeter measures the amount of light that cannot pass through a solution.

This is known as absorbance.

Below shows a graph of absorbance against concentration of starch.



(g) The absorbance of the solution at 40 °C was 0.56 arbitrary units after 30 seconds.

What was the concentration of starch in this solution?

_____

Concentration of starch = _____ %

**(1)**

(h) The concentration of starch in the solution at 20 °C after 1 minute is different from the concentration at 40 °C after 1 minute.

Explain why.

_____

_____

_____

_____

**(2)**

(i) Predict the absorbance for the solution at 80 °C after 30 seconds.

Give a reason for your answer.

Absorbance = _____ arbitrary units

Reason _____

_____

_____

_____

**(3)**

**(Total 16 marks)**